Operations and Maintenance Facility South

Final Environmental Impact Statement – Executive Summary

SOUND TRANSIT
140A
154B
Link

Federal Transit Administration

SOUNDTRANSIT

June 2024

SOUNDTRANSIT

June 7, 2024

Dear Recipient:

The U.S. Department of Transportation Federal Transit Administration (FTA) and Sound Transit (the Central Puget Sound Regional Transit Authority) have prepared this Final Environmental Impact Statement (EIS) on the proposed Operations and Maintenance Facility (OMF) South project. The OMF South would receive, test, commission, store, maintain, and deploy light rail vehicles as part of Sound Transit's Link light rail system expansion. FTA is the National Environmental Policy Act (NEPA) lead agency. Sound Transit is the project proponent and State Environmental Policy Act (SEPA) lead agency.

FTA and Sound Transit prepared this Final EIS pursuant to NEPA (42 United States Code 4321 et seq.) and SEPA (Chapter 43.21C Revised Code of Washington) to inform the public, agencies, and decision makers about the potential environmental impacts and benefits of building and operating the OMF South in the city of Kent or Federal Way, Washington.

The major choice for the project involves the location of a light rail OMF in the South corridor of the Link light rail system. The Sound Transit Board will consider the alternatives evaluated in the Final EIS, public and agency comments on the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS, and other information before selecting the project to be built. After the Sound Transit Board selects the project to be built, FTA will issue a Record of Decision, which will state FTA's decision on the project and list Sound Transit's mitigation commitments to reduce or avoid impacts.

Enclosed is an Executive Summary of the Final EIS. The full EIS and separately bound appendices and technical reports are available online at: https://www.soundtransit.org/system-expansion/operations-maintenance-facility-south/documents. Please see the Fact Sheet of this Executive Summary regarding how to obtain hard copies and who to contact for further information on the Final EIS.

Sincerely,

Erin Green

Erin Green
Environmental Manager, South Corridor

CHAIR

Dow Constantine
King County Executive

VICE CHAIRS

Kim Roscoe
Fife Mayor

Dave Somers
Snohomish County Executive

BOARD MEMBERS

Nancy Backus
Auburn Mayor

Claudia Balducci
King County Councilmember

Angela Birney
Redmond Mayor

Bruce Dammeier
Pierce County Executive

Cassie Franklin
Everett Mayor

Christine Frizzell
Lynnwood Mayor

Bruce Harrell
Seattle Mayor

Jim Kastama
Puyallup Mayor

Roger Millar
Washington State Secretary
of Transportation

Ed Prince
Renton Councilmember

Dan Strauss
Seattle Councilmember

Dave Upthegrove
King County Council Chair

Peter von Reichbauer
King County Councilmember

Kristina Walker
Tacoma Councilmember

Girmay Zahilay
King County Council Vice Chair

INTERIM
CHIEF EXECUTIVE OFFICER

Goran Sparrman

Central Puget Sound Regional Transit Authority • Union Station
401 S. Jackson St., Seattle, WA 98104-2826 • Reception: (206) 398-5000 • FAX: (206) 398-5499
www.soundtransit.org

Commitment to Accessibility

Sound Transit and the United States Department of Transportation - Federal Transit Administration are committed to ensure that information is available in appropriate alternative formats to meet the requirements of persons who have a disability. If you require an alternative version of this file, please contact FTAWebAccessibility@dot.gov.

OPERATIONS AND MAINTENANCE FACILITY SOUTH
KING COUNTY, WASHINGTON

FINAL ENVIRONMENTAL IMPACT STATEMENT

Submitted pursuant to
the National Environmental Policy Act (NEPA) (42 United States Code 4321)
and the State Environmental Policy Act (SEPA) (Ch. 43.21C Revised Code of Washington)
by the

UNITED STATES DEPARTMENT OF TRANSPORTATION FEDERAL TRANSIT ADMINISTRATION

and

CENTRAL PUGET SOUND REGIONAL TRANSIT AUTHORITY (SOUND TRANSIT)

In cooperation with

FEDERAL HIGHWAY ADMINISTRATION
UNITED STATES ARMY CORPS OF ENGINEERS
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
CITY OF FEDERAL WAY
CITY OF KENT

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2024.05.07 09:01:35 -07'00'

May 7, 2024
Date of Approval

Susan Fletcher
Regional Administrator
NEPA Responsible Official
For Federal Transit Administration, Region 10

Perry Weinberg
Perry Weinberg (May 6, 2024 11:40 PDT)

May 6, 2024
Date of Approval

Perry Weinberg
Deputy Executive Director
Office of Environmental Affairs and Sustainability
SEPA Responsible Official
For Sound Transit

Operations and Maintenance Facility South Final Environmental Impact Statement

National Environmental Policy Act (NEPA) lead agency: Federal Transit Administration

State Environmental Policy Act (SEPA) lead agency: Central Puget Sound Regional Transit Authority (Sound Transit)

Cooperating agencies: Federal Highway Administration, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington State Department of Transportation, City of Federal Way, City of Kent

Abstract: The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct and operate a Link light rail operations and maintenance facility in its South Corridor (OMF South). The facility would meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. OMF South would be used to store, maintain, and deploy about 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire Link light rail system.

This Final Environmental Impact Statement (EIS) considers three site alternatives in King County, Washington for the OMF South: two in the City of Federal Way and one in the City of Kent. These alternatives are named the South 336th Street Alternative, South 344th Street Alternative, and Midway Landfill Alternative. The Sound Transit Board of Directors identified the South 336th Street Alternative as the Preferred Alternative.

FTA and Sound Transit are issuing this Final EIS as a joint document under the National Environmental Policy Act (NEPA) (42 United States Code 4321 et seq.) and the Washington State Environmental Policy Act (SEPA) (Chapter 43.21C Revised Code of Washington). This Final EIS analyzes the OMF South project environmental effects and responds to comments received on the March 2021 SEPA Draft EIS and September 2023 NEPA Draft/SEPA Supplemental Draft EIS.

Contacts for Additional Information

Justin Zweifel, Environmental Protection Specialist
Federal Transit Administration
915 Second Avenue, Suite 3192
Seattle, Washington 98174-1002
(206) 220-7538
justin.zweifel@dot.gov

Erin Green, South Corridor Environmental Manager
Sound Transit
401 S Jackson Street
Seattle, Washington 98104
(206) 398-5464
erin.green@soundtransit.org

Sagar Ramachandra, South Corridor Capital Projects Engagement Manager
Sound Transit
401 S Jackson Street
Seattle, Washington 98104
(206) 398-5453
sagar.ramachandra@soundtransit.org

NEPA review period ends: July 8, 2024

Estimated EIS Cost
Pursuant to 40 CFR 1502.11, the estimated cost to prepare both the draft and final environmental impact statement is $118,916.

Tribal Acknowledgement

As we plan and build one of the largest transit expansions in North America, which includes the first light rail transit extensions on reservation lands in the history of the United States, we would like to acknowledge the people who have been here since time immemorial: the Puyallup Tribe of Indians, the Muckleshoot Indian Tribe, the Nisqually Indian Tribe, the Suquamish Tribe, the Squaxin Island Tribe, the Snoqualmie Indian Tribe, and the Confederated Tribes and Bands of the Yakama Nation. We would like to thank each Tribe for their partnership.

Fact Sheet

Project Title

Operations and Maintenance Facility South (OMF South)

Proposed Action

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct and operate a Link light rail operations and maintenance facility in its South Corridor (OMF South). The facility would meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy about 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire Link light rail system. OMF South would create high-skilled, living-wage jobs for more than 610 people in south King County.

OMF South would include three primary buildings: the Operations and Maintenance Facility (OMF) building, Maintenance of Way (MOW) building, and the Link System-Wide Storage building. The OMF building includes service lanes for vehicle maintenance, repair, carwash, cleaning, painting, spare parts storage, operations, and administration. The MOW building includes areas for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure. The Link System-Wide Storage building includes areas for receiving and storing all parts for the Link light rail system. The buildings could include offices, locker rooms, lunchrooms, and other spaces for employees.

OMF South would include runaround tracks to maneuver vehicles, storage tracks, a yard area for outside storage, a training track, traction power substations, and parking for employees, visitors, and nonrevenue vehicles. Additionally, OMF South would need to have tracks connecting it to an operating light rail line when the facility opens. In southern King County the OMF will need to connect to the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by site alternative.

Three site alternatives for the proposed project are evaluated in this Final Environmental Impact Statement (EIS): two in the city of Federal Way and one in the city of Kent. These alternatives are named the South 336th Street Alternative, South 344th Street Alternative, and Midway Landfill Alternative, respectively. The Sound Transit Board of Directors (the Board) identified the South 336th Street Alternative as the Preferred Alternative for evaluation in the EIS.

Depending on the alternative and resulting environmental impacts, the project also includes minimization and mitigation measures that address potential impacts to visual and aesthetic resources, noise, and ecosystem resources. Refinements to mitigation measures will continue through final design.

Dates of Construction and Opening

Final design and construction are scheduled to begin later in 2024. The forecasted in-service date is between 2032 and 2037, depending on the alternative selected to be built. However, project realignment (Resolution R2021-05), influenced by the COVID-19 pandemic and increased project cost estimates, may have an impact on the future project schedule. OMF South is a Tier 1 project, which means Sound Transit will continue to develop it for construction, and it will be managed under more ambitious schedule completion targets.

Environmental Process

This Final EIS is a joint document issued under the National Environmental Policy Act (NEPA) (42 United States Code [USC] § 4321) and the Washington State Environmental Policy Act (SEPA) (Revised Code of Washington [RCW] 43.21.C.030 and Chapter 197-11 of the Washington Administrative Code [WAC]). The Federal Transit Administration (FTA) is the lead agency under NEPA and Sound Transit is the lead agency under SEPA. As described in more detail below, this Final EIS responds to comments received on both the March 2021 SEPA Draft EIS and September 2023 NEPA Draft/SEPA Supplemental Draft EIS.

NEPA Lead Agency

Federal Transit Admistration
915 2nd Avenue, Suite 3192
Seattle, Washington 98174-1002
https://www.transit.dot.gov/about/regional-offices/region-10/region-10

Project Proponent and SEPA Lead Agency

Sound Transit
Union Station
401 S Jackson Street
Seattle, Washington 98104
www.soundtransit.org

NEPA Responsible Official

Susan Fletcher, Regional Administrator
Federal Transit Administration Region 10
915 Second Avenue, Suite 3192
Seattle, Washington 98174-1002

SEPA Responsible Official

Perry Weinberg, Deputy Executive Director, Office of Environmental Affairs and Sustainability
Sound Transit
401 S Jackson Street
Seattle, Washington 98104

Contacts for Additional Information

FTA

Justin Zweifel, Environmental Protection Specialist
Federal Transit Administration
915 Second Avenue, Suite 3192
Seattle, Washington 98174-1002
(206) 220-7538
justin.zweifel@dot.gov

Sound Transit

Erin Green, South Corridor Environmental Manager
Sound Transit
401 S Jackson Street
Seattle, Washington 98104
(206) 398-5464
erin.green@soundtransit.org

Sagar Ramachandra, South Corridor Capital Projects Engagement Manager
Sound Transit
401 S Jackson Street
Seattle, Washington 98104
(206) 398-5453
sagar.ramachandra@soundtransit.org

Principal Contributors

This Final EIS was prepared by Sound Transit in conjunction with the following firms: HDR, Inc.; Parametrix, Inc.; Aqua Terra Cultural Resource Consultants; Historical Research Associates, Inc.; Cross-Spectrum Acoustics, Inc.; ECONorthwest; EnviroIssues; and Two Hundred. See Appendix A1, List of Preparers, for a detailed list of preparers and the nature of their contributions.

Date of Issue

June 7, 2024

Anticipated or Potential Licenses, Permits, and Approvals

License, Permit or Approval	Issuing Agency
Federal	
Air Space Lease for Use of Interstate Right-of-Way	Federal Highway Administration
Clean Water Act, Section 404 (including NEPA documentation)	U.S. Army Corps of Engineers
Federal Endangered Species Act Consultation	U.S. Fish and Wildlife Service National Oceanic and Atmospheric Administration Fisheries Service
Federal Endangered Species Act Determination	Federal Transit Administration
Section 106 Determination	Federal Transit Administration
Section 4(f) Determination	Federal Transit Administration
NEPA Record of Decision	Federal Transit Administration
NEPA Record of Decision	Federal Highway Administration
NEPA documentation for reconfiguration of towers and power lines	Bonneville Power Administration
NEPA documentation under the Comprehensive Environmental Response, Compensation, and Liability Act	U.S. Environmental Protection Agency
State	
Hydraulic Project Approval	Washington Department of Fish and Wildlife
Section 106 Review	Washington State Department of Archaeology and Historic Preservation
Temporary Modification of Water Quality Criteria	Washington State Department of Ecology
Underground Storage Tank Notification Requirement	Washington State Department of Ecology
Clean Water Act, Section 401 Water Quality Certification	Washington State Department of Ecology
Cleanup Action Plan Amendment and related Consent Decree	Washington State Department of Ecology
Temporary Construction Airspace Lease (SR 99, I-5)	Washington State Department of Transportation
Air Space Lease: State Transportation Routes and Interstate Right-of-Way (with Federal Highway Administration)	Washington State Department of Transportation
Land Acquisition	Washington State Department of Transportation

Anticipated or Potential Licenses, Permits, and Approvals (continued)

License, Permit or Approval	Issuing Agency
Local	
Street Use Permits	City of Federal Way or Kent
Construction Permits	City of Federal Way or Kent
Right-of-Way Permits	City of Federal Way or Kent
Environmental Critical Areas/Sensitive Areas Review	City of Federal Way or Kent
Compliance Review of National Pollutant Discharge Elimination System Stormwater Discharge requirements before discharge to local stormwater system	City of Federal Way or Kent
Development Permits, Including Conditional Use Permit or Land Use Code Amendment	City of Federal Way or Kent
Noise Variance	City of Federal Way or Kent
Street Vacations	City of Federal Way
Other	
Notification of Intent to Perform Demolition or Asbestos Removal	Puget Sound Clean Air Agency
Pipeline and Utility Crossing Permits	Utility Providers
Utility Approvals: Easements and Use Agreements	Utility Providers

Note: Not all permits would be needed for every alternative.

Next Steps

Following issuance of the Final EIS, the Sound Transit Board of Directors will make a final decision on the alternative to be built. FTA will then issue a Record of Decision (ROD) no sooner than 30 days after publication of the Final EIS. The ROD will describe the project Sound Transit would build along with measures to avoid, minimize, and mitigate environmental impacts.

Because SEPA requires that the Sound Transit Board's final decision on the project be informed by the Final EIS, the Final EIS must be issued independently of the ROD so that Sound Transit's decision can later be incorporated into the ROD. As a result of these regulatory requirements under SEPA, it is not practical to issue a combined Final EIS and ROD, and they are being issued as separate documents.

Related Documents

- Regional Transit Long-Range Plan Update (Sound Transit, December 2014)
- Regional Transit Long-Range Plan Update Final Supplemental Environmental Impact Statement (Sound Transit, November 2014)
- Federal Way Link Extension Final Environmental Impact Statement (Sound Transit, November 2016)
- Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit, June 2016)
- Tacoma Dome Link Extension and Operations and Maintenance Facility South: Early Scoping Information Report (Sound Transit, March 2018)
- Tacoma Dome Link Extension and Operations and Maintenance Facility South: Early Scoping Summary Report (Sound Transit, June 2018)
- Operations and Maintenance Facility South: Alternatives Evaluation Technical Memorandum (Sound Transit, February 2019)
- Operations and Maintenance Facility South: Scoping Information Report (Sound Transit, February 2019)
- Operations and Maintenance Facility South: Scoping Summary Report (Sound Transit, May 2019)
- Operations and Maintenance Facility South: Draft Environmental Impact Statement (Sound Transit, March 2021).
- Operations and Maintenance Facility South: Comment Summary Report (Sound Transit, November 2021)
- Operations and Maintenance Facility South: NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement (FTA and Sound Transit, September 2023).
- Operations and Maintenance Facility South: NEPA Draft/SEPA Supplemental Draft EIS Comment Summary Report (Sound Transit, April 2024)

Cost and Availability of Final Environmental Impact Statement

The Final EIS is available for public review in a variety of formats and locations. It is available on the Sound Transit website: www.soundtransit.org/system-expansion/operations-maintenance-facility-south/documents. Paper copies are available for the cost listed below, which is below the cost of reproduction:

- Executive Summary - Free
- EIS - $25.00
- Technical Reports and other appendices - $15.00 each

To request paper copies or a flash drive of the documents, please contact Dominique Jones at (206) 689-4783 or email dominique.jones@soundtransit.org.

Paper copies are also available for review at the following locations:

- Sound Transit offices, Union Station, 401 South Jackson Street, Seattle (please call the Sound Transit librarian at (206) 398-5344 weekdays from 8:00 a.m. to 5:00 p.m. to arrange an appointment)
- Federal Way City Hall, 33325 8th Avenue S, Federal Way
- Federal Way Library, 34200 1st Way S, Federal Way
- Federal Way 320th Library, 848 S 320th St, Federal Way
- Federal Way Community Center, 876 S 333rd Street, Federal Way
- Kent Library, 212 2nd Ave N, Kent
- Kent Commons Community Center, 525 4th Ave N, Kent
- Kent City Hall, 220 4th Avenue S, Kent

Appeals

SEPA challenges to this Final EIS are governed by Sound Transit Resolution R7-1 and the Washington State SEPA rules and regulations (Chapter 43.21 RCW and WAC 197-11-680).

As provided in Resolution R2018-17, appeals of SEPA determinations must be made in writing by filing a letter of appeal and paying the required fee within 14 days following the date the environmental document is issued under SEPA. Letters of appeal should be addressed to:

Goran Sparrman, Interim Chief Executive Officer
Sound Transit
401 S Jackson Street
Seattle, Washington 98104

Appeals must be received by Sound Transit on or before 5:00 p.m. on June 21, 2024. Additional details about the appeals process and requirements are set out in Resolution R2018-17 and in the SEPA rules and regulations.

Executive Summary

126B
149
112A
107
123A
SOUND TRANSIT

Introduction

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to build and operate a Link light rail operations and maintenance facility in its South Corridor (OMF South). The facility would meet agency needs for an expanded fleet of light rail vehicles (LRVs). OMF South would support the expansion of the Link light rail system as part of Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). Under Sound Transit 3, the Link light rail system in central Puget Sound would grow to 116 miles with over 80 stations.

The system would expand north to Everett, south to Federal Way and Tacoma, east to Redmond, south Kirkland, and Issaquah, and west to West Seattle and Ballard by 2042 as shown in Figure ES-1. Sound Transit 3 calls for a total fleet of approximately 460 LRVs. To meet the system expansion goals, Sound Transit needs two additional operations and maintenance facilities: one each in the North and South Corridors. While OMF South would be in the South Corridor, it would support Sound Transit's system-wide expansion by providing a facility to receive, test, commission, store, maintain, and deploy an increased LRV fleet for the entire Link light rail system.

Environmental Planning and NEPA/SEPA Coordination

The environmental process for OMF South began in April 2018 with an early scoping period under the Washington State Environmental Policy Act (SEPA) to inform the alternatives development process. At that time, the environmental review process was conducted in compliance with SEPA only. Under SEPA, key environmental milestones were completed, including alternatives development as part of the scoping process and issuance of a SEPA Draft Environmental Impact Statement (EIS) in March 2021. After considering the SEPA Draft EIS and the comments received, the Sound Transit Board of Directors identified the South 336th Street Alternative as the Preferred Alternative for further evaluation in the SEPA Final EIS (Motion M2021-81, December 2021).

Subsequently, the design for the Preferred Alternative was advanced and modified in response to comments received during the 2021 SEPA Draft EIS comment period. A test track was added to the Preferred and South 344th Street alternatives to meet additional operational needs. Additionally, the Federal Transit Administration (FTA) and Sound Transit determined the need for an EIS under NEPA to support federal funding and approvals. With FTA as the NEPA lead agency, a NEPA Draft/SEPA Supplemental Draft EIS was issued September 22, 2023.

FTA and Sound Transit prepared this Final EIS. It evaluates three build alternatives that meet the purpose and need for the proposed project, as described below. These three alternatives are the South 336th Street (Preferred) Alternative in Federal Way, the South 344th Street Alternative in Federal Way, and the Midway Landfill Alternative in Kent, shown in Figure ES-2.

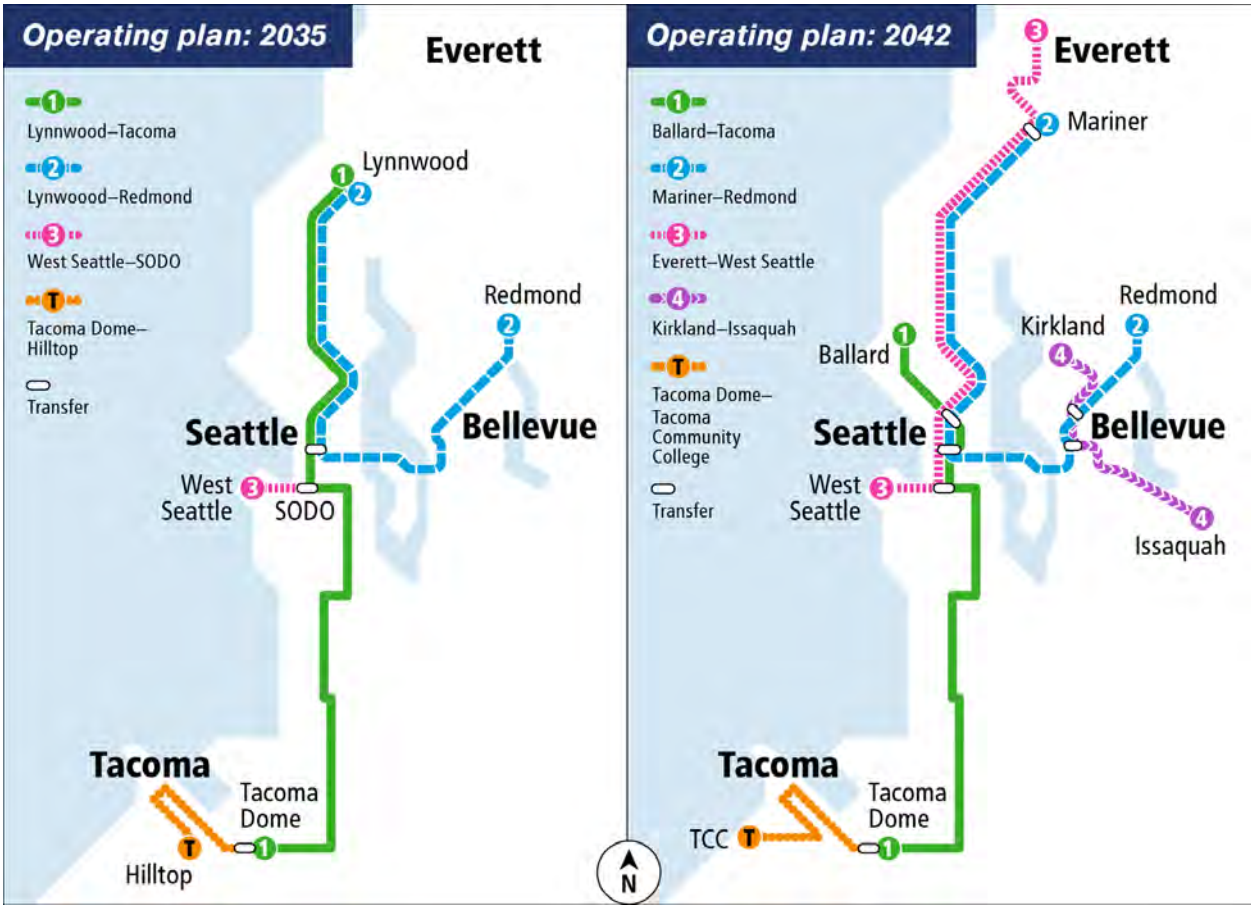

Operating plan: 2035
1 Lynnwood–Tacoma
2 Lynwoood–Redmond
3 West Seattle–SODO
T Tacoma Dome–Hilltop
Transfer
Everett
Lynnwood
Redmond
Seattle
Bellevue
West Seattle
SODO
Tacoma
Tacoma Dome
Hilltop
Operating plan: 2042
1 Ballard–Tacoma
2 Mariner–Redmond
3 Everett–West Seattle
4 Kirkland–Issaquah
T Tacoma Dome–Tacoma Community College
Transfer
Everett
Mariner
Ballard
Kirkland
Redmond
Seattle
Bellevue
West Seattle
Issaquah
Tacoma
Tacoma Dome
TCC
N

Figure ES-1: Link Light Rail System Expansion

The EIS also evaluates a No Build Alternative, which considers how the transit system would operate if the proposed project were not built. The No Build Alternative provides a baseline against which to measure the impacts of the build alternatives.

The discussion that follows states the proposed project's purpose and need, compares the levels of impact that would result from each build alternative, and describes design features and measures that would avoid, reduce, or mitigate impacts. Sound Transit's goal is to preserve and promote a healthy and sustainable environment by minimizing adverse impacts to people and the natural and built environments. The methodologies used to evaluate impacts are generally described in the introduction to each subsection of Chapter 3 in the Final EIS.

Final design and construction of the project are scheduled to begin later in 2024. The forecasted in-service date is between 2032 and 2037, depending on the alternative selected to be built. However, this schedule could change, resulting in a delayed opening or the construction of OMF South in phases to reach full operational capacity over time.

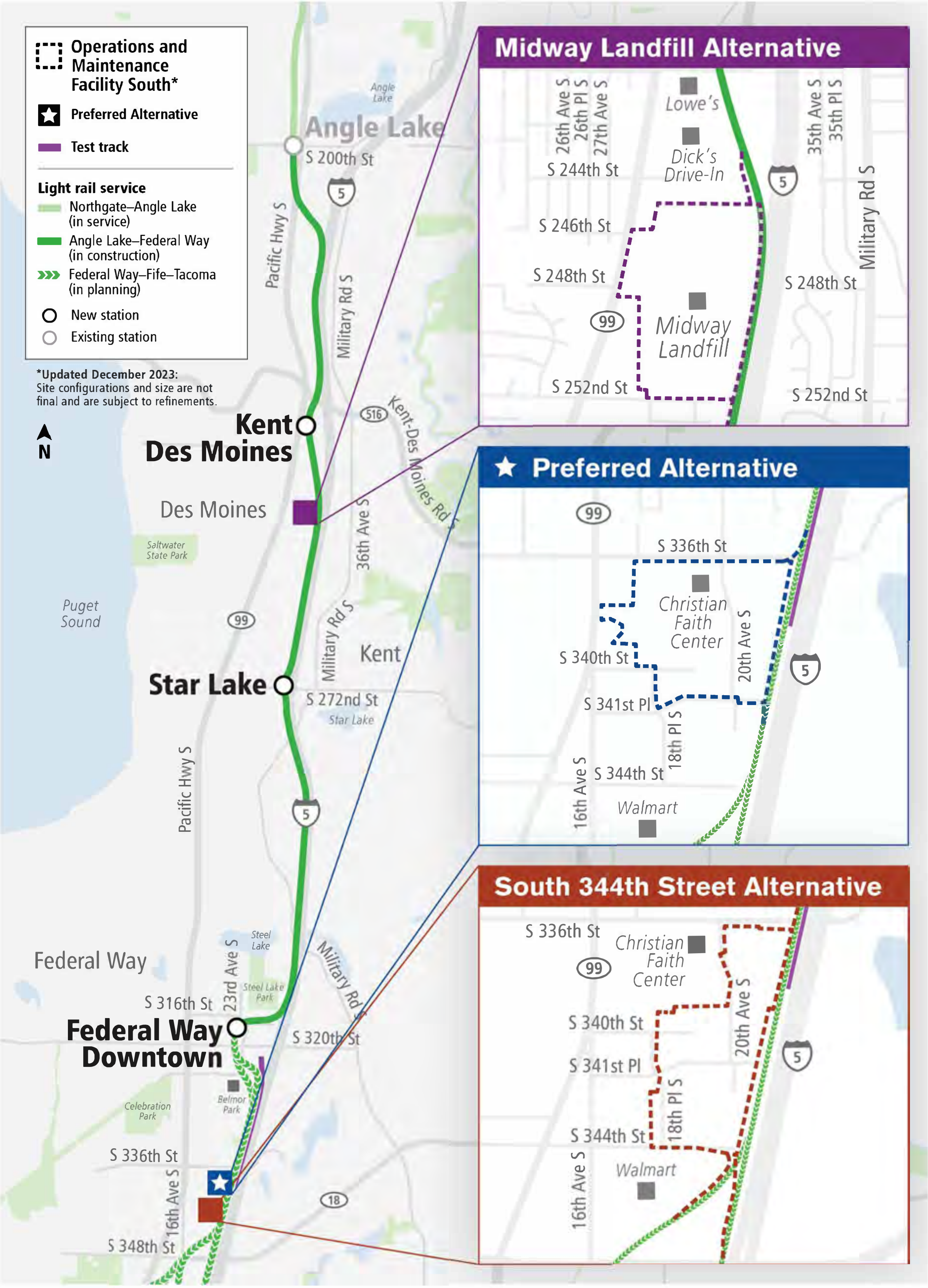

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
Angle Lake
S 200th St
5
Pacific Hwy S
Military Rd S
516
Kent-Des Moines Rd S
Kent Des Moines
Des Moines
36th Ave S
Saltwater State Park
Puget Sound
99
Military Rd S
Kent
Star Lake
S 272nd St
Star Lake
Pacific Hwy S
5
Federal Way
Steel Lake
23rd Ave S
Steel Lake Park
Military Rd S
S 316th St
Federal Way Downtown
S 320th St
Celebration Park
Belmor Park
S 336th St
16th Ave S
18
S 348th St
Midway Landfill Alternative
26th Ave S
26th Pl S
27th Ave S
Lowe's
Dick's Drive-In
35th Ave S
35th Pl S
S 244th St
5
Military Rd S
S 246th St
S 248th St
S 248th St
99
Midway Landfill
S 252nd St
S 252nd St
Preferred Alternative
99
S 336th St
Christian Faith Center
20th Ave S
S 340th St
5
S 341st Pl
18th Pl S
16th Ave S
S 344th St
Walmart
South 344th Street Alternative
S 336th St
Christian Faith Center
99
20th Ave S
S 340th St
5
S 341st Pl
18th Pl S
S 344th St
16th Ave S
Walmart

Figure ES-2: Project Alternatives

ES.1 Purpose and Need

The purpose of the OMF South project is to:

- Provide a facility with the capacity to receive, test, commission, store, maintain, and deploy vehicles to support the intended level of service for the system-wide Link light rail expansion.
- Support efficient and reliable light rail service that minimizes system operating costs.
- Support and connect efficiently to the regional system and be technically and financially feasible to build, operate, and maintain, consistent with the Sound Transit 3 Plan and the Sound Transit Regional Transit Long-Range Plan.

The project is needed because:

- The current regional system lacks a facility with sufficient capacity and suitable location to support the efficient and reliable long-term operations for system-wide Link light rail expansion, including the next phase of expansion in King and Pierce counties.
- New light rail maintenance and storage capacity needs to be available with sufficient time to accept delivery of and commission new vehicles to meet the expansion needs outlined in Sound Transit 3 and to store existing vehicles while the new vehicles are tested and prepared.

The OMF South project is necessary to support the addition of approximately 144 LRVs as part of the Sound Transit 3 system expansion. The final number of light rail vehicles maintained in this location will be determined in the Rail Fleet Management Plan update, currently underway by Sound Transit. The facility includes functions that support the entire Link light rail system, such as receiving, testing, and commissioning new LRVs. In addition, OMF South would include Maintenance of Way (MOW) facilities and a Link System-Wide Storage building to receive and store vehicle parts and components, tracks and components, and station parts and components.

ES.2 Alternatives Considered

The OMF South alternatives underwent an extensive evaluation process prior to their identification for study in the EIS. Beginning in early 2018, Sound Transit conducted early scoping under SEPA, followed by alternatives development, including site identification, prescreening, and alternatives evaluation. In early 2019, six alternatives were presented to the public during the SEPA scoping period, and in May 2019 the Board identified three alternatives for evaluation in the SEPA Draft EIS. These three alternatives were the South 336th Street Alternative in Federal Way, the South 344th Street Alternative in Federal Way, and the Midway Landfill Alternative in Kent.

The SEPA Draft EIS was published in March 2021 and had a public comment period extending from March 5 to April 19, 2021. After considering the SEPA Draft EIS and the comments received from Tribes, agencies, and the public, the Board identified the South 336th Street Alternative as the Preferred Alternative for further study in the SEPA Final EIS (Motion M2021 81; December 2021).

No-Build Alternative

The No Build Alternative evaluates how the transit system would operate if the proposed project were not built. It assumes that the other Link light rail system improvements listed in Sound Transit 3 would be built, including extensions to West Seattle, Ballard, Issaquah, and Tacoma. The No Build Alternative also assumes that the new North Corridor OMF would be constructed. Under the target schedule for Sound Transit's System Expansion Plan, each of these projects would be constructed and operational by 2042.

The analysis of the No Build Alternative is based on the expected conditions in 2042, which is the future design year for the project. Due to the realigned capital program (Resolution R2021 05, August 2021) completion of some Sound Transit 3 projects may be delayed past 2042; however, 2042 provides a common future analysis year for ridership forecasting, air, noise, transportation, and other environmental elements on all Sound Transit 3 projects.

Under the No-Build Alternative, impacts from the Sound Transit 3 projects listed above, including Federal Way Link Extension (FWLE), Tacoma Dome Link Extension (TDLE), West Seattle Link Extension (WSLE), and other reasonably foreseeable future actions by others would still occur. As the FWLE and TDLE projects are within the study areas for the OMF South project alternatives, there are impacts that may be similar to or that overlap with those of OMF South. FWLE is under construction with a forecasted in-service date of 2026. The impacts of FWLE have been addressed in the Federal Way Link Extension Final Environmental Impact Statement. TDLE is currently undergoing environmental review under both NEPA and SEPA by FTA and Sound Transit. The Tacoma Dome Link Extension Draft Environmental Impact Statement is expected to be published in mid 2024, with a forecasted in-service date of 2035.

Affordable and Target Schedules

Due to steeply rising real estate prices and other construction expenses, Sound Transit projects currently in early planning and design, including OMF South, are seeing cost estimate increases. To ensure that funding remains available to complete all voter-approved projects, the Sound Transit Board conducted a "realignment" process that established the following two schedules:

Affordable Schedule: a schedule that is affordable, using current financial projections and cost estimates to set the general order in which projects will advance. This "affordable" schedule established an approach to prioritize, fund, and manage program work over time (Resolution 2021-05).

Target Schedule: schedule for priority projects, as close to Sound Transit 3 Plan schedules as possible, reliant upon reductions in the affordability gap through cost savings and additional revenue.

Under all currently proposed build alternatives for TDLE, the TDLE mainline tracks south of Federal Way Downtown Station would also serve as part of connecting mainline tracks to OMF South, depending on which OMF South build alternative is selected. If TDLE is constructed as proposed, impacts from the mainline tracks would be primarily the same under both the No Build and build alternatives for OMF South, although the timing of those impacts would be different. TDLE impacts will be further detailed in the separate Tacoma Dome Link Extension Draft Environmental Impact Statement.

The No Build Alternative assumes Sound Transit's Link light rail storage and maintenance facilities (including OMF North) would support a maximum Link light rail fleet size of about 352 LRVs, which is fewer than the approximately 460 LRVs needed to operate the system at the planned service levels of Sound Transit 3. As a result, Link light rail operations would be less efficient than they would otherwise be with OMF South, and Sound Transit would not be able to meet expected ridership demand. As documented in Sound Transit 3, the

No Build Alternative would fail to meet the purpose and need of the project and could indirectly result in worse traffic congestion and greater vehicle emissions than would otherwise occur under the build alternatives by failing to support intended levels of service for the system-wide Link light rail expansion.

Build Alternatives

Build alternatives evaluated in this document include the South 336th Street Alternative (the Preferred Alternative), the South 344th Street Alternative, and the Midway Landfill Alternative. The basic design and function of the OMF South site would be the same for all alternatives. The primary differences between the three build alternatives include their geographic location and that the Preferred and South 344th Street alternatives include mainline connecting tracks and a test track.

Several separate operational functions are proposed for the OMF South site. These functions would be the same for all build alternatives. Each alternative would include a 2 story OMF building, a 1-story MOW building, a 1-story Link System-Wide Storage building, storage tracks, yard areas, and parking spaces (including accessible parking) for employees, visitors, and nonrevenue Sound Transit vehicles. The site would include space for receiving, testing, commissioning, storing, maintaining, and deploying approximately 144 LRVs in addition to housing administrative and operational functions, such as serving as a report base for operators. OMF South would include administration, workshop, and storage space for MOW and Facilities staff and functions. There would be a training track that would include all the track installation configurations found in the Link system. Currently, storage is provided at existing OMF sites and at locations outside of these sites. OMF South's Link System-Wide Storage building is intended to centralize the receiving, distribution and storage needs and would minimize the need for storage in locations outside of currently owned properties.

Track Types

Mainline Tracks: Tracks that are used for LRVs or are the principal artery of a system to which other components (such as operation and maintenance facilities) are connected. Mainline tracks can be elevated (on a structure) or at-grade (on the ground surface).

Tail Track: A track at the end of the mainline that can be used for storing a train.

Test Track: A dedicated track to allow LRVs to be tested without using the mainline tracks.

Lead Track: A track connecting a railroad yard or facility with mainline tracks.

Training Track: A short length of track located within the OMF site that includes all the track installation configurations found in the Link system.

For the purposes of analysis, mainline tracks, tail tracks, and the test track are included with the mainline; lead tracks and the training track are included with the OMF site.

The OMF South facility needs to connect to the Link light rail system via an operating mainline. The Preferred and South 344th Street alternatives are approximately 1 mile south of the FWLE terminus at the Federal Way Downtown Station and would require construction of mainline tracks to connect the OMF South facility to FWLE. The Midway Landfill Alternative is adjacent to the FWLE alignment and would connect directly to the mainline tracks.

Design Updates to the Preferred and South 344th Street Alternatives

After publication of the 2021 SEPA Draft EIS, Sound Transit updated design elements of the alternatives to reflect public comments on the SEPA Draft EIS, coordination with local jurisdictions, and operational needs. Design updates are described below and in Chapter 2, Alternatives Considered, of the Final EIS.

Updated design elements of the Preferred Alternative and South 344th Street alternatives include the following:

- Addition of a third track parallel to the mainline tracks to serve as a dedicated test track to test new and rehabilitated LRVs to ensure their safety, compliance with Sound Transit's requirements, and readiness to carry passengers. For the Midway Landfill Alternative, this testing would continue to be conducted on the mainline tracks.

Updated design elements of the Preferred Alternative include the following:

- The main site entrance has been moved from State Route (SR) 99 to S 341st Place.
- 18th Place S has been extended to connect S 340th Street and S 336th Street as a replacement for the removal of 20th Avenue S. The extended street would include a bike/pedestrian trail to provide public amenities.
- 21st Avenue S has been extended to connect to S 344th Street.
- Frontage improvements (including road widening) have been added on the south side of S 336th Street to meet city requirements.
- The OMF South site has been expanded to the southwest to provide more space for buildings and yard area.
- The OMF South site and internal track configuration has been modified to a parallelogram to allow for a wider stream and wetland corridor on the east side of the OMF, between the site and Interstate 5 (I-5).
- Existing culverts that carry the West Fork Hylebos Creek Tributary under S 336th Street and the East Fork Hylebos Creek Tributary under S 344th Street are planned to be upgraded, removed, and/or relocated to meet state fish passage requirements.

Design of the Preferred Alternative is likely to continue to evolve as Sound Transit works to minimize and mitigate environmental impacts.

Preferred Alternative

The Preferred Alternative is in Federal Way between S 336th Street and S 341st Place and between I-5 and SR 99. The Preferred Alternative represents the Board's preference based on information currently available. Identifying a Preferred Alternative assists the public in reviewing the environmental documents. The selection of the alternative to be built will be made by the Board after the Final EIS is issued.

Mainline Tracks

The Preferred Alternative would require approximately 1.4 miles of connecting mainline tracks from the southern terminus of FWLE (see Figure ES-3). If TDLE is constructed as proposed, LRVs providing passenger service would operate on these mainline tracks. TDLE is currently undergoing a separate environmental review.

There are two alignment options for this length of mainline tracks: the 40 mph Alignment and 55 mph Design Option, which differ near their connection to the FWLE terminus. The mainline tracks would be elevated, with north-bound and south-bound tracks. The tracks would extend south approximately 1,000 feet past the southeast corner of the OMF South site, at that point serving as tail tracks. These elevated tail tracks would be used to allow trains to access the Link system from the south if the northern lead tracks were out of service.

A test track would run parallel to the east side of the mainline tracks from S 324th Street to just south of S 336th Street — approximately 0.9 mile. The test track would be at the same elevation as the mainline tracks, with the exception of the north end of the track near S 324th Street, where the mainline tracks would be elevated, and the test track would be at grade.

OMF South Site

The Preferred Alternative site footprint is approximately 66 acres, which includes three primary buildings, storage tracks, a training track, yard areas, and approximately 480 parking spaces. The yard area would be approximately 6.7 acres. Figure ES-4 is an aerial view with a conceptual layout. The Preferred Alternative would also include extensions of 18th Place S and 21st Avenue S.

In addition to the mainline tracks, the site would also require lead tracks to access the rail system. Elevated lead tracks would leave the northeast corner of the site and be approximately 800 feet long. Similarly, a pair of elevated lead tracks approximately 1,000 feet long would leave the southeast corner of the site to access the mainline tail tracks. If the Preferred Alternative is selected, Sound Transit would continue to explore site designs to minimize ecosystem impacts, which could include modifying the locations of buildings, track, and 18th Place South within the site boundaries.

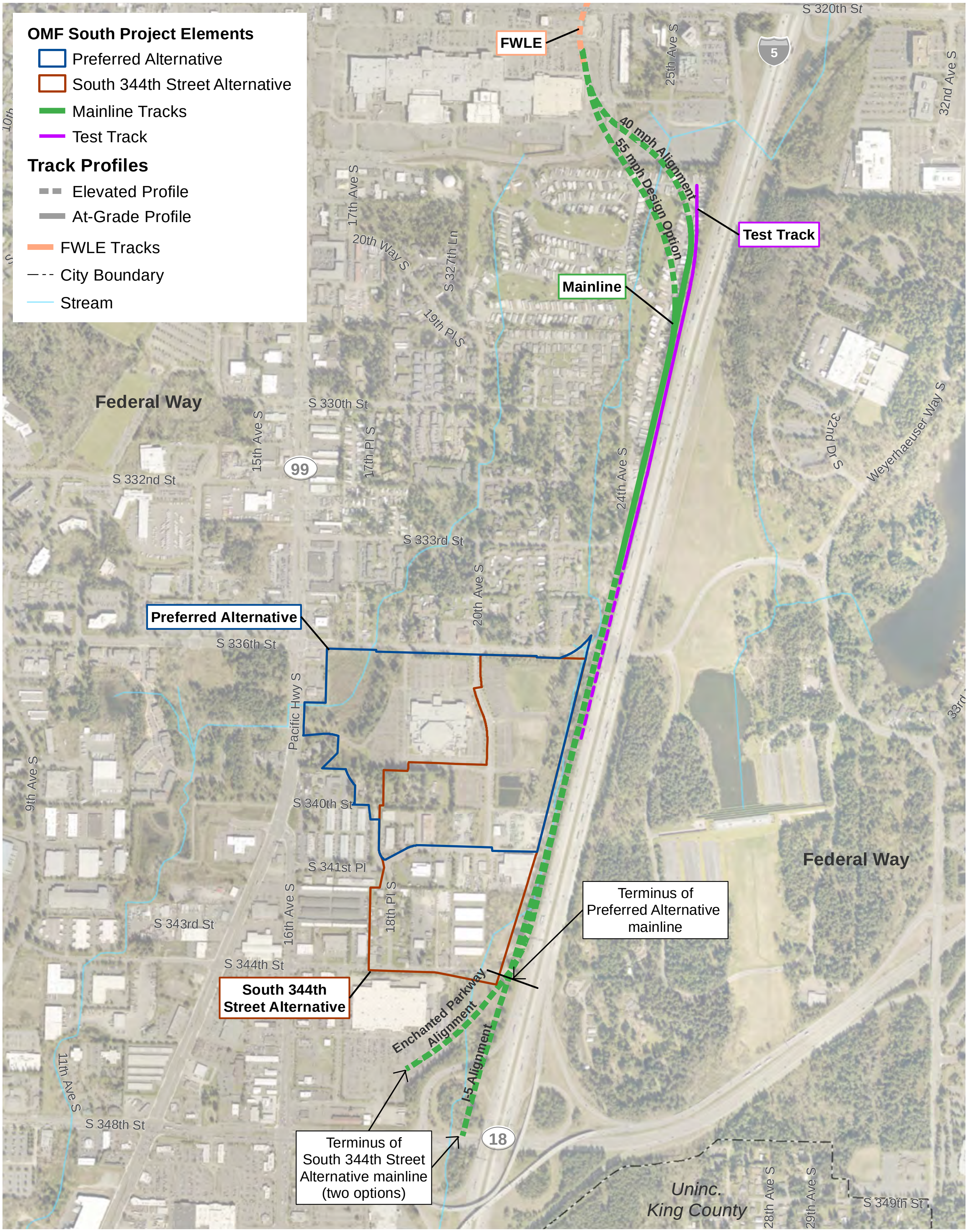

OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profiles
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
40 mph Alignment
55 mph Design Option
Test Track
Mainline
Preferred Alternative
Terminus of Preferred Alternative mainline
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
Terminus of South 344th Street Alternative mainline (two options)
Federal Way
Federal Way
Uninc. King County
5
99
18
S 320th St
25th Ave S
32nd Ave S
17th Ave S
20th Way S
S 327th Ln
19th Pl S
S 330th St
15th Ave S
17th Pl S
S 332nd St
S 333rd St
24th Ave S
32nd Dr S
Weyerhaeuser Way S
20th Ave S
S 336th St
Pacific Hwy S
9th Ave S
S 340th St
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
11th Ave S
S 348th St
28th Ave S
29th Ave S
S 349th St
33rd

Figure ES-3: Mainline Track Options

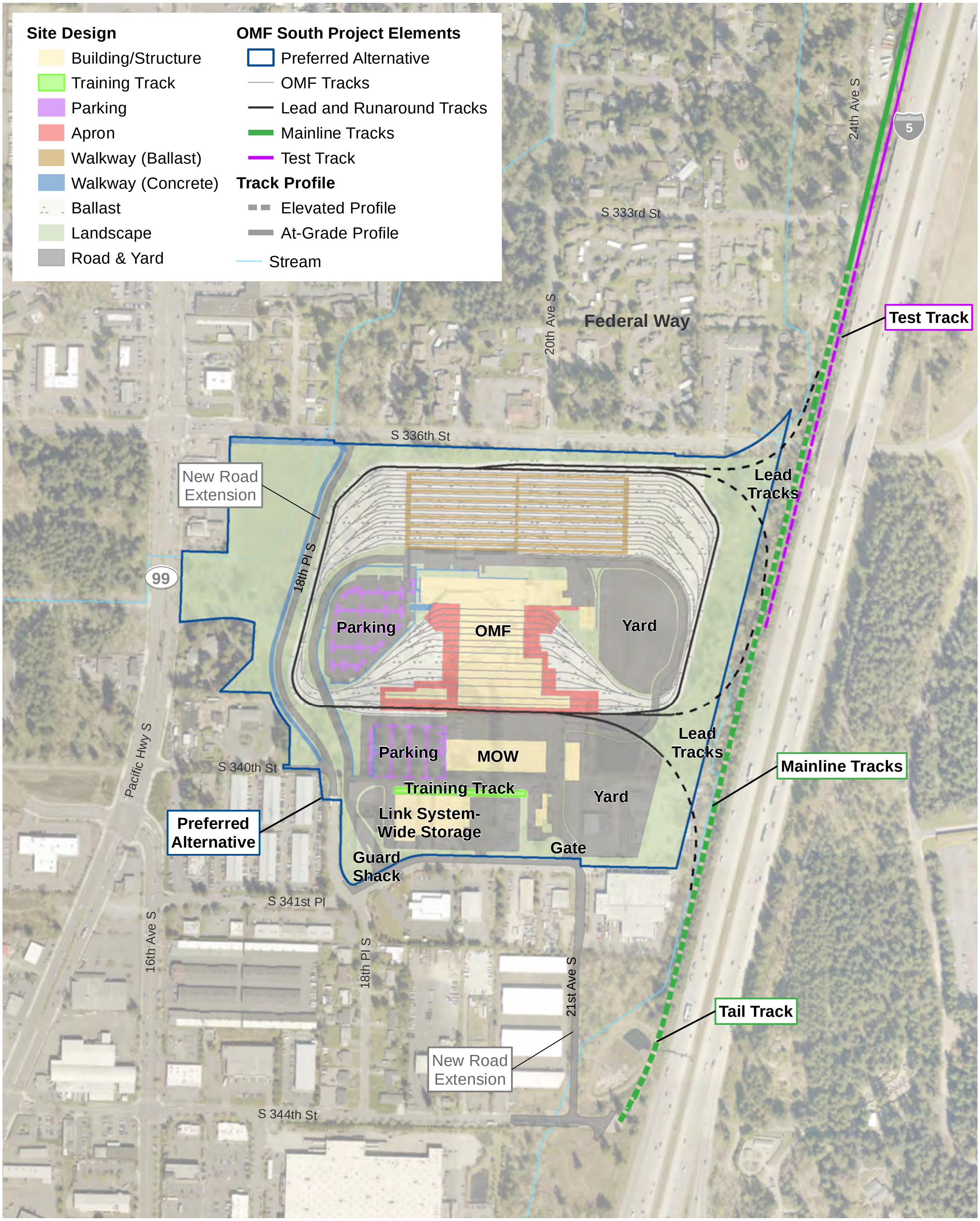

Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
24th Ave S
5
S 333rd St
20th Ave S
Federal Way
Test Track
S 336th St
New Road Extension
Lead Tracks
99
18th Pl S
Parking
OMF
Yard
Lead Tracks
Mainline Tracks
Pacific Hwy S
S 340th St
Parking
MOW
Training Track
Link System-Wide Storage
Yard
Preferred Alternative
Guard Shack
Gate
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Figure ES-4: Conceptual Layout: Preferred Alternative

South 344th Street Alternative

The South 344th Street Alternative is in Federal Way between S 336th Street and S 344th Street and between I-5 and 18th Place S.

Mainline Tracks

The South 344th Street Alternative would require approximately 1.8 miles of connecting mainline tracks from the southern terminus of the FWLE project to the site (see Figure ES-3). As with the Preferred Alternative, these tracks would serve as future mainline tracks for LRV passenger service if TDLE is constructed as proposed. The test track and mainline alignment options are the same as described for the Preferred Alternative in the section above and shown in Figure ES-5.

As with the Preferred Alternative, the mainline tracks would extend past the southeast corner of the OMF South site to serve as tail tracks. These tail tracks would be used to allow trains to access the Link system from the south if the northern lead tracks are out of service. There are two options for the South 344th Street Alternative tail tracks that follow the design alternatives for TDLE: the Enchanted Parkway alignment and the I-5 alignment. Both options are completely elevated, with the Enchanted Parkway alignment extending approximately 1,100 feet south of the site and the I-5 alignment extending approximately 1,400 feet south of the site.

OMF South Site

The South 344th Street Alternative site footprint is approximately 64 acres, which includes buildings, storage tracks, a training track, yard areas, and approximately 480 parking spaces. The yard area would be approximately 8.2 acres. Figure ES-5 is an aerial view with a conceptual layout.

In addition to the mainline connecting tracks, the site would also require lead tracks to access the rail system. The elevated lead tracks would leave the northeast corner of the site and be approximately 1,100 feet long. Similarly, a set of approximately 1,600 feet of elevated lead tracks would leave the southeast corner of the site to connect to the mainline tail tracks for the Enchanted Parkway alignment; approximately 1,300 feet of elevated lead tracks would be needed to connect the site to the mainline tail tracks for the I-5 alignment.

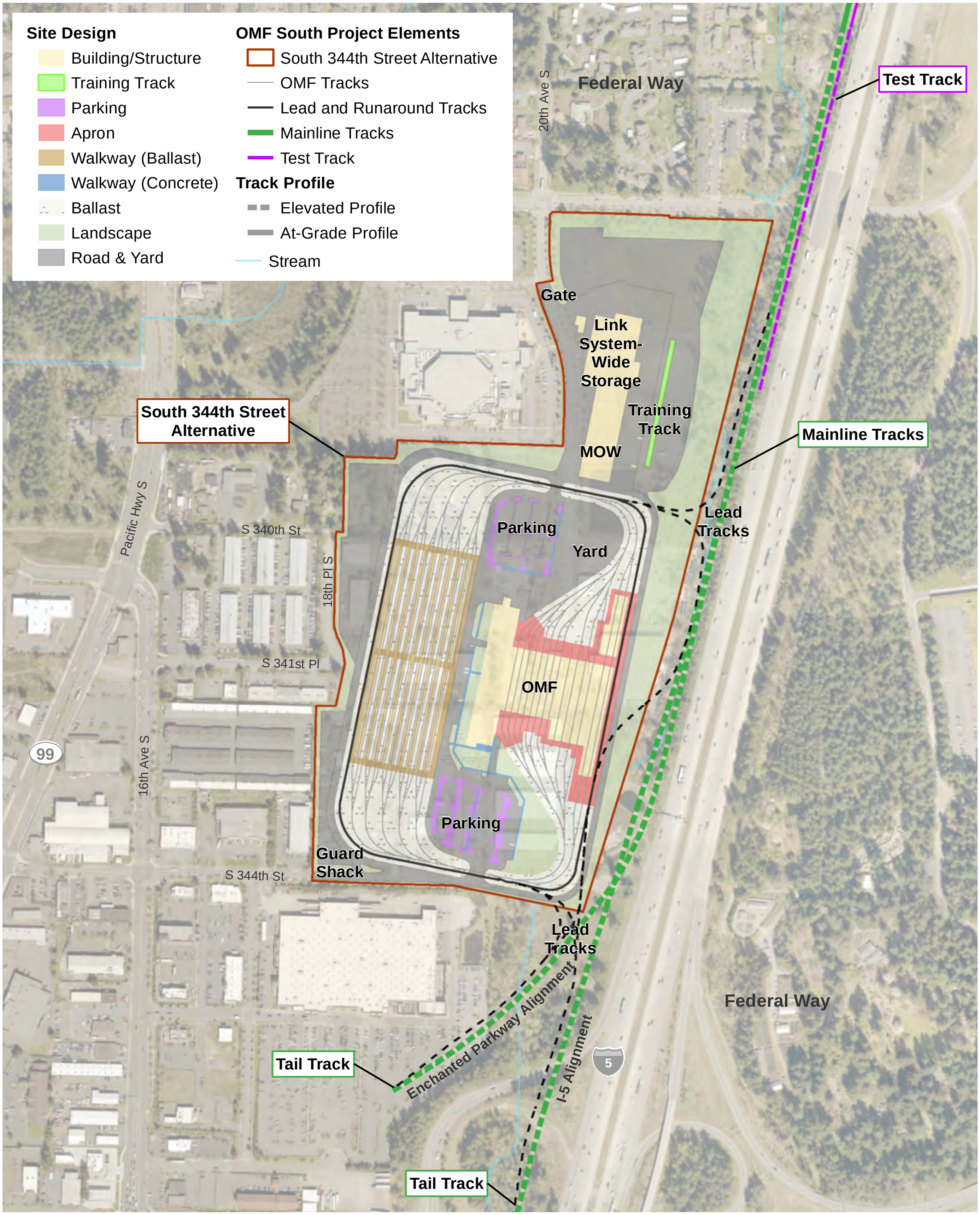

Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
Federal Way
20th Ave S
Test Track
Gate
Link System-Wide Storage
Training Track
MOW
South 344th Street Alternative
Mainline Tracks
Lead Tracks
Pacific Hwy S
S 340th St
18th Pl S
Parking
Yard
S 341st Pl
OMF
99
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
Enchanted Parkway Alignment
Federal Way
Tail Track
I-5 Alignment
5
Tail Track

Figure ES-5: Conceptual Layout: South 344th Street Alternative

Midway Landfill Alternative

The Midway Landfill Alternative is in Kent between S 246th Street and S 252nd Street and between I-5 and SR 99.

Mainline

Because the site would be located adjacent to FWLE, which has a forecasted in-service date of 2026, there would be no need to build additional mainline tracks.

OMF South Site

The site footprint of the Midway Landfill Alternative is approximately 68 acres, which includes buildings, storage tracks, a training track, yard areas, and approximately 480 parking spaces. The yard area encompasses approximately 8.3 acres. Figure ES-6 is an aerial view with a conceptual site layout.

The Midway Landfill Alternative would connect to the mainline tracks via a series of lead tracks between the Kent/Des Moines and South 272nd Street stations. An approximately 3,200 foot long lead track would run parallel to the FWLE mainline tracks, and five shorter (approximately 400 foot-long) lead tracks would connect it to the site. The lead track parallel to FWLE would be elevated for approximately 35 percent of its length; the shorter lead tracks would be primarily at grade.

Midway Landfill Alternative Subsurface Construction Design Options

The Midway Landfill site is a publicly owned, mostly vacant site along the FWLE. However, there are unique risks involved with building on a former landfill that is under active Superfund site monitoring and reporting requirements. A Superfund site is a location contaminated by hazardous waste that has been designated by the U.S. Environmental Protection Agency (EPA) for management and cleanup. In addition, waste in the landfill is settling at different rates across the site, which poses long-term operations and maintenance concerns. After a series of workshops and further analysis to address this settlement concern, Sound Transit developed three subsurface construction design options for building an OMF on the landfill: Platform, Hybrid, and Full Excavation.

Under the Platform subsurface construction design option, OMF South would be built on a 3.5 foot-thick concrete slab platform supported on approximately 700 concrete-filled drilled shafts. The drilled shafts would be 10 feet in diameter, distributed on a 35-foot by 70-foot grid under the buildings, track, and drainage vault area. Average shaft depths would range from 120 feet to 180 feet below finished grade. Due to the number of drilled shafts, the entire soil and geomembrane cap system that overlays the landfill would be removed then replaced after the shafts had been installed. The platform would then be constructed on top of the new cap, which would be designed to meet the regulatory requirements for the remedial controls to contain the landfill waste and hazardous emissions and to prevent precipitation from reaching the buried refuse where it could contaminate groundwater.

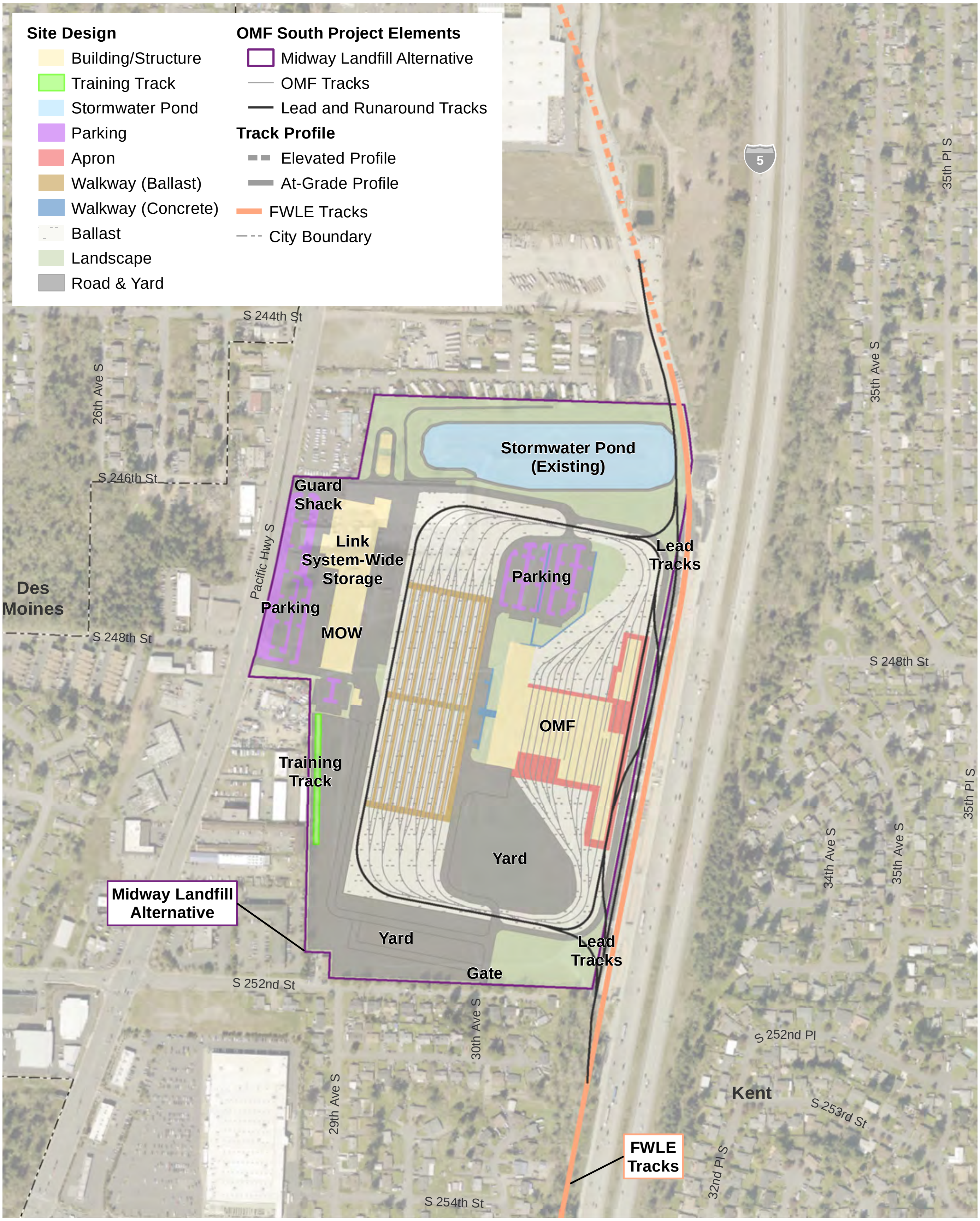

Site Design
Building/Structure
Training Track
Stormwater Pond
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Midway Landfill Alternative
OMF Tracks
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
5
S 244th St
26th Ave S
35th Pl S
35th Ave S
S 246th St
Stormwater Pond
(Existing)
Guard
Shack
Link
System-Wide
Storage
Pacific Hwy S
Lead
Tracks
Parking
Des
Moines
Parking
MOW
S 248th St
S 248th St
OMF
Training
Track
35th Pl S
34th Ave S
35th Ave S
Yard
Midway Landfill
Alternative
Yard
Lead
Tracks
Gate
S 252nd St
30th Ave S
S 252nd Pl
29th Ave S
Kent
S 253rd St
FWLE
Tracks
32nd Pl S
S 254th St

Figure ES-6: Conceptual Layout: Midway Landfill Alternative

Under the Hybrid subsurface construction design option, the entire landfill cap system would also be removed and replaced. Approximately 4.3 million cubic yards of loose landfill material beneath the cap would be excavated, and the remaining fill would undergo a ground improvement process called deep dynamic compaction to prepare the site for construction. Excavated material would be screened to determine whether it was suitable for reuse. A 1 foot thick concrete slab over a 3-foot-thick beam system would be built to support facilities sensitive to settlement, including tracks, parking, and roads. Approximately 110 concrete-filled drilled shafts would provide additional support where needed under buildings. Approximately 1.2 million cubic yards of suitable soil would need to be brought to the site.

The Full Excavation subsurface construction design option would completely excavate the landfill, screen excavated material for reuse, and backfill with soil that the OMF would be built on. The landfill cap system would also be removed and replaced to cover the reused landfill material. Excavation of the landfill would produce approximately 4.9 million cubic yards of loose material consisting of solid waste and soil, of which approximately 3 million cubic yards would be hauled off site. The hauled off material would be the equivalent of about 920 Olympic-sized swimming pools. Approximately 1.6 million cubic yards of suitable soil would be imported to the site.

Construction Approach for the Build Alternatives

Major construction activities would start with demolishing existing buildings, relocating utilities, and grading and excavating the site, which may include construction of retaining walls. The next phase of construction would include installing track work and electrical systems (overhead catenary system power lines, traction power substations [TPSS], etc.) and constructing the OMF South buildings.

Typical construction would occur on a 5- to 6-day workweek schedule, primarily during daytime hours. In some situations (such as when street detours are involved or when daytime construction periods need to be shortened to reduce impacts), additional shifts, all-week, nighttime, or 24-hour construction activities could be necessary.

Opinion of Probable Cost

The opinion of probable cost is presented in ranges in Table ES-1. Cost estimates at this early phase of project development (approximately 10 percent design) are for comparative purposes only using a “Unit Cost Library” assembly methodology for cost estimating and do not represent the project budget. Sound Transit has developed high-level conceptual cost estimates for all alternatives evaluated in the Final EIS. A more detailed estimate is being developed for the Preferred Alternative as the project design advances and would continue to be refined for the alternative selected to be built, prior to final design. Sound Transit establishes a project budget when design has advanced and a project’s baseline budget and schedule is established prior to the start of construction.

ES.3 Comparison of Alternatives

Table ES-1 below summarizes key characteristics and long-term impacts (unless otherwise specified) that differentiate the build alternatives. There would be additional temporary impacts to these elements of the environment during construction that are not reflected in this table. Both long-term and construction impacts are discussed in detail in the Final EIS.

The OMF South build alternatives are anticipated to have similar impacts to many of the elements of the natural and built environment. However, there are some impacts and characteristics that distinguish the alternatives from each other.

Table ES-1: Key Characteristics and Impacts of the Build Alternatives

Key Characteristics and Impacts	Preferred Alternative[1]	South 344th Street Alternative[1]	Midway Landfill Alternative[2]
Opinion of Probable Cost (In 2023 dollars)[3, 4]			
Mainline[5]	$356 M to $449 M	$528 M to $695 M	N/A
OMF[6]	$1.5 B to $1.8 B	$1.5 B to $1.9 B	$2.1 B to $3.5 B
Total	***$1.9 B to $2.2 B***	***$2.0 B to $2.6 B***	***$2.1 B to $3.5 B***
Annual Operating Cost Estimate (In 2023 dollars)[4]			
Mainline[5]	$1.2 M	$1.5 M	N/A
OMF	$12 M	$12 M	$13 M
Total	***$13.2 M***	***$13.5 M***	***$13 M***
Final Design/Construction Duration[7]			
Complete Facility	***4y 8m***	***4y 9m***	***7y 6m to 10y***
Transportation			
Maximum anticipated daily truck trips during construction			
Mainline[5]	120	120	N/A
OMF Site[8]	45	77	71 to 564
Total	***165***	***197***	***71 to 564***

Notes:

[1] Ranges for the Preferred and South 344th Street alternatives reflect the two mainline alignment options (40 mph Alignment and 55 mph Design Option). For the purposes of analysis, the mainline also includes the test track and tail tracks.

[2] Ranges for the Midway Landfill Alternative reflect the three subsurface construction design options (Platform, Hybrid, and Full Excavation).

[3] Opinion of probable cost includes property acquisition, relocation assistance, final design, and construction.

[4] The unit costs used to develop the opinion of probable costs are based on costs from 2023. They do not account for future increases due to inflation.

[5] With the Midway Landfill Alternative, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

[6] There is potential increased cost risk due to the nature of the uncertain subsurface conditions at the landfill and the low level of design (10 percent) and subsurface exploration at this phase.

[7] Construction duration totals reflect the overlap of some site preparation and facility construction activities and rounding of months.

[8] Estimates represent a worst-case scenario during the site preparation phase and not a daily average of truck trips over the entire construction period.

Table ES-1: Key Characteristics and Impacts of the Build Alternatives (continued)

Key Characteristics and Impacts	Preferred Alternative[1]	South 344th Street Alternative[1]	Midway Landfill Alternative[2]
Acquisitions, Displacements, and Relocations			
Parcels affected			
Mainline[5]	7	9	N/A
OMF Site	30	51	47
Total	***37***	***60***	***47***
Business displacements			
Mainline[5]	0	0	N/A
OMF Site	11	17[9]	4
Total	***11***	***17***	***4***
Residential displacements			
Mainline[5]	71 to 77	71 to 77	N/A
OMF Site	15	20	0
Total	***86 to 92***	***91 to 97***	***0***
Land Use			
Acres of land converted to transportation use			
Mainline[5]	36	40	N/A
OMF Site	67	57	71
Total	***103***	***97***	***71***
Economics			
Estimated number of employees displaced[10]			
Mainline[5]	0	0	N/A
OMF Site	126	212	43
Total	***126***	***212***	***43***
Social Resources, Community Facilities, and Neighborhoods			
Displaced social and community resources	1 church and associated school and daycare center, 1 in-home daycare center	4 churches	None
Visual and Aesthetics			
Level of visual impact			
Mainline[5]	High	High	N/A
OMF Site	Medium	Medium	Medium

Notes:

[1] Ranges for the Preferred and South 344th Street alternatives reflect the two mainline alignment options (40 mph Alignment and 55 mph Design Option). For the purposes of analysis, the mainline also includes the test track and tail tracks.

[2] Ranges for the Midway Landfill Alternative reflect the three subsurface construction design options (Platform, Hybrid, and Full Excavation).

[5] With the Midway Landfill Alternative, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

[9] Includes GarageTown, comprised of approximately 60 owners.

[10] The number of displaced employees is an estimate based on the business building size and the type of business activity and not on an actual survey of businesses.

Table ES-1: Key Characteristics and Impacts of the Build Alternatives (continued)

Key Characteristics and Impacts	Preferred Alternative[1]	South 344th Street Alternative[1]	Midway Landfill Alternative[2]
Noise			
Sensitive receptors affected by noise			
Mainline[5]	0 to 4	0 to 4	N/A
OMF Site	0	0	0
Total	***0 to 4***	***0 to 4***	***0***
Ecosystem Resources			
Linear feet of long-term stream impacts			
Mainline[5]	1,550 to 1,600	1,600 to 1,650	N/A
OMF Site	1,500	1,250	0
Total	***3,050 to 3,100***	***2,850 to 2,900***	***0***
Acres of impacts to mature native forest			
Mainline[5]	3	4	N/A
OMF Site	11	6	0
Total	***14***	***10***	***0***
Acres of long-term impacts to wetlands			
Mainline[5]	1.6	1.5	N/A
OMF Site	2.7	1.4	0
Total	***4.3***	***2.9***	***0***
Geology and Soils			
Export material (volume in cubic yards)	205,000	310,000	670,000 to 2,920,000
Import material (volume in cubic yards)	185,000	200,000	0 to 1,610,000
Hazardous Materials			
High risk for contaminated material	No	No	Yes

Notes:

[1] Ranges for the Preferred and South 344th Street alternatives reflect the two mainline alignment options (40 mph Alignment and 55 mph Design Option). For the purposes of analysis, the mainline also includes the test track and tail tracks.

[2] Ranges for the Midway Landfill Alternative reflect the three subsurface construction design options (Platform, Hybrid, and Full Excavation).

[5] With the Midway Landfill Alternative, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

The current level of project design includes uncertainties regarding the project scope, engineering data, mitigation requirements, schedule, and project delivery methods. To account for these uncertainties, the Opinion of Probable Cost is provided in a range. These conceptual estimates focus on the project elements that are defined consistently across alternatives, that capture the essential physical features of alternatives, and that help distinguish alternatives from one another.

In addition to the "Unit Cost Library" cost estimate, Sound Transit completed a more detailed estimate, applying a "bottoms up" cost methodology for the Preferred Alternative. Preliminary information from this methodology indicates cost growth of 33 percent attributable to the change in estimating methodology, inflation factors, market conditions, design development, and scoping changes. Sound Transit anticipates that the South 344th Street and Midway Landfill alternatives would have a similar increase if a "bottoms up" cost methodology were applied to those alternatives. Capital projects across the Puget Sound region are experiencing the effects of inflationary factors including increases in the cost of materials and labor. Sound Transit employs Value Management evaluations and procurement strategies to establish final project budgets, supporting prudent expenditure of public funds. Each project estimate throughout the various design phases will therefore need to be evaluated and adjusted specifically considering current market conditions. This market conditions adjustment is independent of escalation and will fluctuate with economics and the value of any given project considered by the marketplace.

Estimates for annual operating costs include long-term expenses to maintain the facility, as well as operating costs associated with trains deploying from and returning to the OMF each day. Additionally, annual mainline track maintenance expenses for the Preferred and South 344th Street alternatives would apply until TDLE is completed.

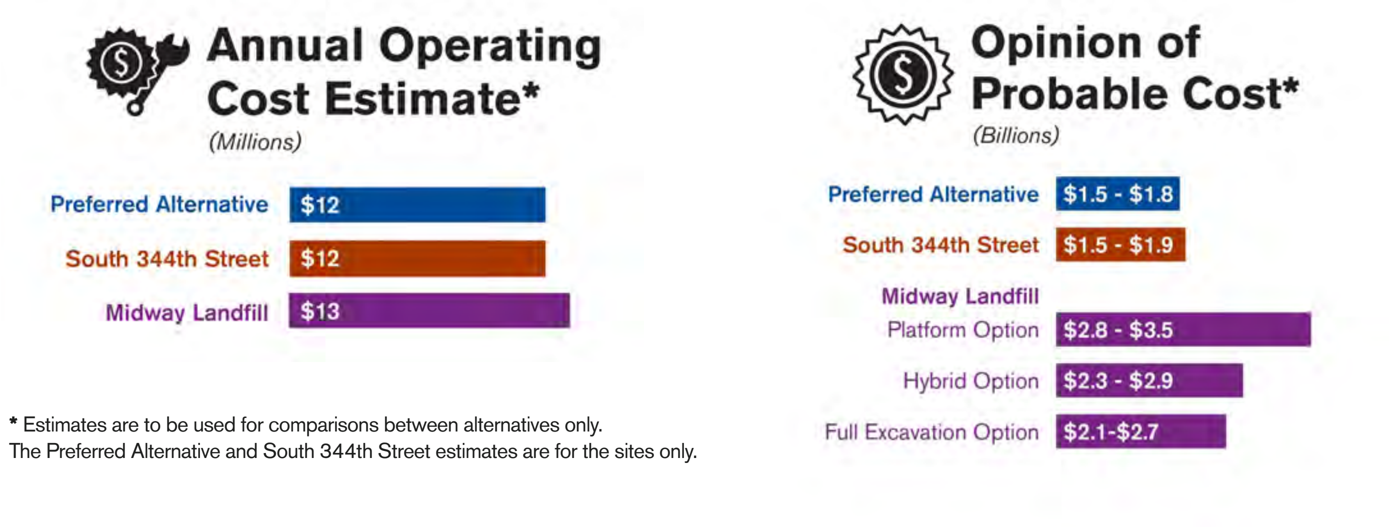
Construction Duration and Traffic

The Midway Landfill Alternative would require extensive preparation work to address site contamination and soil stability. As a result, the overall construction period (not including final design) is anticipated to range from 6 years, 2 months to 8 years, 8 months, depending on the subsurface construction design option chosen, which is nearly double to more than double the time anticipated for either of the Preferred or South 344th Street alternatives.

The extensive site preparation work required for the Midway Landfill Alternative subsurface construction design options would expose the surrounding community to construction impacts over a longer period. It would result in much higher volumes of construction traffic for exporting and importing large quantities of fill material. The Hybrid and Full Excavation subsurface construction design options are estimated to require up to approximately 570 peak daily truck trips over their site preparation phase (estimated to be up to 4 years, 4 months for the Full Excavation subsurface design option and 5 years, 7 months for the Hybrid subsurface design option). This is in comparison to approximately 80 or fewer peak daily truck trips for the other OMF South site alternatives, with also approximately 120 peak daily truck trips during mainline construction. It is important to note, however, that these estimates represent a conservative scenario during the site preparation phase and not a daily average of truck trips over the entire construction period. While I-5 and the arterials surrounding the Midway Landfill Alternative are anticipated to be able to accommodate the additional truck traffic, the substantial number of daily truck trips necessary for those subsurface construction design options could exacerbate existing congestion in some locations.

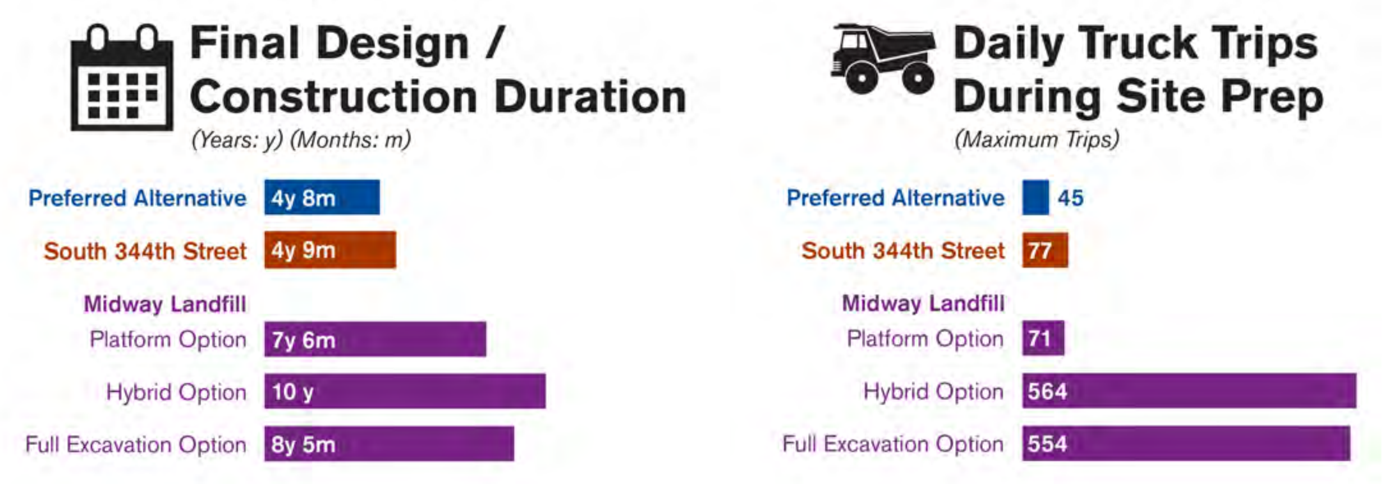
Should OMF South be at the Midway Landfill Alternative site, it would need to connect to the FWLE mainline tracks between the landfill and I-5. Construction of FWLE is underway and has a forecasted in-service date of 2026. FWLE would not preclude selection of the OMF South site at the Midway Landfill. If OMF South were to connect to the FWLE mainline tracks after they are operational, it could result in shutdowns of revenue service for periods of time during construction.

Figure ES-7: Illustrated Metrics – Comparative Cost Estimates



* Estimates are to be used for comparisons between alternatives only.
The Preferred Alternative and South 344th Street estimates are for the sites only.

Figure ES-8: Illustrated Metrics – Construction Duration and Traffic



OMF South Opening Schedule

Table ES-2 shows the forecasted in-service dates for the three OMF South build alternatives. Compared to the Preferred and South 344th Street alternatives, the Midway Landfill Alternative would open years later. The additional LRV maintenance and storage capacity provided by OMF South needs to be available with sufficient time to accept delivery of and commission new LRVs for expansion projects like TDLE and WSLE and to store existing LRVs. Without the OMF South in place, the Link light rail system would operate at reduced service levels.

Following the OMF South opening, the facility would begin receiving new LRVs. Completing delivery, testing, and commissioning for all new LRVs is anticipated to take about 3 years. Minimum operating segments and opening year service levels for TDLE and WSLE may not require all the new vehicles. Project schedules will be refined as project development advances and are not final until projects are in final design.

Table ES-2: OMF South Final Design/Construction Durations and Forecasted In-Service Dates

Characteristic	Preferred Alternative[1]	South 344th Street Alternative[1]	Midway Landfill Alternative
Final Design/ Construction Duration	4 years, 8 months	4 years, 9 months	Platform: 7 years, 6 months Hybrid: 10 years Full excavation: 8 years, 5 months
OMF South Forecasted In-Service Date	2032	2032	Platform: 2035 Hybrid: 2037 Full excavation: 2036

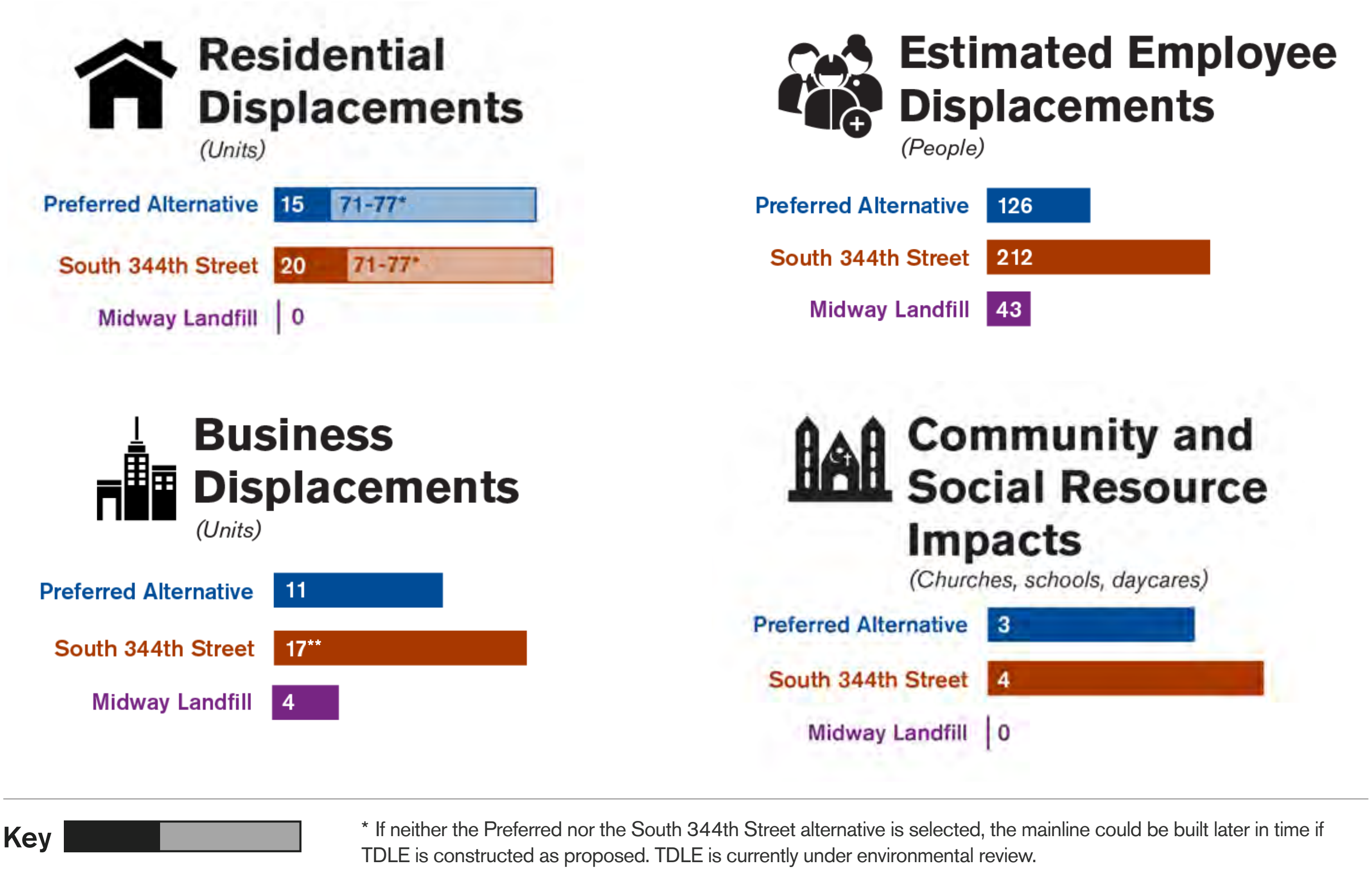
Notes: Final Design/Construction Duration includes 6 months construction float.

[1] Sound Transit is pursuing measures to advance the opening earlier (potentially 2030).

Acquisitions, Land Use, and Economics

The Preferred and South 344th Street alternatives would have the most displacements, particularly for residents and employees, as compared to the Midway Landfill Alternative, which is primarily undeveloped. Most of the residences displaced by the Preferred and South 344th Street alternatives are due to the mainline through the Belmor Mobile Home Park (Belmor). Relocating Belmor residences to mobile home parks may be challenging due to the limited availability within the area for relocating, purchasing, or renting mobile homes. The Midway Landfill Alternative would not displace any residences. However, if the Midway Landfill Alternative were selected to be built, the residential displacements from mainline construction could still occur if TDLE — currently subject to environmental review — is constructed as proposed.

Figure ES-9: Illustrated Metrics – Acquisitions, Land Use, and Economics



* If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

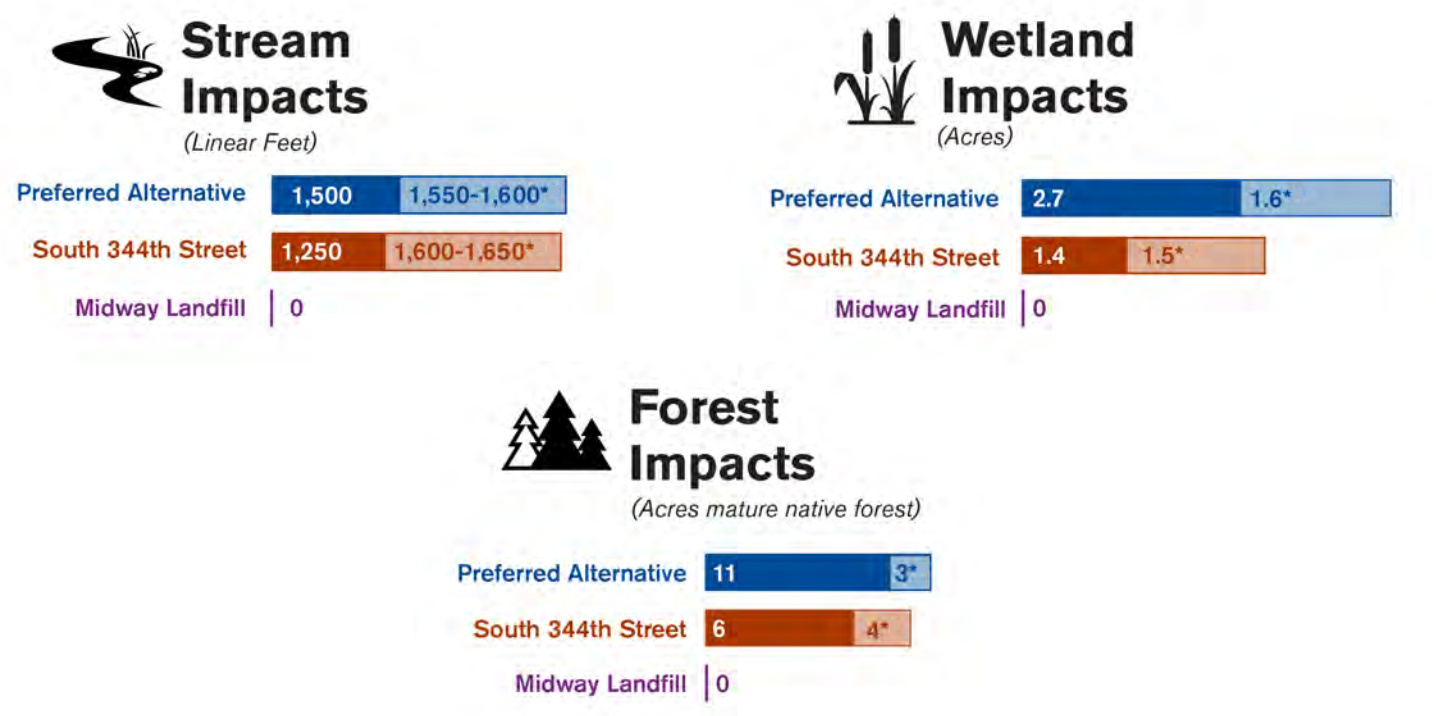
** Includes GarageTown, comprised of approximately 60 owners.

The Preferred Alternative would displace the Christian Faith Center, which includes a child-care center and the Pacific Christian Academy. The Christian Faith Center could be difficult to relocate because it consists of over 200,000 square feet of building space and numerous parking lots on an approximately 25-acre campus. The South 344th Street Alternative would displace the most businesses and employees, including the Ellenos Yogurt manufacturing facility and GarageTown, which includes approximately 60 owners. These properties could also be difficult to relocate due to their lot size, use, and specialized facility requirements. The South 344th Street Alternative would displace four religious facilities: Voice of Hope Church, Family Life Community Church, Redwood Church of God, and Tabernacle Temple of Praise.

Ecosystem Resources

Both the Preferred and South 344th Street alternatives are situated near tributaries of Hylebos Creek, including associated forested riparian habitat and wetlands that provide a range of ecological functions. The Preferred Alternative would have the greatest impact to ecological resources, including streams, wetlands, and mature native forest. The Midway Landfill Alternative is in an area with few natural resources and therefore would have minimal impacts to ecosystem resources.

Figure ES-10: Illustrated Metrics – Ecosystem Resources



Key ■ ▨

* If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

The Preferred and South 344th Street alternatives would relocate portions of East Fork Hylebos Creek Tributary, which would lead to permanent impacts to adjacent wetland and forested riparian habitat. Some of the riparian habitat along the East Fork Hylebos Creek Tributary is also considered mature forested habitat. The mainline tracks for the Preferred and South 344th Street alternatives would impact the same area of wetland, but the South 344th Street Alternative mainline tracks would impact more wetland buffer areas due to the greater length of the tail tracks. However, if the Midway Landfill Alternative were selected to be built, impacts to East Fork Hylebos Creek Tributary could still occur if TDLE is constructed as proposed.

Salmonids are not currently known or expected to be present in reaches of East Fork Hylebos Tributary or West Fork Hylebos Tributary in the study area. However, these streams are designated as Essential Fish Habitat for Pacific salmon because of their potential to support fish use.

Hazardous Materials

The Midway Landfill Alternative poses unique risks that are not of concern for the Preferred and South 344th Street alternatives. As a Superfund site, the Midway Landfill is covered by a protective cap and is under active monitoring and reporting to ensure that the cleanup measures continue to function as planned. These protective and monitoring systems would need to be replaced or upgraded to varying degrees depending on the subsurface construction design option chosen. Further, the landfill waste is decomposing and settling at different rates, which creates engineering challenges as well as concerns for safety during construction and long-term operation and maintenance. The continuation of the landfill monitoring systems and mitigation for potential risks posed by settlement and methane gas over the lifespan of the facility would add to additional operating complexities and costs.

In addition to ground settlement and human health risks, the Midway Landfill Alternative would require Washington State Department of Ecology (Ecology) and/or EPA approval to amend the existing Ecology Cleanup Action Plan and EPA ROD to confirm that the project would maintain the environmental cleanup and protection commitments currently in place for the landfill. This approval process could be lengthy and poses risk to the project schedule and cost. Further, acquisition of and construction within the Midway Landfill would cause Sound Transit to incur potential liability under state law (the Model Toxics Control Act [MTCA]) and federal law (the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]).

ES.4 Other Environmental Considerations

Environmental Justice

This Final EIS includes an Environmental Justice Assessment, as required by Executive Order 12898, Executive Order 14096, and Department of Transportation Order 5610.2C, in Appendix E. This analysis follows guidance in FTA Circular C-4703.1 and addresses whether the OMF South alternatives would result in disproportionate and adverse effects to minority or low-income populations and summarizes the public outreach to minority and low-income populations within the project area. The analysis also discusses the potential benefits of the project to minority and low-income populations, as well as the specific outreach efforts made during project development to involve these populations.

The population in the OMF South study area has a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Project impacts primarily concern displacement of housing and community facilities — including religious facilities and childcare centers — and visual impacts. Other long-term and construction-related project impacts would be limited or avoided, minimized, or mitigated through the implementation of effective best management practices and mitigation measures.

Benefits to both environmental justice and non-environmental justice populations served by the project include enhanced community connectivity for the Preferred Alternative through public space and a multi-use trail integrated into the site design, construction jobs with project labor agreements and a disadvantaged business enterprise program to support hiring minority populations, and the creation of new high-skilled, living-wage jobs to operate the facility. Indirect benefits include supporting the Sound Transit 3 system expansion by providing capacity to ensure transit reliability, access, connectivity, and frequency. Although all populations would have access to these benefits to the same extent, the benefit would be greater for minority and low-income populations because these groups are more likely to use transit.

As part of its public engagement efforts during the OMF South scoping period and 2021 SEPA Draft EIS process, Sound Transit conducted a preliminary demographic analysis to identify low income, minority, and limited-English-proficiency populations. Based on this analysis, Sound Transit used specific strategies to reach those communities during public outreach. As the project moves forward, Sound Transit will continue to engage community leaders, jurisdictions, and social service providers to seek input, assess outreach methods, and identify additional ways to reach low-income, minority, and limited-English-proficiency populations.

After considering the project's potential effects, mitigation and avoidance measures and anticipated benefit to minority and low-income populations, FTA has determined that the OMF South project would not result in disproportionate and adverse effects on minority and low-income populations.

Section 4(f)/Section 6(f) Resources

Federal law protects historic properties and significant, publicly owned parks and recreation areas from being adversely affected by U.S. Department of Transportation projects. These resources are protected under federal laws commonly referred to as Section 4(f), Section 106, and Section 6(f). Cedar Grove Park and Town Square Park, both in Federal Way, are within the study area but would not incur impacts that would rise to the level of a Section 4(f) use. Five parks are within the Midway Landfill study area (Parkside Park, Parkside Wetlands, Salt Air Vista Park, Linda Heights Park, and West Hills Park). They also would not incur impacts that would rise to the level of a Section 4(f) use. The mainline for the Preferred and South 344th Street alternatives would require the relocation of Bonneville Power Administration (BPA) powerlines. FTA and BPA determined, and the State Historic Preservation Officer (SHPO) concurred, that raising the transmission lines to accommodate the OMF South project would have no adverse effect on historic properties under Section 106. Due to this, FTA has made a determination that the Preferred and South 344th Street alternatives would have a de minimis impact under Section 4(f). There would be no use of Section 4(f) properties for the Midway Landfill Alternative. There are no Section 6(f) resources in the OMF South study area and therefore no potential impacts.

ES.5 Cumulative Impacts

Cumulative effects are from past, present, and reasonably foreseeable future actions that could interact with the impacts of OMF South alternatives, regardless of the project proponent. As described above, there would be impacts associated with TDLE that would overlap with OMF South, particularly from the mainline tracks for the Preferred and South 344th Street alternatives. TDLE would introduce additional LRVs traveling at higher speeds, which would result in greater potential noise impacts. This could require additional mitigation in the form of longer noise barriers as well as mitigation for some vibration impacts, which could be constructed as part of the OMF South project. FWLE and TDLE, combined with OMF South, could have cumulative visual impacts due to additional elevated tracks, large structures, and clearing of trees and vegetation, particularly for the mainline alignments adjacent to I-5. Lastly, these projects, coupled with OMF South, would contribute cumulatively to reductions in the amount and function of ecosystem resources in the study area. In addition, the Federal Way City Center Access Project and Washington State Department of Transportation (WSDOT)

Triangle project are proposed adjacent to the Preferred and South 344th Street alternatives. The City Center Access Project is in the early design phase, but currently does not have guaranteed construction funding. The Triangle Project was suspended in 2023, with no date scheduled for resumption.

ES.6 Avoidance, Minimization, and Mitigation

Sound Transit would comply with applicable federal, state, and local environmental regulations and would apply mitigation measures to reduce significant adverse impacts. The Final EIS identifies measures to mitigate adverse impacts as well as avoidance and minimization measures that would be part of the project. The following summarizes select mitigation measures for impacts that the alternatives might not be able to minimize or avoid. These measures would be refined through final design and permitting.

Acquisitions, Displacements, and Relocations

Sound Transit would compensate and help relocate residents and businesses affected by property acquisitions, consistent with Sound Transit policy and applicable federal regulations.

Visual and Aesthetic Resources

Sound Transit would incorporate context-sensitive design measures that would be developed and refined during final design with input from the affected communities and cities. The design measures could include additional plantings and landscaping to minimize adverse visual impacts, along with retaining wall and building façade treatments. Landscaping and aesthetic treatments would be intended to add “human-scale” elements.

Sound Transit would consult with WSDOT staff to develop appropriate site-specific measures and mitigate impacts to Resource Conservation Areas adjacent to I-5 with replacement property or with other measures agreed to by WSDOT and FHWA, consistent with the WSDOT Roadside Policy Manual.

Noise

Noise barriers would be necessary to mitigate noise impacts from train operation along the 55 mph Design Option for the mainline tracks for the Preferred and South 344th Street alternatives. The noise barriers would be along the elevated mainline tracks along a portion of Belmor. The exact location would depend on the mainline design option chosen.

Both mainline options for the Preferred and South 344th Street alternatives would modify a portion of an existing berm and remove noise walls adjacent to I-5 that screen residences from traffic noise. While the retained fill structure to support the mainline would serve as a barrier to traffic noise from I-5, the modification of the existing berm and noise walls is anticipated to result in traffic noise impacts for about one to three residences. As a result, Sound Transit may need to replace portions of noise walls and berms along I-5 that would be removed as part of the Preferred and South 344th Street alternatives. If necessary, any replacement walls would be designed to maintain noise levels at or below the future noise levels predicted without the mainline. Sound Transit would conduct additional noise analysis during final design in coordination with WSDOT to confirm whether noise mitigation is needed.

Ecosystem Resources

Both the Preferred and South 344th Street alternatives would impact wetlands, streams, and their respective forested buffers. During final design and permitting,

Sound Transit would first work to avoid and minimize impacts through design measures and best management practices. For the Preferred Alternative, Sound Transit would continue to refine the site design during final design to minimize ecosystem impacts. This could include modifying the locations of buildings, track, and 18th Place South within the site boundaries. Where impacts are unavoidable, Sound Transit would mitigate them in accordance with applicable federal regulations, local critical area ordinances, and permit requirements.

After project construction, the temporarily impacted wetlands, streams and buffers would be restored and replanted onsite. Mitigation for permanent impacts could include use of an approved mitigation bank, such as the Port of Tacoma Upper Clear Creek Mitigation Bank, or in lieu fee programs, like the King County Mitigation Reserves Program. Impacts on wetlands and streams could also be mitigated through offsite mitigation actions developed in collaboration with Tribal, federal, and state agencies and the city of Federal Way.

ES.7 Significant Unavoidable Adverse Impacts

With the avoidance, minimization, and potential mitigation measures described in this Final EIS, significant adverse impacts could be avoided for most elements of the environment.

The Preferred and South 344th Street alternatives would have varying degrees of impacts to mature forest and other native vegetation, which would result in a loss of habitat. The loss of mature forested habitat, including adjacent to the I-5 corridor, would result in longer-term ecological and visual impacts that may not be immediately mitigable by replacement vegetation or restoration actions. Additionally, the introduction of the large-scale mainline with the Preferred and South 344th Street alternatives would have high visual impacts. Implementation of mitigation measures would soften views of the mainline but would not fully mitigate the visual impacts in some locations.

ES.8 Public Involvement to Date

Sound Transit has been engaging the public and agencies since the start of early scoping in 2018, conducted under SEPA. During that early scoping, Sound Transit held a 30-day comment period from April 2 to May 3, 2018, that included open houses and opportunities for the members of the public and agencies to provide input on the purpose and need of the OMF South and TDLE projects. In 2019, Sound Transit conducted formal public environmental scoping under SEPA. This included meetings with the public and agencies, public notices and advertisements, and a comment period from February 19 through April 1, 2019. During the development of the 2021 SEPA Draft EIS, Sound Transit continued community engagement activities through drop-in sessions and an online open house where attendees could learn more about the project. Additionally, Sound Transit has had continued coordination with agencies and local jurisdictions throughout the environmental review process.

The 2021 SEPA Draft EIS was available for an extended comment period of 45 days (March 5 to April 19, 2021) that included two online public meetings/hearings and other opportunities for the public and agencies to comment in writing. Appendix B, Public Involvement and Agency Coordination, has additional details including how Sound Transit has engaged low-income and minority populations.

As the design for the Preferred Alternative was advanced and modified in response to comments received during the 2021 SEPA Draft EIS comment period, FTA and Sound Transit determined the need for an EIS in compliance with NEPA to support federal funding and approvals. On July 19, 2023, FTA issued a notice of intent to prepare an EIS in the Federal Register and initiated a 30-day scoping period under NEPA. During the scoping period FTA invited comments on the project alternatives, information, and analyses relevant to the project.

The NEPA Draft/SEPA Supplemental Draft EIS was available for a 45-day comment period (September 22 to November 6, 2023) that included one in-person and one online public meeting/hearing and other opportunities to comment in writing, including through an online open house. Sound Transit continued community engagement and Tribal, agency, and local jurisdiction coordination activities throughout the comment period. See Appendix B, Public Involvement and Agency Coordination, for more details.

ES.9 Areas of Controversy and Issues to be Resolved

The following are known areas of controversy and issues to be resolved. Others may be identified as the project advances.

Preferred and South 344th Street Alternatives

The reconfiguration of surface streets under the Preferred Alternative and the removal of street segments within the South 344th Street Alternative site may not comply with Federal Way development regulations concerning the size of blocks within the street network. If the Board were to select either the Preferred Alternative or South 344th Street Alternative, Sound Transit would work with Federal Way through the street vacation process to address the standards.

Both the Preferred and South 344th Street alternatives would impact ecosystem resources, specifically wetlands and streams. This could pose a risk to both the schedule and budget of these alternatives, given the potential complexity and extent of negotiations related to the environmental permitting process and development of a comprehensive mitigation approach acceptable to Tribal, federal, state, and local agencies. During final design, Sound Transit would refine the site design to minimize impacts to ecosystem resources. Sound Transit would coordinate with Tribal, federal, state, and local agencies in defining the mitigation approach for unavoidable impacts.

Midway Landfill Alternative

Sound Transit has identified four risks that are unique to the site's prior use as a disposal facility and classification as a Superfund site: (1) ground settlement, (2) human health and safety, (3) legal, and (4) regulatory coordination. The first two risks are described in Appendix D, Midway Landfill Support Documents. Legal risk includes incurring potential liability under MTCA and CERCLA through purchase or lease of any portion of the landfill or through construction within the landfill. Regulatory risks include impacts to the project schedule due to the additional approvals needed before construction.

ES.10 Next Steps

The following steps are anticipated after the publication of the Final EIS:

- **Project Decision:** After the Final EIS is published, the Board will consider the public comments received and the alternatives evaluated in the Final EIS and select the project alternative to be built.
- **Federal Approval:** FTA will issue a ROD that states FTA's decision on the project, identifies the alternatives considered, and lists environmental mitigation commitments. The issuance of the ROD is required before federal funding or approvals.
- **Final Design and Construction:** This phase includes final facility design, permitting, property acquisitions and relocation, construction, and testing.
- **Open for Operations:** 2032 is the forecasted in-service date for the OMF South facility, based on Sound Transit's Resolution R2021-05.

Figure ES-11 below shows the anticipated schedule for the environmental review, design, construction, and opening of OMF South.

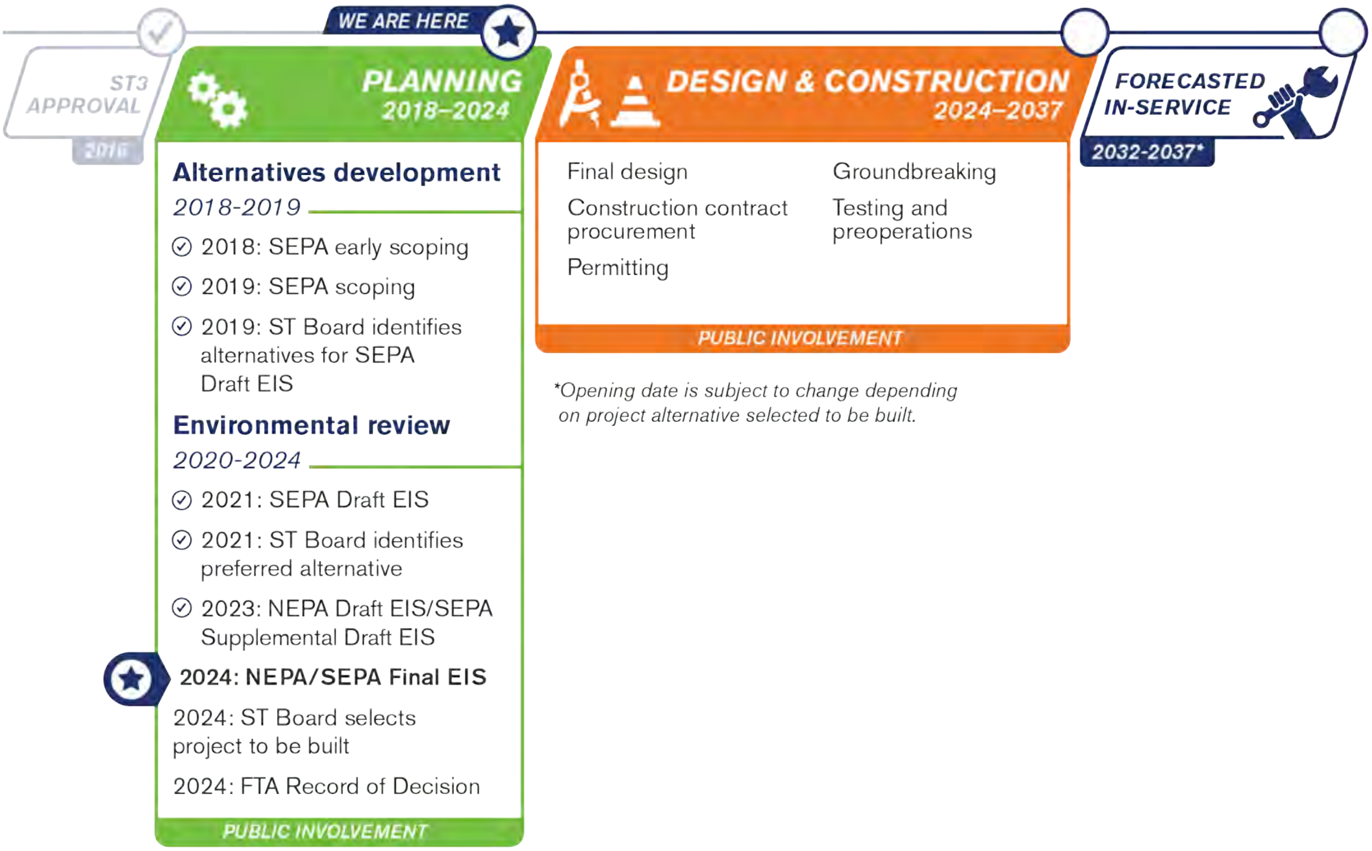

ST3
APPROVAL
2016
WE ARE HERE
PLANNING
2018–2024
Alternatives development
2018-2019
2018: SEPA early scoping
2019: SEPA scoping
2019: ST Board identifies alternatives for SEPA Draft EIS
Environmental review
2020-2024
2021: SEPA Draft EIS
2021: ST Board identifies preferred alternative
2023: NEPA Draft EIS/SEPA Supplemental Draft EIS
2024: NEPA/SEPA Final EIS
2024: ST Board selects project to be built
2024: FTA Record of Decision
PUBLIC INVOLVEMENT
DESIGN & CONSTRUCTION
2024–2037
Final design
Construction contract procurement
Permitting
Groundbreaking
Testing and preoperations
PUBLIC INVOLVEMENT
FORECASTED
IN-SERVICE
2032-2037*
*Opening date is subject to change depending on project alternative selected to be built.

Figure ES-11: Anticipated Project Milestones

CONTACT US

Visit our webpage and sign up for project news www.soundtransit.org/omfs

Email OMFSouth@soundtransit.org

Call 206-398-5453

Federal Transit Administration

SOUNDTRANSIT

Table of Contents

FACT SHEET ...... **ES-i**

EXECUTIVE SUMMARY **ES-1**

Introduction ES-1
ES.1 Purpose and Need ES-4
ES.2 Alternatives Considered ES-4
ES.3 Comparison of Alternatives ES-17
ES.4 Other Environmental Considerations ES-26
ES.5 Cumulative Effects ES-27
ES.6 Avoidance, Minimization, and Mitigation ES-27
ES.7 Significant Unavoidable Adverse Impacts ES-28
ES.8 Public Involvement to Date ES-29
ES.9 Areas of Controversy and Issues to be Resolved ES-29
ES.10 Next Steps ES-30

INTRODUCTION **1-1**

1 PURPOSE AND NEED FOR THE PROJECT **1-2**

1.1 Sound Transit 3: The Regional Transit System Plan for Central Puget Sound . 1-2
1.2 Purpose of the Project 1-4
1.3 Need for the Project 1-4

2 ALTERNATIVES CONSIDERED **2-1**

2.1 Background and Project Development 2-1
  2.1.1 OMF South Components 2-3
  2.1.2 OMF South Operations 2-5
2.2 Alternative Development and Scoping 2-7
  2.2.1 Early Scoping 2-7
  2.2.2 Identifying Potential OMF South Sites 2-8
  2.2.3 SEPA Scoping 2-11
  2.2.4 Board Identification of Site Alternatives 2-13
  2.2.5 Refinement of Alternatives for the 2021 SEPA Draft EIS 2-13
  2.2.6 2021 SEPA Draft EIS Publication and Board Identification of Preferred Alternative 2-14
  2.2.7 Federal Environmental Review Process 2-14
  2.2.8 Design Updates 2-14
2.3 Project Alternatives 2-15
  2.3.1 No-Build Alternative 2-15
  2.3.2 Build Alternatives 2-16

2.3.3 Overview of Construction Approach 2-26
2.3.4 Construction Methods, Sequence, and Activities 2-26
2.3.5 Midway Landfill Site Subsurface Construction Design Options 2-27
2.3.6 Staging Areas and Construction Easements 2-30
2.4 Environmental Commitments and Sustainability 2-30
2.5 Funding and Opinion of Probable Cost 2-31
2.6 Next Steps and Schedule 2-33
2.6.1 Project Schedule 2-33
2.6.2 Benefits and Disadvantages of Delaying Project Implementation 2-34

3 AFFECTED ENVIRONMENT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES 3.1-1

3.1 Introduction 3.1-1
3.2 Transportation 3.2-1
3.2.1 Affected Environment 3.2-1
3.2.2 Environmental Impacts 3.2-13
3.2.3 Mitigation Measures 3.2-42
3.3 Acquisitions, Displacements, and Relocations 3.3-1
3.3.1 Affected Environment 3.3-1
3.3.2 Environmental Impacts 3.3-2
3.3.3 Relocation Opportunities 3.3-5
3.3.4 Sound Transit Acquisition and Relocation Policy Summary 3.3-7
3.3.5 Mitigation Measures 3.3-8
3.4 Land Use 3.4-1
3.4.1 Affected Environment 3.4-1
3.4.2 Consistency with Regional and Local Comprehensive Plans and Zoning 3.4-11
3.4.3 Environmental Impacts 3.4-14
3.4.4 Mitigation Measures 3.4-18
3.5 Economics 3.5-1
3.5.1 Affected Environment 3.5-1
3.5.2 Environmental Impacts 3.5-5
3.5.3 Mitigation Measures 3.5-12
3.6 Environmental Justice, Social Resources, Community Facilities, and Neighborhoods 3.6-1
3.6.1 Affected Environment 3.6-1
3.6.2 Environmental Impacts 3.6-7
3.6.3 Environmental Justice Summary 3.6-11
3.6.4 Mitigation Measures 3.6-13

3.7 Visual and Aesthetic Resources 3.7-1
  3.7.1 Affected Environment 3.7-1
  3.7.2 Environmental Impacts 3.7-9
  3.7.3 Mitigation Measures 3.7-22
3.8 Air Quality and Greenhouse Gas Emissions 3.8-1
  3.8.1 Affected Environment 3.8-1
  3.8.2 Environmental Impacts 3.8-3
  3.8.3 Mitigation Measures 3.8-9
3.9 Noise and Vibration 3.9-1
  3.9.1 Affected Environment 3.9-2
  3.9.2 Environmental Impacts 3.9-7
  3.9.3 Mitigation Measures 3.9-13
3.10 Ecosystem Resources 3.10-1
  3.10.1 Affected Environment 3.10-1
  3.10.2 Environmental Impacts 3.10-10
  3.10.3 Mitigation Measures 3.10-33
3.11 Water Resources 3.11-1
  3.11.1 Affected Environment 3.11-1
  3.11.2 Environmental Impacts 3.11-9
  3.11.3 Mitigation Measures 3.11-20
3.12 Geology and Soils 3.12-1
  3.12.1 Affected Environment 3.12-1
  3.12.2 Environmental Impacts 3.12-3
  3.12.3 Mitigation Measures 3.12-7
3.13 Hazardous Materials 3.13-1
  3.13.1 Affected Environment 3.13-1
  3.13.2 Environmental Impacts 3.13-8
  3.13.3 Mitigation Measures 3.13-12
3.14 Public Services 3.14-1
  3.14.1 Affected Environment 3.14-1
  3.14.2 Environmental Impacts 3.14-7
  3.14.3 Mitigation Measures 3.14-12
3.15 Utilities, Energy, and Electromagnetic Fields 3.15-1
  3.15.1 Affected Environment 3.15-2
  3.15.2 Environmental Impacts 3.15-4
  3.15.3 Mitigation Measures 3.15-14
3.16 Historic and Archaeological Resources 3.16-1
  3.16.1 Regulatory Context 3.16-2
  3.16.2 Affected Environment 3.16-3
  3.16.3 Environmental Impacts 3.16-9
  3.16.4 Mitigation Measures 3.16-12

3.17 Parks and Recreational Resources 3.17-1
  3.17.1 Affected Environment 3.17-1
  3.17.2 Environmental Impacts 3.17-3
  3.17.3 Mitigation Measures 3.17-6
3.18 Section 4(f) and 6(f) Resources 3.18-1
  3.18.1 Affected Environment 3.18-1
  3.18.2 Environmental Impacts 3.18-2
  3.18.3 Mitigation Measures 3.18-2

4 CUMULATIVE EFFECTS ANALYSIS 4-1

4.1 Temporal and Geographic Boundaries of the Cumulative Effects Analysis 4-1
4.2 Past and Present Actions 4-2
  4.2.1 Natural Environment 4-2
  4.2.2 Built Environment 4-3
4.3 Reasonably Foreseeable Future Actions 4-3
4.4 Analysis of Cumulative Effects 4-8
  4.4.1 Transportation 4-8
  4.4.2 Acquisitions, Displacements, and Relocations 4-9
  4.4.3 Land Use 4-9
  4.4.4 Economics 4-10
  4.4.5 Environmental Justice, Social Resources, Community Facilities, and Neighborhoods 4-11
  4.4.6 Visual and Aesthetic Resources 4-11
  4.4.7 Air Quality and Greenhouse Gas Emissions 4-12
  4.4.8 Noise and Vibration 4-12
  4.4.9 Ecosystem Resources 4-13
  4.4.10 Water Resources 4-14
  4.4.11 Geology and Soils 4-15
  4.4.12 Hazardous Materials 4-15
  4.4.13 Public Services 4-15
  4.4.14 Utilities, Energy, and Electromagnetic Fields 4-16
  4.4.15 Historic and Archaeological Resources 4-16
  4.4.16 Parks and Recreational Resources 4-17

5 COMMENT SUMMARY 5-1

5.1 Overview of the 2021 Draft Environmental Impact Statement Comment Period 5-1

5.1.1 Comments from Tribes and Agencies 5-1

5.1.2 Comments from Businesses and Community Groups 5-6

5.1.3 General Public Comments 5-9

5.2 Overview of the 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement 5-11

5.2.1 Comments from Tribes, Agencies, and Jurisdictions 5-12

5.2.2 Comments from Businesses and Community Groups 5-14

5.2.3 General Public Comments 5-15

5.3 Responses to Common Comments 5-15

Figures

Figure ES-1 Link Light Rail System Expansion ES-2

Figure ES-2 Project Alternatives ES-3

Figure ES-3 Mainline Track Options ES-9

Figure ES-4 Conceptual Layout: Preferred Alternative ES-10

Figure ES-5 Conceptual Layout: South 344th Street Alternative ES-12

Figure ES-6 Conceptual Layout: Midway Landfill Alternative ES-15

Figure ES-7 Illustrated Metrics – Opinion of Probable Cost ES-20

Figure ES-8 Illustrated Metrics – Construction Duration and Traffic ES-21

Figure ES-9 Illustrated Metrics – Acquisitions, Land Use, and Economics ES-22

Figure ES-10 Illustrated Metrics – Ecosystem Resources ES-23

Figure ES-11 Anticipated Project Milestones ES-31

Figure 1.1-1 Link Light Rail System Expansion 1-3

Figure 2.1-1 Link System Future Expansion and OMF Site Locations 2-2

Figure 2.1-2 Link Light Rail Vehicle 2-3

Figure 2.1-3 Typical OMF Schematic 2-4

Figure 2.2-1 OMF South Sites Included in the Development of SEPA Alternatives 2-8

Figure 2.2-2 SEPA Scoping Alternatives 2-12

Figure 2.3-1 Project Alternatives 2-17

Figure 2.3-2 Mainline Track Options 2-18

Figure 2.3-3 Preferred Alternative Overview Map 2-20

Figure 2.3-4 Conceptual Layout: Preferred Alternative 2-21

Figure 2.3-5 Conceptual Layout: South 344th Street Alternative 2-23

Figure 2.3-6 Conceptual Layout: Midway Landfill Alternative 2-25

Figure 2.3-7 Platform Subsurface Construction Design Option Cross Section 2-29

Figure 2.3-8 Hybrid Subsurface Construction Design Option Cross Section 2-29

Figure 2.3-9 Full Excavation Subsurface Construction Design Option Cross Section 2-30

Figure 3.2-1 Transportation Study Area: Preferred and South 344th Street Alternatives 3.2-2
Figure 3.2-2 Study Area Intersections: Preferred and South 344th Street Alternatives..... 3.2-3
Figure 3.2-3 Transportation Study Area: Midway Landfill Alternative 3.2-4
Figure 3.2-4 Study Area Intersections: Midway Landfill Alternative 3.2-5
Figure 3.2-5 Existing Bicycle and Pedestrian Facilities: Preferred and South 344th Street Alternatives..... 3.2-10
Figure 3.2-6 Existing Bicycle and Pedestrian Facilities: Midway Landfill Alternative..... 3.2-11
Figure 3.2-7 2042 Build Alternative AM and PM Peak Hour Traffic Operations: Preferred Alternative 3.2-21
Figure 3.2-8 2042 Build Alternative AM and PM Peak Hour Traffic Operations: South 344th Street Alternative..... 3.2-25
Figure 3.2-9 2042 Build Alternative AM and PM Peak Hour Traffic Operations: Midway Landfill Alternative..... 3.2-29
Figure 3.2-10 Existing Annual Average Daily Traffic Along Truck-Haul Routes: Preferred Alternative 3.2-34
Figure 3.2-11 Existing Annual Average Daily Traffic Along Truck-Haul Routes: South 344th Street Alternative..... 3.2-36
Figure 3.2-12 Existing Annual Average Daily Traffic Along Truck-Haul Routes: Midway Landfill Alternative..... 3.2-40
Figure 3.4-1 Existing Land Uses: Preferred Alternative 3.4-3
Figure 3.4-2 Generalized Zoning: Preferred Alternative 3.4-4
Figure 3.4-3 Existing Land Uses: South 344th Street Alternative 3.4-6
Figure 3.4 4 Generalized Zoning: South 344th Street Alternative..... 3.4-7
Figure 3.4-5 Existing Land Uses: Midway Landfill Alternative 3.4-9
Figure 3.4 6 Generalized Zoning: Midway Landfill Alternative..... 3.4-10
Figure 3.5-1 Forecast Analysis Zones: OMF South Alternatives 3.5-4
Figure 3.6-1 Neighborhoods: OMF South Alternatives 3.6-2
Figure 3.6-2 Social Resources Affected Environment: Preferred and South 344th Street Alternatives..... 3.6-3
Figure 3.6-3 Social Resources Affected Environment: Midway Landfill Alternative..... 3.6-4
Figure 3.7-1 Visual Conditions and Key Observation Points: Mainline Track Options 3.7-3
Figure 3.7-2 Visual Conditions and Key Observation Points: Preferred Alternative 3.7-4
Figure 3.7-3 Visual Conditions and Key Observation Points: South 344th Street Alternative..... 3.7-5
Figure 3.7-4 Visual Conditions and Key Observation Points: Midway Landfill Alternative..... 3.7-6
Figure 3.7-5 Mainline Tracks Key Observation Point 1..... 3.7-11
Figure 3.7-6 Mainline Tracks Key Observation Point 2..... 3.7-11
Figure 3.7-7 Mainline Tracks Key Observation Point 3..... 3.7-12
Figure 3.7-8 Mainline Tracks Key Observation Point 4..... 3.7-12
Figure 3.7-9 Preferred Alternative Key Observation Point 1 ..... 3.7-14
Figure 3.7-10 Preferred Alternative Key Observation Point 2 ..... 3.7-14
Figure 3.7-11 Preferred Alternative Key Observation Point 3 ..... 3.7-15

Figure 3.7-12 South 344th Street Alternative Key Observation Point 1 .... 3.7-16
Figure 3.7-13 South 344th Street Alternative Key Observation Point 2 .... 3.7-17
Figure 3.7-14 South 344th Street Alternative Key Observation Point 3 .... 3.7-17
Figure 3.7-15 Midway Landfill Alternative Key Observation Point 1.................................. 3.7-18
Figure 3.7-16 Midway Landfill Alternative Key Observation Point 2.................................. 3.7-19
Figure 3.7-17 Midway Landfill Alternative Key Observation Point 3.................................. 3.7-19
Figure 3.7-18 Midway Landfill Alternative Key Observation Point 4.................................. 3.7-20
Figure 3.9-1 Measurement Locations for Existing Ambient Noise and Vibration: Preferred Alternative 3.9-4
Figure 3.9-2 Measurement Locations for Existing Ambient Noise and Vibration: South 344th Street Alternative.. 3.9-5
Figure 3.9-3 Measurement Locations for Existing Ambient Noise: Midway Landfill Alternative.. 3.9-6
Figure 3.9-4 Noise Impact Locations: 55 mph Design Option... 3.9-10
Figure 3.9-5 Noise Barrier Locations: 55 mph Design Option... 3.9-15
Figure 3.10-1 Ecosystem Resources: Mainline Track Options 3.10-2
Figure 3.10-2 Ecosystem Resources: Preferred and South 344th Street Alternatives....... 3.10-3
Figure 3.10-3 Ecosystem Resources: Midway Landfill Alternative.................................... 3.10-4
Figure 3.11-1 Water Resources Affected Environment: Preferred and South 344th Street Alternatives.. 3.11-2
Figure 3.11-2 Water Resources Affected Environment: Midway Landfill Alternative.......... 3.11-3
Figure 3.11-3 Study Area Hydrologic Soil Groups: Preferred and South 344th Street Alternatives 3.11-6
Figure 3.11-4 Study Area Hydrologic Soil Groups: Midway Landfill Alternative 3.11-7
Figure 3.13-1 Preferred and South 344th Street Alternatives 3.13-3
Figure 3.13-2 Hazardous Material Sites: Hazardous Material Sites: Midway Landfill Alternative.. 3.13-4
Figure 3.14-1 Public Services: Preferred and South 344th Street Alternatives 3.14-2
Figure 3.14-2 Public Services: Midway Landfill Alternative... 3.14-5
Figure 3.14-3 Emergency Response Routes: South 344th Street Alternative.................... 3.14-9
Figure 3.16-1 Area of Potential Effect: OMF South 3.16-4
Figure 3.16-2 Built Environment Parcel Survey: Preferred and South 344th Street Alternatives 3.16-7
Figure 3.16-3 Built Environment Parcel Survey: Midway Landfill Alternative 3.16-8
Figure 3.17-1 Parks and Recreational Resources: Preferred and South 344th Street Alternatives 3.17-2
Figure 3.17-2 Parks and Recreational Resources: Midway Landfill Alternative 3.17-4
Figure 4.3-1 Past, Present, and Reasonably Foreseeable Future Actions 4-5
Figure 4.3-2 Past, Present, and Reasonably Foreseeable Future Actions 4-6

Tables

Table ES-1 Key Characteristics and Impacts of the Build Alternatives ES-17
Table ES-2 OMF South Final Design/Construction Durations and Planned Opening Dates ES-24
Table 2.2-1 OMF South Building/Yard, MOW, and Link System-Wide Storage Staff Calculations 2-5
Table 2.2-2 Draft Operating Plan for Link Light Rail 2-6
Table 2.2-3 Evaluation Criteria, Measures, and Methods 2-9
Table 2.3-1 Estimated OMF South Construction Durations 2-27
Table 2.3-2 Midway Landfill Preparation Material Requirements 2-28
Table 2.5-1 Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives 2-32
Table 2.7-1 Project Schedule 2-34
Table 3.2 1 Average Control Delay Used in Level of Service 3.2-6
Table 3.2 2 Planning and Operational Level of Service 3.2-6
Table 3.2 3 Level of Service Standards 3.2-7
Table 3.2 4 Freight Goods Transportation System Classification System 3.2-8
Table 3.2-5 Forecast Auto Volumes for the Build Alternatives 2042 AM and PM Peak Hours 3.2-16
Table 3.2-6 Preferred Alternative 2042 AM Peak Hour Traffic Operations 3.2-19
Table 3.2-7 Preferred Alternative 2042 PM Peak Hour Traffic Operations 3.2-20
Table 3.2-8 South 344th Street Alternative 2042 AM Peak Hour Traffic Operations 3.2-23
Table 3.2-9 South 344th Street Alternative 2042 PM Peak Hour Traffic Operations 3.2-24
Table 3.2-10 Midway Landfill Alternative 2042 AM Peak Hour Traffic Operations 3.2-27
Table 3.2-11 Midway Landfill Alternative 2042 PM Peak Hour Traffic Operations 3.2-28
Table 3.2 12 Estimated Truck Activity and Passenger Car Equivalency Values Associated with Site Preparation for the Build Alternatives 3.2-31
Table 3.2-13 Estimated Hourly Truck Activity at the Preferred and South 344th Street Alternatives Compared with Existing AADT 3.2-32
Table 3.2 14 Estimated Truck Activity Associated with Site Preparation for Midway Landfill Alternative Subsurface Construction Design Options 3.2-37
Table 3.2 15 Estimated Hourly Truck Activity Associated with Midway Landfill Alternative Subsurface Construction Design Options 3.2-38
Table 3.2-16 Estimated Daily Truck Activity for the Midway Landfill Alternative Compared with Existing AADT 3.2-39
Table 3.3 1 Potentially Affected Parcels and Displacements 3.3-3
Table 3.3 2 Affected Parcels by Land Use 3.3-3
Table 3.3-3 Property Available for Relocation in the Study Area 3.3-6

Table 3.3-4 Residential Property Available for Relocation in the Study Area.................... 3.3-6

Table 3.4-1 Estimated Share of Total Commercial, Mixed-Use, and Residential Zoned Land to Be Acquired 3.4-15

Table 3.4-2 Amount of Converted Land by Land Uses.. 3.4-15

Table 3.5-1 Population, Household, and Employment Forecasts by Region and County 3.5-2

Table 3.5-2 Population, Household, Employment Forecast by FAZ 3.5-2

Table 3.5-3 Employment Forecasts by Census Tract.. 3.5-3

Table 3.5 4 General Fund Revenues for Federal Way and Kent..................................... 3.5-5

Table 3.5-5 Property Acquisition Impacts on Businesses and Employees 3.5-7

Table 3.5-6 Total Taxable Assessed Valuation by Alternative... 3.5-9

Table 3.5 7 Direct Expenditures and Direct Employment During Construction.............. 3.5-11

Table 3.6 1 Study Area Demographics 3.6-7

Table 3.7 1 Existing Visual Quality for the OMF South Alternatives 3.7-2

Table 3.7-2 Mitigation for Impacts to Visual and Aesthetic Resources 3.7-23

Table 3.8-1 PM2.5 Monitoring results at Beacon Hill, Kent, and Auburn Monitoring Stations (micrograms per cubic meter).. 3.8-2

Table 3.8-2 Ozone Monitoring Results at Beacon Hill Monitoring Station (parts per million) 3.8-2

Table 3.8 3 Annual Operational Greenhouse Gas Emissions 3.8-5

Table 3.8-4 Total Annual Greenhouse Gas Emissions... 3.8-7

Table 3.8-5 Social Cost of GHG Emissions and Emission Equivalencies........................ 3.8-7

Table 3.9 1 Summary of Existing Ambient Noise Measurement Results.......................... 3.9-3

Table 3.9-2 Summary of Noise Impacts: 40 mph Alignment Mainline Track..................... 3.9-8

Table 3.9-3 Summary of Noise Impacts: 55 mph Design Option Mainline Track 3.9-9

Table 3.9-4 Typical Construction Scenario, At-Grade Track 3.9-11

Table 3.9 5 Summary of Potential Noise Barrier Locations 3.9-14

Table 3.10 1 Potential Long-Term Impacts on Aquatic Resources................................ 3.10-13

Table 3.10 2 Potential Long-Term Impacts on Vegetation 3.10-19

Table 3.10 3 Potential Long-Term Impacts on Wetlands... 3.10-22

Table 3.10 4 Potential Long-Term Wetland Buffer Impacts... 3.10-23

Table 3.10-5 Potential Temporary (Construction-Related) Impacts on Aquatic Resources.. 3.10-26

Table 3.10 6 Potential Temporary (Construction-Related) Impacts on Vegetation 3.10-28

Table 3.10-7 Potential Temporary (Construction-Related) Impacts on Wetlands 3.10-30

Table 3.10-8 Potential Temporary (Construction-Related) Impacts on Wetland Buffers. 3.10-31

Table 3.11 1 Potentially Affected Surface Water Bodies 3.11-5

Table 3.11 2 Total Impervious Surface Land Cover Changes 3.11-10

Table 3.11 3 Pollution-Generating Impervious Surface Land Cover Changes 3.11-11

Table 3.12 1 Cut and Fill Volumes for the OMF South Build Alternatives 3.12-5

Table 3.13-1 Number of Hazardous Material Sites within Study Areas 3.13-2

Table 3.14-1 Emergency Response Travel Times: South 344th Street Alternative 3.14-10

Table 3.15-1 Utility Providers in Study Area 3.15-2

Table 3.15-2 2019 Utility Data for Puget Sound Energy 3.15-3

Table 3.15-3 Estimated Aggregate Annual Operational and Maintenance Energy Consumption for OMF South Build Alternatives 3.15-5

Table 3.15 4 Summary of Utility Impacts for OMF South Build Alternatives 3.15-8

Table 3.15 5 Total Construction-Related Energy Consumption 3.15-9

Table 3.15-6 Preferred and South 344th Street Alternatives Mainline Utility Impacts Summary 3.15-10

Table 3.16-1 Summary of Archaeological Resources within the APE 3.16-6

Table 3.17-1 Parks and Recreational Resources: Preferred and South 344th Street Alternatives 3.17-1

Table 3.17-2 Parks and Recreational Resources: Midway Landfill Alternative 3.17-3

Table 4.3-1 Past, Present, and Reasonably Foreseeable Future Actions 4-3

Table 4.4-1 Ecosystem Resource Impacts from Reasonably Foreseeable Future Projects in the Study Area 4-14

Appendices

Appendix A	Environmental Impact Statement Support Information
- A1	List of Preparers
- A2	Distribution List
- A3	Glossary
- A4	References

Appendix B	Public Involvement and Agency Coordination

Appendix C	Conceptual Design Drawings and Engineering Information[1]

Appendix D	Midway Landfill Support Documents[1]
- D1	Midway Landfill Site Engineering Optimization Report
- D2	Interim Midway Landfill Preparation Memorandum
- D3	Conceptual Landfill Site Reuse Plan
- D4	Midway Landfill Human Health Risk Assessment (plus addendum)

Appendix E	Environmental Justice Assessment

Appendix F	Section 4(f) and Section 6(f) Assessment

Appendix G	Technical Reports[1]
- G1	Transportation Technical Report
- G2	Noise and Vibration Technical Report
- G3	Ecosystem Resources Technical Report
- G4	Historic and Archaeological Resources Technical Report

Appendix H	Supporting Information for Other Technical Analyses
- H1	Potentially Affected Parcels
- H2	Land Use Technical Appendix
- H3	Visual and Aesthetic Resources Technical Appendix
- H4	Air Quality and Greenhouse Gas Emissions Technical Appendix
- H5	Water Quality Technical Appendix

Appendix I	Biological Assessment

Appendix J	Environmental Mitigation Plan

Appendix K	Potential Preferred Alternative Design Refinements

Appendix L	Draft EIS Comments and Responses
- L1	2021 SEPA Draft EIS Comments and Responses
- L2	2023 NEPA Draft/SEPA Supplemental Draft EIS Comments and Responses

---

[1] Available on electronic flash drive and the project website at http://www.soundtransit.org/system-expansion/operations-maintenance-facility-south/documents. Printed versions are available for the cost of reproduction.

INTRODUCTION

In March 2021, the Central Puget Sound Regional Transit Authority (Sound Transit) published a Draft Environmental Impact Statement (EIS) under the State Environmental Policy Act (SEPA) for the Operations and Maintenance Facility South (OMF South) Project. After considering the 2021 SEPA Draft EIS and the comments received, the Sound Transit Board of Directors (Board) identified the South 336th Street Alternative as the Preferred Alternative for study in the Final EIS, along with the other alternatives (Motion M2021-81, December 2021). Subsequently, the design for the Preferred Alternative was advanced and modified in response to comments received during the 2021 SEPA Draft EIS comment period. To meet additional operational needs, a test track was added to the Preferred and South 344th Street alternatives. These changes are described in Section 2.2.8, Design Updates.

In January 2023, the Federal Transit Administration (FTA) and Sound Transit determined that compliance under the National Environmental Policy Act (NEPA) was necessary to support federal approvals and funding.

To reduce duplication of process, FTA and Sound Transit prepared a Draft EIS as a combined NEPA/SEPA document. Since a Draft EIS under SEPA was already published, the document served as a Draft EIS under NEPA and a Supplemental Draft EIS under SEPA, referred to simply as the Draft EIS herein. This document has been prepared under both NEPA and SEPA and is the Final EIS. FTA is the lead federal agency under NEPA, and Sound Transit is the lead agency under SEPA. The Final EIS evaluates a Preferred Alternative, two other build alternatives, and a No-Build Alternative. The No-Build Alternative represents the transportation system and environment as they would exist without the construction and operation of OMF South.

1 PURPOSE AND NEED FOR THE PROJECT

Sound Transit proposes to construct OMF South, an operations and maintenance facility (OMF) in the South Corridor to support Sound Transit's Link light rail system expansion. This expansion and the related increase in the light rail vehicle (LRV) fleet and daily operations is identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). Sound Transit's goal is to preserve and promote a healthy and sustainable environment by minimizing adverse impacts to people and the natural and built environments.

1.1 Sound Transit 3: The Regional Transit System Plan for Central Puget Sound

Under Sound Transit 3, the light rail system in central Puget Sound would grow to 116 miles with over 80 stations. Figure 1.1-1 shows the full system planned for operation in 2042 under the target schedule. It includes light rail expansion north to Everett, south to Federal Way and Tacoma, east to Redmond, south Kirkland and Issaquah, and west to West Seattle and Ballard. In addition to the two existing operation and maintenance facilities — OMF Central, in Seattle, and OMF East, in Bellevue — new operation and maintenance facilities would be needed in the North and South Corridors to support the system expansion.

North Corridor

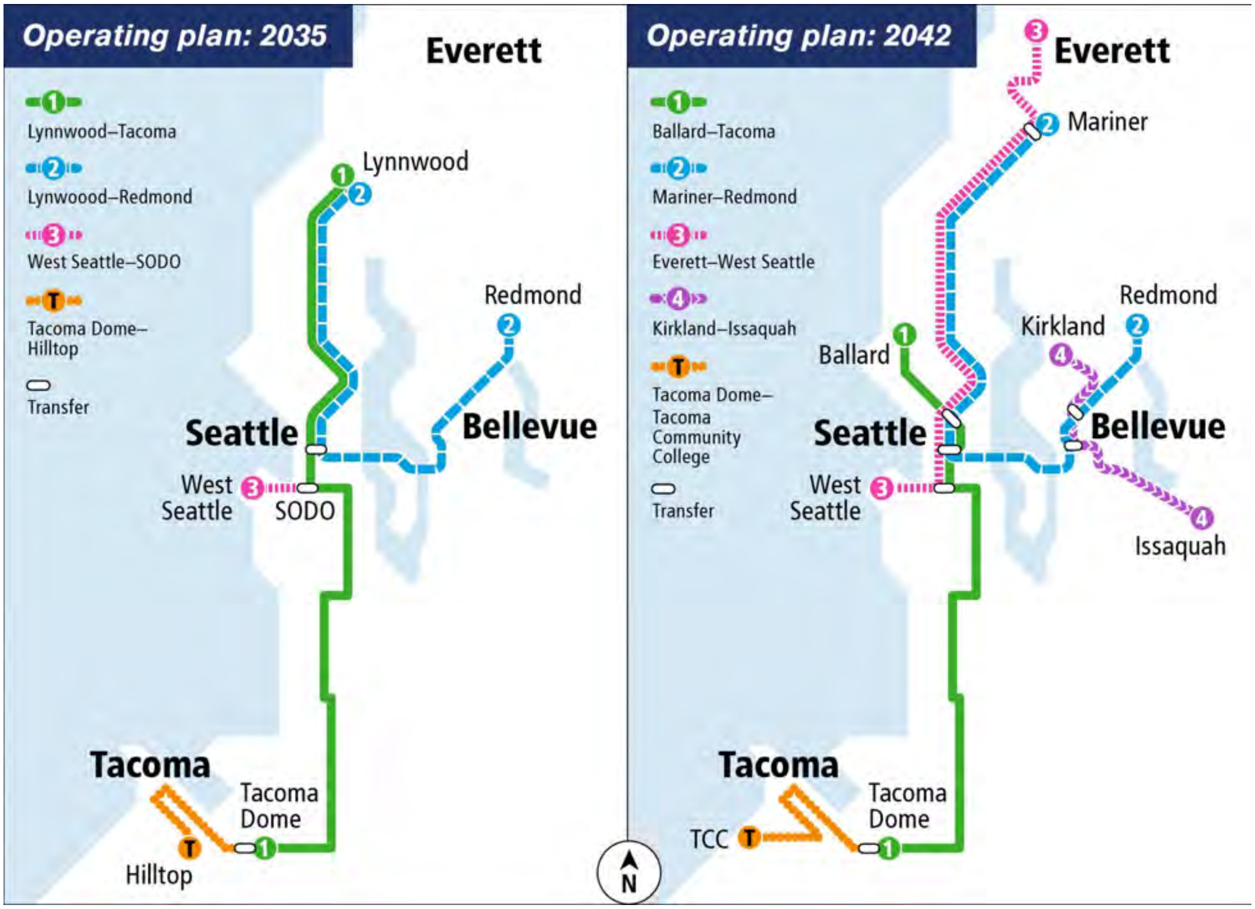
Sound Transit 3 includes extending light rail north from the Lynnwood Transit Center to downtown Everett via the Southwest Everett Industrial Center. The forecasted in-service date for this line is 2037 under the target schedule and includes six stations serving the areas of West Alderwood Mall, Ash Way, Mariner, Southwest Everett Industrial Center, State Route (SR) 526 near Evergreen Way, and the area at the existing Everett Station. Additional parking would be provided at the Mariner and Everett stations. A light rail OMF would be in the North Corridor to maintain and store a portion of the LRV fleet for the Everett to Alaska Junction and Mariner Way to Downtown Redmond services.

Affordable and Target Schedules

Due to steeply rising real estate prices and other construction expenses, Sound Transit projects currently in early planning and design, including OMF South, are seeing cost estimate increases. To ensure that funding remains available to complete all voter-approved projects, the Sound Transit Board conducted a "realignment" process that established the following two schedules:

Affordable Schedule: a schedule that is affordable, using current financial projections and cost estimates to set the general order in which projects will advance. This "affordable" schedule established an approach to prioritize, fund, and manage program work over time (Resolution 2021- 05).

Target Schedule: schedule for priority projects, as close to Sound Transit 3 Plan schedules as possible, reliant upon reductions in the affordability gap through cost savings and additional revenue.


Operating plan: 2035
1 Lynnwood–Tacoma
2 Lynwoood–Redmond
3 West Seattle–SODO
T Tacoma Dome–Hilltop
Transfer
Everett
Lynnwood
Redmond
Seattle
Bellevue
West Seattle
SODO
Tacoma
Tacoma Dome
Hilltop
Operating plan: 2042
1 Ballard–Tacoma
2 Mariner–Redmond
3 Everett–West Seattle
4 Kirkland–Issaquah
T Tacoma Dome–Tacoma Community College
Transfer
Everett
Mariner
Redmond
Kirkland
Ballard
Seattle
Bellevue
West Seattle
Issaquah
Tacoma
Tacoma Dome
TCC
N

Note: The 2042 operating plan is the target schedule.

Figure 1.1-1 Link Light Rail System Expansion

Central Corridor

Sound Transit 3 includes two light rail extensions within Seattle. The first extension would add 4.7 miles of light rail service from Seattle to West Seattle’s Alaska Junction neighborhood with four stations between South of Downtown (known as SODO) and Alaska Junction with service anticipated to begin in 2032. The second extension would add 7.1 miles of light rail service from downtown Seattle to Ballard, which includes a 3.3-mile light rail-only tunnel through downtown Seattle and South Lake Union and has a forecasted in-service date of 2039. This extension would have nine new stations between International District/Chinatown and Market Street in Ballard. In addition, three infill stations would be added serving NE 130th Street, S Graham Street, and S Boeing Access Road near Interstate 5 (I-5), with parking provided at the S Boeing Access Road station. Infill stations are new stations built on existing light rail lines. Connections to the existing OMF Central would be built to service vehicles operating in this corridor. OMF Central will maintain and store a portion of the LRV fleet for multiple lines.

East Corridor

Sound Transit 3 includes extending light rail on the Eastside, connecting Redmond, Bellevue, south Kirkland, and Issaquah to each other and to the rest of the regional system. Eastside investments include two stations serving southeast Redmond and downtown Redmond along with a new light rail line from south Kirkland to Issaquah via Bellevue, with a forecasted in-service date of 2041 under the target schedule. Four stations would be included in the latter light rail extension serving south Kirkland, the Richards Road area, Eastgate near Bellevue College, and central Issaquah. Additional parking would be provided at the southeast Redmond, south Kirkland, and central Issaquah stations. OMF East was constructed in 2021 in the East Corridor to maintain and store a portion of the LRV fleet for the Mariner Way to Downtown Redmond and South Kirkland to Issaquah services.

South Corridor

Sound Transit 3 includes funding to complete the light rail extension south from Kent/Des Moines to Federal Way, with stations at S 272nd Street (Star Lake Station) and the Federal Way Transit Center (which has since been renamed the Federal Way Downtown Station). This light rail extension is under construction, with a forecasted in-service date of 2026.

Sound Transit 3 plans to extend light rail from the Federal Way Downtown Station south to Tacoma. The forecasted in-service date is 2035. New stations would be in South Federal Way, Fife, and Tacoma, where the station would provide a multimodal connection to the existing Tacoma Link, Sounder commuter rail, Sound Transit Express Bus, and Amtrak. Parking would be added at the South Federal Way and Fife stations. OMF South (the proposed project) would be built in the South Corridor to maintain and store a portion of the LRV fleet for the Everett to West Seattle and Ballard to Tacoma Dome service as well as to receive, test, commission, store, maintain, and deploy new LRVs for the entire system.

Sound Transit 3 also includes an expansion of Tacoma Link to Tacoma Community College, with six stations. This is a separate fleet served by the Tacoma Link Operations and Maintenance Facility.

1.2 Purpose of the Project

The purpose of OMF South is to:

- Provide a facility with the capacity to receive, test, commission, store, maintain, and deploy vehicles to support the intended level of service for the system-wide light rail system expansion.
- Support efficient and reliable light rail service that minimizes system operating costs.
- Support and connect efficiently to the regional system and be technically and financially feasible to build, operate, and maintain, consistent with the Sound Transit 3 Plan and Sound Transit's Regional Transit Long-Range Plan.

1.3 Need for the Project

The project is needed because:

- The current regional system lacks a facility with sufficient capacity and suitable location to support the efficient and reliable long-term operations for system-wide light rail expansion, including the next phase of expansion in King and Pierce counties.
- New light rail maintenance and storage capacity needs to be available with sufficient time to accept delivery of and commission new vehicles to meet the expansion needs outlined in Sound Transit 3 and to store existing vehicles while the new vehicles are tested and prepared.

The OMF South project is necessary to support the addition of approximately 144 LRVs as part of the Sound Transit 3 system expansion. The facility includes functions that support the entire Link light rail system, such as receiving, testing, and commissioning new LRVs. In addition, OMF South would include Maintenance of Way (MOW) facilities and a Link System-Wide Storage building to receive and store vehicle parts and components, tracks and components, and station parts and components.

2 ALTERNATIVES CONSIDERED

2.1 Background and Project Development

Sound Transit was created to build a regional mass transit system connecting the urban centers of King, Pierce, and Snohomish counties. Figure 2.1-1 shows the regional light rail system with planned extensions and the locations of existing and planned OMFs. In 1996, the first phase of investment in the mass transit system began with Sound Move, which included regional express buses, commuter rail, and light rail (Sound Transit 1996). Sound Transit began operating the first phase of the Link light rail system, Central Link, with the line from downtown Seattle south to SeaTac in 2009.

OMF Central was built in Seattle as part of the first phase of Central Link construction. OMF Central is used to clean, store, maintain, and deploy 104 LRVs for daily service. It provides facilities for vehicle storage, inspections, heavy maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, new LRVs are currently received, tested (while stationary and at low speed), and commissioned at this facility. Higher speed testing of new LRVs is currently conducted on the mainline tracks in Tukwila during off-peak hours and at night when the light rail system is closed.

OMF Central also accommodates administrative and operational functions, such as serving as a report base for LRV operators, as well as the Link Control Center. Included is a MOW building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, stations and other infrastructure. Other facility elements include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher workstations, security offices, training rooms, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

The second phase of investment in the region’s mass transit system began with Sound Transit 2 in 2008 (Sound Transit 2008). Sound Transit 2 includes regional express bus and commuter rail services and 36 additional miles of light rail to form a 55-mile regional system. Sound Transit 2 extends light rail south to Kent/Des Moines and Federal Way (fully funded in Sound Transit 3), east to Redmond, and north to Lynnwood, and includes OMF East in Bellevue.

Sound Transit completed construction of OMF East in 2021 and began clearance testing for East Link in 2022. East Link will have a staggered opening; East Link Starter Line opened in spring 2024. When the East Link full line opens (forecasted in-service date of 2025), OMF East will be used to support up to 96 LRVs for daily service. It has facilities for vehicle storage, inspections, light maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. It will also accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a MOW building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, stations, and other infrastructure. Other facility elements include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher workstations, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

The third phase of investment began in 2016, with Sound Transit 3 (Sound Transit 2016a). In addition to bus, bus rapid transit, and commuter rail service expansion, Sound Transit 3 includes 62 new miles of light rail for a regional system reaching 116 miles. Sound Transit 3 extends light rail to Tacoma, Everett, south Kirkland, Issaquah, downtown Redmond, and the Seattle neighborhoods of West Seattle and Ballard.

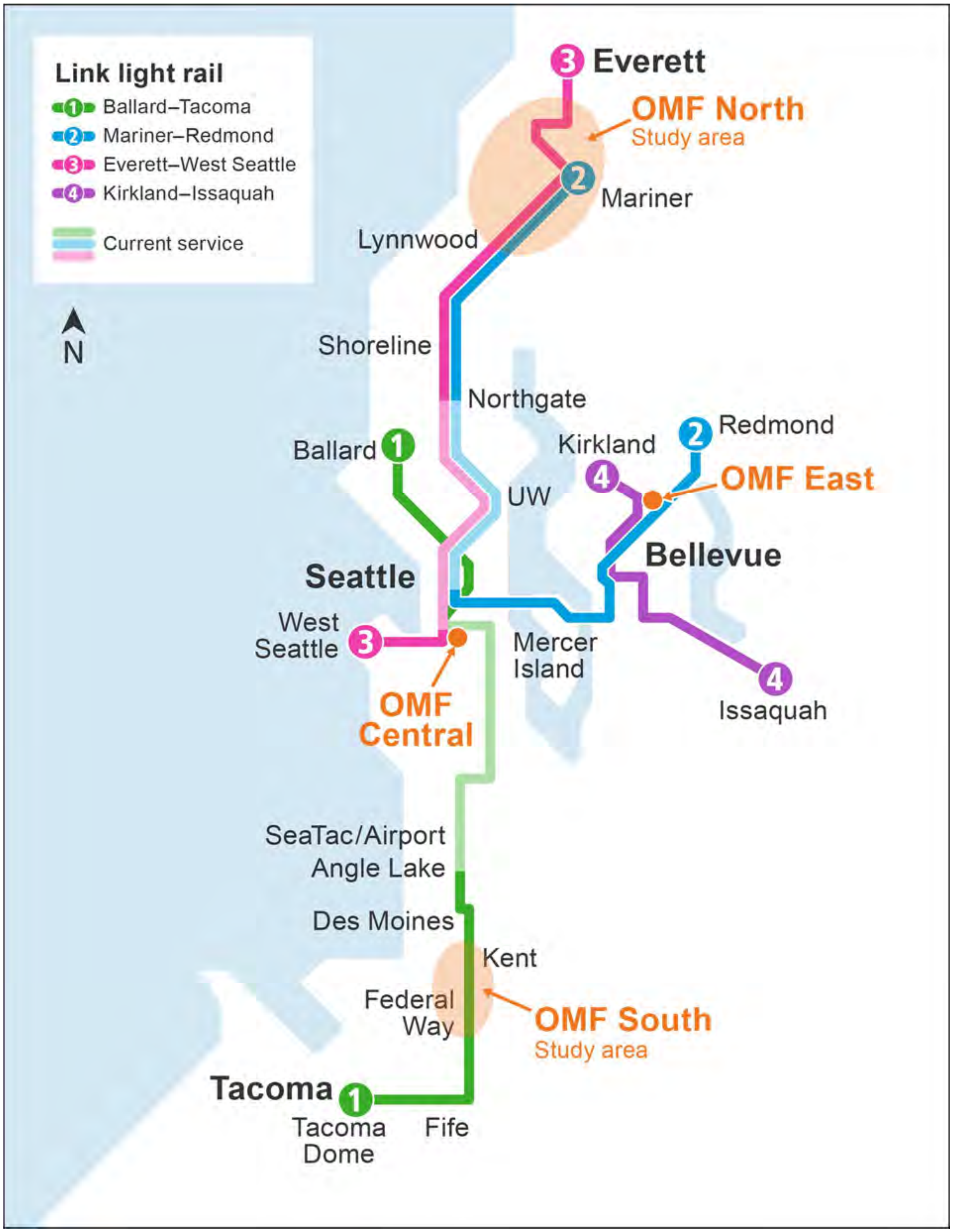

Link light rail
1 Ballard–Tacoma
2 Mariner–Redmond
3 Everett–West Seattle
4 Kirkland–Issaquah
Current service
N
3 Everett
OMF North
Study area
2 Mariner
Lynnwood
Shoreline
Northgate
Ballard 1
UW
Kirkland
2 Redmond
4
OMF East
Bellevue
Seattle
West Seattle 3
Mercer Island
4 Issaquah
OMF Central
SeaTac/Airport
Angle Lake
Des Moines
Kent
Federal Way
OMF South
Study area
Tacoma 1
Tacoma Dome
Fife

Figure 2.1-1 Link System Future Expansion and OMF Site Locations

Sound Transit 3 calls for a total fleet (existing plus new) of approximately 460 LRVs. To meet Sound Transit 3's system expansion goals, Sound Transit needs two additional operations and maintenance facilities: one in both the North and South Corridors. The proposed OMF South project will satisfy the need for an OMF in the South Corridor and LRV testing to support system expansion.

2.1.1 OMF South Components

OMF sites are necessary throughout Sound Transit's light rail network to clean, store, maintain, and deploy LRVs (Figure 2.1-2).

OMF South is designed to accommodate three LRV types:

- Kinkisharyo: 62 LRVs are in the existing fleet. Each LRV is 95 feet long with 74 seats.
- Siemens S70: 152 LRVs are in the process of being delivered and tested. Each LRV is 95 feet long with 74 seats.
- New higher-capacity LRV: The new higher-capacity LRVs are anticipated to provide more seating and standing space and will carry about 5 to 10 percent more people (Sound Transit is in the process of selecting the new LRV model; no decision has been made at this time).

Sound Transit's light rail system runs on electricity supplied by a wire structure called the overhead catenary system; the dog-legged-shaped component that extends from the roof of the LRV to the overhead catenary system is called the pantograph. When contact is established, direct-current electricity from the wire is converted to alternating current for train propulsion.

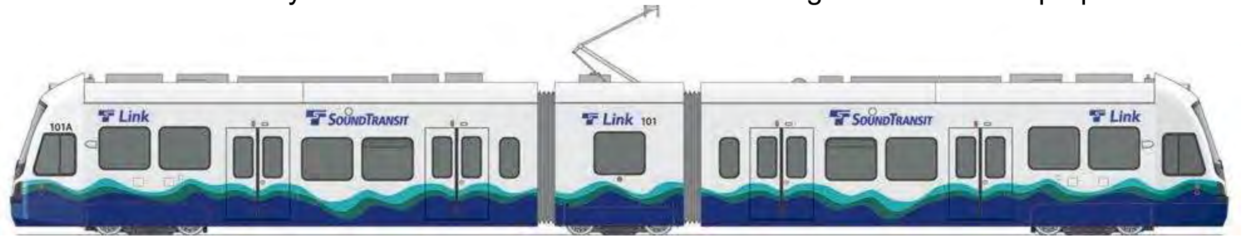


Figure 2.1-2 Link Light Rail Vehicle

The OMF South project includes the following components:

- Runaround tracks
- Storage tracks sized for approximately 144 LRVs
- Lead tracks connecting the site to the mainline tracks
- Maintenance building with service lanes for vehicle maintenance, repair, carwash, cleaning, painting, spare parts storage, operations, and administration
- Yard area for outside storage
- MOW building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure
- Training track that includes all the track installation configurations found in the Link system
- Link System-Wide Storage building for receiving and storing all parts of the Link light rail system, including LRV parts and components, MOW track and components, and Facilities station parts and components

- Traction power substations (TPSS) to boost the power to the overhead catenary system that powers the LRVs
- Offices, locker rooms, lunchrooms, and other spaces for employees, including meeting rooms that could serve multiple purposes, such as classroom space
- Auto/truck access points
- Employee and visitor parking
- Sound Transit nonrevenue vehicle parking

Depending on the alternative selected, the OMF South project could also include a test track to prepare new vehicles for service.

The proposed dimensions and configuration of the OMF are primarily driven by the space required for the runaround track. This track allows LRVs to enter and move around within the site. Vehicles can either go directly to the storage area or continue to the maintenance and/or wash bays for service and then return to the storage area directly without the operator changing ends of the train. The OMF size is also driven by the size of the operations and maintenance building, the number of tracks needed to store the LRVs, and the desire to locate the MOW building and the Link System-Wide Storage building outside the OMF track loops to allow for more storage capacity and easier access.

An OMF connects to the light rail system mainline tracks via lead tracks. The lead tracks allow LRVs to deploy from the OMF to the mainline tracks for daily operation and travel back to the facility nightly for vehicle maintenance. The length of these lead tracks depends on the distance from the OMF to the operating mainline tracks and will vary by alternative. Because two of the alternatives would be the southern terminus of the existing Link system until construction of the proposed Tacoma Dome Link Extension (TDLE), the site configurations would also include tail tracks, which are simply an extension of the mainline past the OMF South site to allow trains to access the Link system from the south if the northern lead tracks are out of service. Figure 2.1-3 shows the different types of tracks found in a typical OMF.

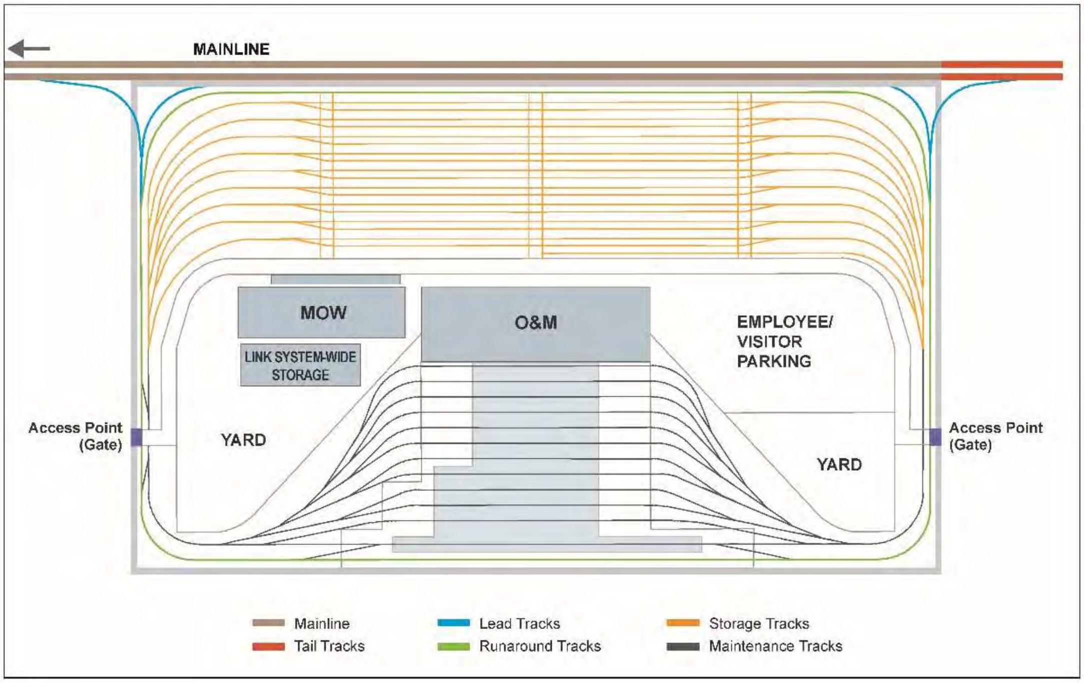


Figure 2.1-3 Typical OMF Schematic

2.1.2 OMF South Operations

The OMF South site operational program and functions do not vary between the build alternatives. The following describes how the proposed project would operate. There are three separate functions proposed for OMF South:

1. OMF building and yard for activities associated with the LRVs;
2. MOW and Facilities storage, workshop, and administration space; and
3. Link System-Wide Storage, an area dedicated to storage needs for the entire Link light rail system.

Some system-wide functions are planned at OMF South. Having these functions at OMF South would allow them to be in close proximity to the vehicle overhaul locations while also meeting existing system needs.

2.1.2.1 Hours

OMF South would operate 24 hours a day, 7 days a week. Approximately 610 staff would be distributed throughout the day at the site, but the largest concentration would be during the day shift, from 3:30 a.m. to 4 p.m. Employee arrival times would stagger throughout each shift. Table 2.2-1 lists staff calculations for all the functions at the site.

Trains receive cleaning and servicing between 1 a.m. and 5 a.m. Mainline tracks are also inspected during this time when no trains are on the tracks. This downtime is called the “nightly maintenance window.”

Table 2.2-1 OMF South Building/Yard, MOW, and Link System-Wide Storage Staff Calculations

	Day	Swing	Graveyard	Total
	3:30 a.m. – 4 p.m.	11 a.m. – 11:30 p.m.	6:30 p.m. – 7:30 a.m.	
Staff Totals	250	195	165	610

2.1.2.2 Light Rail Vehicle Operations and Maintenance

OMF South would be used to receive, test, commission, store, maintain, and deploy approximately 144 vehicles for daily service. The final number of LRVs maintained at this location will be determined in the Rail Fleet Management Plan update, currently underway by South Transit. OMF South would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

Because new LRVs require testing at a variety of operating conditions, including running at top speed and testing acceleration and braking functions, depending on the alternative, OMF South would include a dedicated test track. During testing, up to eight one-car LRVs could make one roundtrip per hour for 4 hours during the daytime and 6 hours during the nighttime. Sound Transit currently uses the mainline revenue track to test vehicles at higher speeds at night, after service has ended (after midnight or 1 a.m.) and outside of maintenance and inspection times.

2.1.2.3 Maintenance of Way

MOW is defined as the upkeep and repair of a railroad's fixed property (such as track and bridges). While the OMF focuses on the LRVs, the MOW's focus is on the track and its corresponding electrical system, including signals and traction power (the electricity that powers the trains).

The MOW area within OMF South would include a large warehouse for equipment and supply storage, shop space, offices, and staff support areas. To train staff on track maintenance, the area would also include a training track, which would be at least 400 feet long and include all the possible track types and configurations found on Sound Transit's rail lines.

Various crews and superintendents (including Track, Right-of-Way, Signal, and Traction Power) would be stationed at OMF South.

2.1.2.4 Link System-Wide Storage

The Link System-Wide Storage building would include areas for storing, shipping, receiving, and supplying all parts for the Link light rail system, including LRV parts and components, MOW track and components, and Facilities station parts and components. There would be a dedicated staging and packaging area for items to be placed before storing or sending out to a Link light rail facility. There would also be office and administrative space.

2.1.2.5 Light Rail Vehicle Fleet Headways and Service Times

Table 2.2-2 includes information on headways by time of day taken from the draft Link light rail system operating plan for 2042. Headway is the amount of time between LRV arrivals at a stop. The draft operating plan assumes 5- to 6-minute peak headways for weekdays and 10- to 15-minute headways on Saturday and Sunday, once the planned light rail extensions under Sound Transit 3 are complete. This draft plan is subject to change.

Table 2.2-2 Draft Operating Plan for Link Light Rail

Service Period	Hours	Headway
Weekday Service		
Early Morning	5:00 a.m. to 6:00 a.m.	12 minutes
Morning Peak	6:00 a.m. to 8:30 a.m.	5–6 minutes
Midday	8:30 a.m. to 3:00 p.m.	10 minutes
Afternoon Peak	3:00 p.m. to 6:30 p.m.	5–6 minutes
Evening	6:30 p.m. to 10:00 p.m.	10 minutes
Late Night	10:00 p.m. to 1:00 a.m.	15 minutes
Saturday		
Early	5:00 a.m. to 8:00 a.m.	12 minutes
Base	8:00 a.m. to 10:00 p.m.	10 minutes
Late	10:00 p.m. to 1:00 a.m.	15 minutes
Sunday		
Early	6:00 a.m. to 8:00 a.m.	12 minutes
Base	8:00 a.m. to 10:00 p.m.	10 minutes
Late	10:00 p.m. to 12:00 a.m. (midnight)	15 minutes

2.2 Alternative Development and Scoping

OMF South alternatives underwent an extensive evaluation process prior to their identification for study in the 2021 SEPA Draft EIS. Beginning in early 2018, Sound Transit conducted early scoping followed by alternative development, including site identification, prescreening, and alternatives evaluation. In early 2019 several alternatives were presented to the public during SEPA scoping, and in May 2019 the Board identified three project alternatives for evaluation in the 2021 SEPA Draft EIS. The SEPA Draft EIS was published in March 2021, and Tribal, public, and agency comments were received. Based on the 2021 SEPA Draft EIS and comments received, the Board identified the South 336th Street Alternative as the Preferred Alternative for evaluation in this Final EIS, along with other alternatives, in December 2021 (Motion M2021-81). Please see Section 2.2.7 for additional detail on the environmental review process.

2.2.1 Early Scoping

In March 2018, Sound Transit published the Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Information Report (Sound Transit 2018a). Early SEPA scoping was intended to initiate the public conversation before the start of environmental studies and was conducted for both the TDLE and OMF South projects concurrently. The public comment period for early scoping was from April 2 to May 3, 2018, during which Sound Transit asked for Tribal, public, and agency comments on the project’s Purpose and Need statement, the TDLE “representative project alignment” and other alternative alignments, and alternative locations for an OMF in the South Corridor. Sound Transit received approximately 50 comments regarding the potential OMF South location, including suggestions for sites in Kent, Federal Way, Milton, Fife, and Tacoma.

Additional information regarding public outreach during the early scoping period is available in Appendix B, Public Involvement and Agency Coordination.

2.2.1.1 OMF South and Tacoma Dome Link Extension Relationship

TDLE has overlapping project elements with the OMF South Preferred and South 344th Street alternatives, which consists of about 1.4 to 1.8 miles of mainline track. However, the projects are independent of each other.

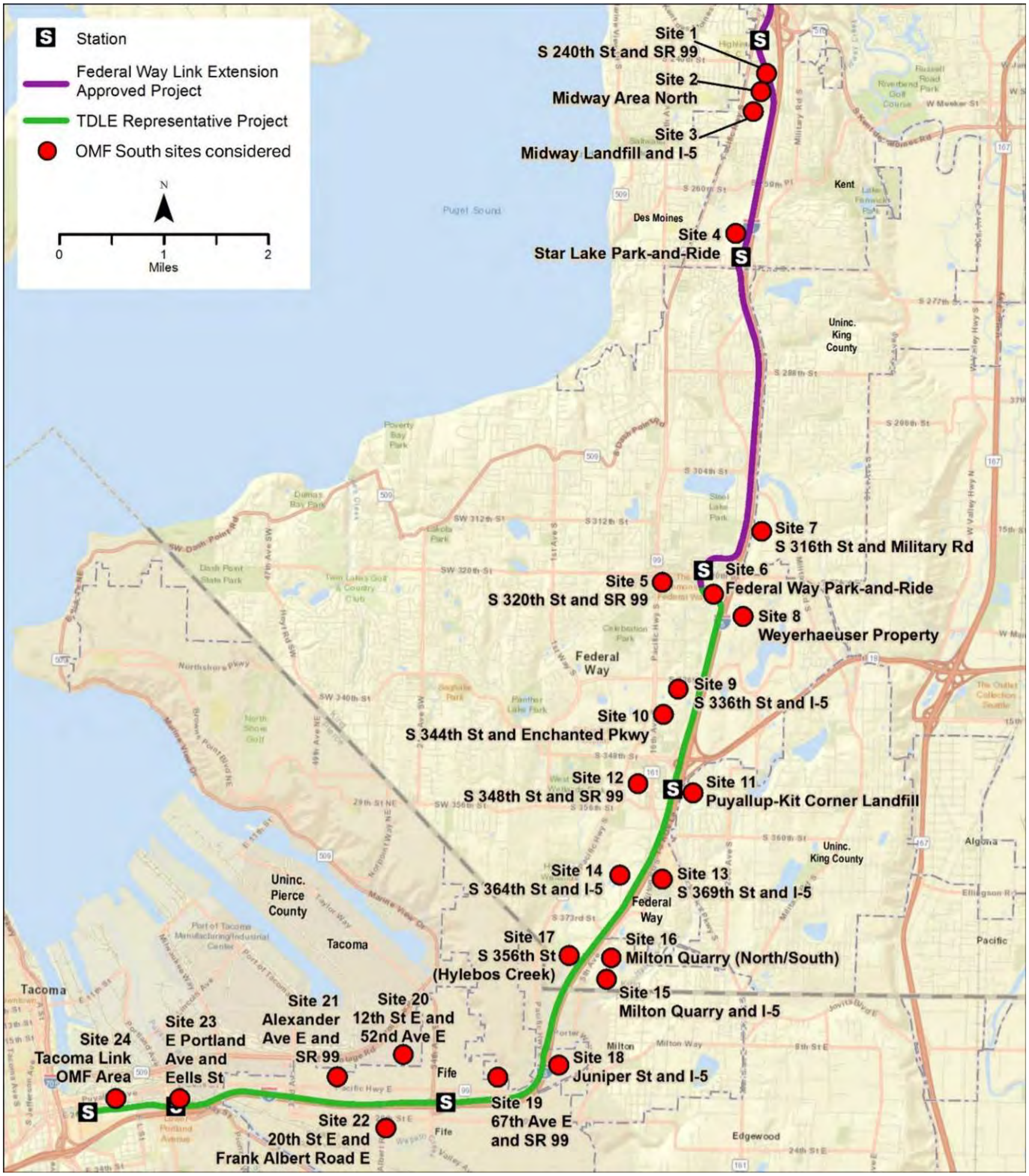
As described in Chapter 1, Purpose and Need for the Project, OMF South is needed to support Sound Transit’s Link light rail system expansion identified in Sound Transit 3. OMFs do not exclusively serve individual light rail alignments. They are necessary and work together to operate the entire Link System. If TDLE were not constructed, OMF South would still be necessary to support other extensions of Link light rail planned under Sound Transit 3. It would provide additional operation and maintenance capacity, allowing Sound Transit to shift trains within the system to minimize overall operating costs. It would also provide greater efficiency and flexibility in overnight storage and maintenance of light rail vehicles and deployment of vehicles at the start of service each day.

TDLE is a major Link light rail service extension and could be built without OMF South. Without OMF South, TDLE could be designed to include facilities for overnight storage and limited maintenance functions. Further, Sound Transit could adjust service levels to adapt to a smaller fleet. FTA and Sound Transit are preparing a separate environmental impact statement to assess TDLE impacts.

2.2.2 Identifying Potential OMF South Sites

2.2.2.1 Site Identification

After early SEPA scoping, Sound Transit initiated the alternative development process, evaluating a total of 24 sites (Figure 2.2-1). These sites were identified through a series of internal workshops with Sound Transit staff and the consultant team and by the public during early SEPA scoping.


S Station
Federal Way Link Extension Approved Project
TDLE Representative Project
OMF South sites considered
N
0
1
2
Miles
Site 1 S 240th St and SR 99
Site 2 Midway Area North
Site 3 Midway Landfill and I-5
Site 4 Star Lake Park-and-Ride
Site 5 S 320th St and SR 99
Site 6 Federal Way Park-and-Ride
Site 7 S 316th St and Military Rd
Site 8 Weyerhaeuser Property
Site 9 S 336th St and I-5
Site 10 S 344th St and Enchanted Pkwy
Site 11 Puyallup-Kit Corner Landfill
Site 12 S 348th St and SR 99
Site 13 S 369th St and I-5
Site 14 S 364th St and I-5
Site 15 Milton Quarry and I-5
Site 16 Milton Quarry (North/South)
Site 17 S 356th St (Hylebos Creek)
Site 18 Juniper St and I-5
Site 19 67th Ave E and SR 99
Site 20 12th St E and 52nd Ave E
Site 21 Alexander Ave E and SR 99
Site 22 20th St E and Frank Albert Road E
Site 23 E Portland Ave and Eells St
Site 24 Tacoma Link OMF Area
Puget Sound
Des Moines
Kent
Uninc. King County
Federal Way
Uninc. Pierce County
Tacoma
Fife
Milton
Edgewood
Algona
Pacific

Source: Sound Transit 2018c

Figure 2.2-1 OMF South Sites Included in the Development of SEPA Alternatives

Sound Transit determined that OMF South should be designed to support the future extensions of the light rail system, including the extension to Tacoma, as envisioned in the agency's Regional Transit Long-Range Plan (Sound Transit 2014) and should be sized to accommodate approximately 144 LRVs.

2.2.2.2 Prescreening

The prescreening evaluation used three criteria to evaluate the 24 sites identified during early SEPA scoping. Sound Transit developed the evaluation criteria based on the OMF South Purpose and Need statement.

- **Meets minimum size and shape.** This criterion evaluated each site's ability to store and maintain at least 144 LRVs and accommodate a 5-acre storage site.
- **Roadway improvements.** This criterion considered whether selection of the site would preclude funded roadway improvements.
- **Regulatory constraints.** This criterion evaluated the potential for severe impacts to known cultural resources, wetlands, and other sensitive areas.

The evaluation criteria were applied to each site using a pass or fail method. If a site failed one criterion, it was not advanced to the next stage in the alternative development process. As a result, six sites were eliminated and two configuration options were added for each Midway Landfill site, for a total of 20 potential sites. The complete results of the pre-screening evaluation are summarized in the OMF South Pre-Screening Technical Memorandum (Sound Transit 2018c).

2.2.2.3 Alternatives Evaluation

The alternatives evaluation used a total of 21 criteria (Table 2.2-3), including environmental factors, operational and cost factors, and plan consistency, to evaluate the 20 sites that moved forward from prescreening to SEPA alternatives evaluation (Figure 2.2-1).

Table 2.2-3 Evaluation Criteria, Measures, and Methods

Criteria	Measures	Methods
Environmental Factors		
Current and Proposed Zoning	Suitability of current and proposed zoning/land use for use as an OMF.	Identify current and proposed zoning on the site using existing city and county land use and zoning maps, and proposed development plans adjacent to adopted land use plans.
Economic	Site located on properties with major economic activity generators.	Assessment of potential property impacts that have a major economic activity generator.
Property Impacts	Estimated level of property impacts (residential, commercial).	Assessment of potential property impacts from OMF South by property type.
Streets/Roads	Auto and truck access to the site from existing highway/arterial system.	Prepare site layouts that show the auto and truck access route to the OMF South site.
Neighborhood/ Community	Impacts to major neighborhood/community cohesion and whether impacts will be equitably distributed.	Identify potential impacts to neighborhood/community cohesion.
Topography	Amount of grading required to accommodate facility.	Prepare site layouts that assess the relative amount of grading required for the OMF South site.

Table 2.2-3 Evaluation Criteria, Measures, and Methods (continued)

Criteria	Measures	Methods
Wetlands and Streams	Disruption to wetland and stream resources or priority habitat areas on or adjacent to the site.	Identify the disruptions to sensitive areas, including wetlands and streams, buffers, steep slopes, or sensitive species or habitat, using geographic information system (GIS) mapping and visual reconnaissance.
Floodplains and Critical Areas	Impacts to floodplains or other critical areas.	Identify floodplains and other critical areas using GIS mapping.
Parks, Trails, and Open Space	Impacts to parks, trails, or open space.	Identify potential impacts to parks, trails, or open space on or adjacent to the OMF South site using GIS mapping.
Historic/Archaeological	Impacts to historic, archaeological resources on or adjacent to the site.	Identify the impacts to National Register of Historic Places eligible historic and archaeological resources on or adjacent to the OMF South site using records search and general reconnaissance.
Hazardous Materials/ Brownfields	Potential to impact sites with hazardous materials.	Identify potential for impacts to sites with hazardous materials releases.
Noise	Potential for impacts to noise-sensitive properties.	Number of noise-sensitive property types within Federal Transit Administration (FTA) noise impact screening distance of 350 feet for unobstructed noise generating areas of the site or connecting tracks.
Operational and Cost Factors		
Size/Configuration	A minimum site size of 33 acres able to store and maintain approximately 144 vehicles, plus an additional 5-acre storage area that includes a 30,000-square-foot building on or adjacent to the site.	Prepare conceptual site layouts that include building footprints, storage tracks, auto/truck access, employee and support vehicle parking, and a 5-acre storage area that includes a 30,000 square foot building on or adjacent to the site.
Maintenance Window	Impact on the nightly maintenance window of 1 a.m. to 5 a.m.	Estimate the impact in minutes on the maintenance window for the OMF South site based on information generated from the Operations Analysis.
LRV Site Access	LRV access to the site related to the complexity of the connection and the distance from the FWLE or TDLE representative alignment.	Identify the complexity and length of the yard lead and track connection to the OMF South sites.
Schedule Risk (Other than LRV Access)	Will the facility be able to receive and commission LRVs per ST3 Operations Analysis?	Identify potential site constraints such as property availability, access, or other logistical, physical, or regulatory factors that would affect the schedule for the facility to be ready to receive and commission LRVs per the ST3 Operations Analysis.
Operability	When the facility (OMF South) opens, will the site be connected to an activated line to allow vehicles to move around the system?	Identify the length of track required to connect the site to an activated line.
Operating Estimates	Order of magnitude operating estimates.	Assess the relative order of magnitude operating estimate for each site.
Capital Estimates	Order of magnitude preliminary capital estimates for the site footprint, 5-acre storage site, and lead track.	Develop order of magnitude preliminary capital estimates for each site, 5-acre storage site, and lead track to the representative alignment.
Property Value	Assessed value plus escalation factors for each property affected by the project footprint of the facility.	Current county property values plus escalation factors for parcels that need to be acquired in order to construct the facility.

Table 2.2-3 Evaluation Criteria, Measures, and Methods (continued)

Criteria	Measures	Methods
Plan Consistency		
Sound Transit Regional Transit Long-Range/ST3 Plan	Consistent with the Sound Transit Regional Transit Long-Range Plan and ST3 Plan.	Compare site with Sound Transit Regional Transit Long-Range Plan and ST3 Plan for consistency and evaluate whether the site is technically and financially feasible to build, operate, and maintain.

Source: Sound Transit 2018c

As a result of the alternatives evaluation, Sound Transit identified six sites to carry forward to the SEPA scoping process. The nine southernmost sites, including all of those in Pierce County, were eliminated because they were not close enough to an operating light rail mainline track. Sound Transit also found that potential sites farther than 1.5 miles south of the Federal Way Link Extension (FWLE) terminus in Federal Way would not be able to efficiently connect to an operating light rail mainline track when the OMF South opens. Another five sites were eliminated because they performed poorly in other criteria. The complete results of the alternatives evaluation are summarized in the OMF South Alternatives Evaluation Technical Memorandum (Sound Transit 2019c).

2.2.3 SEPA Scoping

Sound Transit published the scoping notice for the EIS in the SEPA Register on February 19, 2019. The SEPA Register is a statewide searchable database where anyone can search and download NEPA and SEPA documents submitted to Ecology to allow easy access to the public, project proponents, local governments, and other agencies. The purpose of scoping is to narrow the focus of the SEPA EIS to significant environmental issues, to eliminate insignificant impacts from detailed study, and to identify a reasonable range of alternatives (Ecology 2003). Sound Transit also asked for comments regarding the project's Purpose and Need statement.

Sound Transit also published the OMF South Scoping Information Report (Sound Transit 2019d) to share information about the project and potential alternatives with Tribes, agencies, and the public. The Information Report described the six sites considered during the SEPA scoping process (Figure 2.2-2):

- S 240th Street and SR 99
- Midway Landfill and I-5
- Midway Landfill and SR 99
- S 316th Street and Military Road
- S 336th Street and I-5
- S 344th Street and I-5

During the public comment period (February 19 to April 1, 2019), Sound Transit accepted comments from Tribes, agencies, and the public and conducted two public scoping meetings, an agency scoping meeting, and an online open house (see Appendix B, Public Involvement and Agency Coordination). The OMF South Scoping Summary Report summarizes the comments received during the SEPA scoping process and identified the next steps for the project (Sound Transit 2019e).

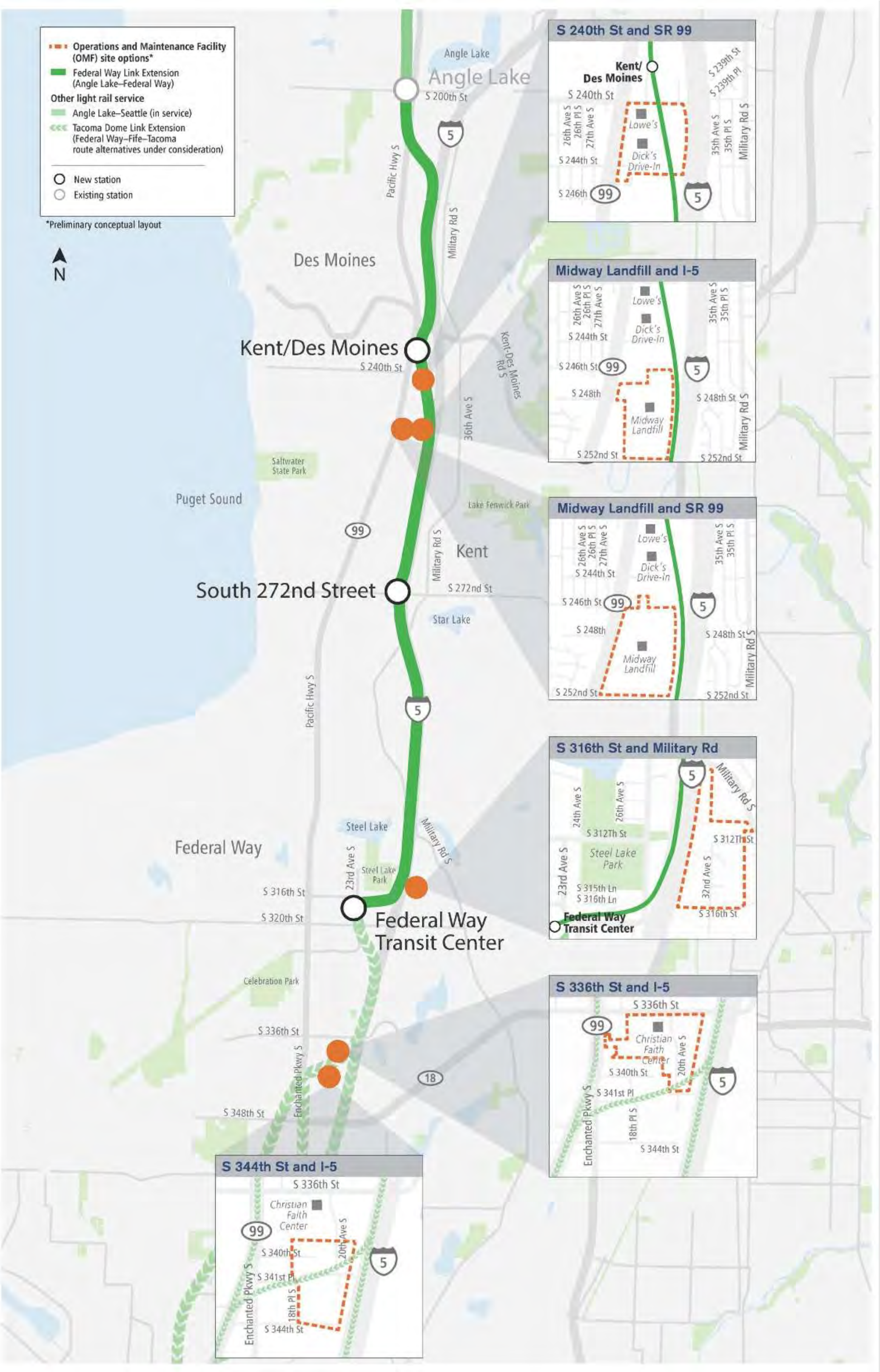

Operations and Maintenance Facility (OMF) site options*
Federal Way Link Extension (Angle Lake–Federal Way)
Other light rail service
Angle Lake–Seattle (in service)
Tacoma Dome Link Extension (Federal Way–Fife–Tacoma route alternatives under consideration)
New station
Existing station
*Preliminary conceptual layout
N
Angle Lake
Des Moines
Kent/Des Moines
South 272nd Street
Federal Way Transit Center
Federal Way
Kent
Puget Sound
S 240th St and SR 99
Midway Landfill and I-5
Midway Landfill and SR 99
S 316th St and Military Rd
S 336th St and I-5
S 344th St and I-5
Lowe's
Dick's Drive-In
Midway Landfill
Christian Faith Center
Steel Lake Park

Figure 2.2-2 SEPA Scoping Alternatives

Most public comments concerned the S 240th Street and SR 99 site, which became known as the Dick's Drive-In alternative (this alternative would have displaced the business). Many of those commenters preferred one, both, or either of the Midway Landfill sites and asked Sound Transit to remove the S 240th Street and SR 99 site from further consideration.

2.2.3.1 Alternatives Proposed During Scoping but Not Carried Forward

During the SEPA scoping process, some commenters suggested specific additional sites be considered. A total of nine sites were mentioned:

- SeaTac – North of the Angle Lake Station, west of 28th Avenue S between S 200th Street/ S 190th Street
- Kent/Des Moines area – Area along I-5 in Des Moines that is the current location of the Silverwood Park Apartments
- Kent Highlands Landfill
- Kent – Vacant parcel on SR 99 across from Fred Meyer in Kent
- Kent/Federal Way – Area between I-5/SR 99 and S 260th Street/S 272nd Street
- Kent Valley near S 272nd Street
- Auburn Yard adjacent to the Sounder tracks
- The Commons at Federal Way on S 320th Street
- South Federal Way – Wetland between Todd Beamer High School and SR 99 in Federal Way

Sound Transit conducted an internal review of the suggested sites using the criteria listed in Table 2.3-1 to determine whether any were viable alternatives. Sound Transit determined that none were viable due to a number of reasons, including size, potential impacts to current light rail operations, and potentially severe impacts to sensitive areas.

2.2.4 Board Identification of Site Alternatives

In May 2019, the Board adopted Motion M2019-50, which identified three site alternatives to study in the OMF South 2021 SEPA Draft EIS: Midway Landfill and I-5, S 336th Street and I-5, and S 344th Street and I-5. These alternatives were renamed Midway Landfill Alternative, South 336th Street Alternative, and South 344th Street Alternative, respectively, and are described in more detail below in Section 2.3, Project Alternatives. The remaining three sites — S 240th Street and SR 99, Midway Landfill and SR 99, and S 316th Street and Military Road — were not carried forward. The Board's action was based on the project's Purpose and Need statement, OMF site requirements and screening criteria during the alternative development process, and comments received during the scoping period. In July 2019, the Board adopted Motion M2019-75 for TDLE, identifying a preferred alternative that narrowed the location of the mainline tracks to an alignment that parallels I-5 in the area south of the Federal Way Downtown Station to the South 336th Street and South 344th Street alternative sites.

2.2.5 Refinement of Alternatives for the 2021 SEPA Draft EIS

At the beginning of the site identification process, Sound Transit developed a generic 1,550-foot by 930-foot OMF layout template that it used to test-fit potential sites. After including setbacks, landscaping, environmentally critical areas, roadways, lead track connections to the mainline tracks, and the 5-acre Link System-Wide Storage facility, it appeared that a site of 40 to

50 acres would be large enough to meet the needs of OMF South. However, as project development continued, and the programming requirements of OMF South were more fully refined to develop the 2021 SEPA Draft EIS alternatives, it became apparent that larger sites were necessary. For example, additional spaces for LRV repair and cleaning were added to the initial design based on lessons learned at OMF Central and from the design of OMF East. Sound Transit also sought to minimize impacts to surrounding neighborhoods by maximizing setbacks to create buffers between the sites and adjacent properties.

During August and September 2019, Sound Transit confirmed that these additional requirements should be incorporated. The increased program requirements meant larger sites; the three sites studied in the 2021 SEPA Draft EIS ranged from 59 to 68 acres.

2.2.6 2021 SEPA Draft EIS Publication and Board Identification of Preferred Alternative

The SEPA Draft EIS was published in March 2021 with a public comment period extending from March 5 to April 19, 2021. After considering the 2021 SEPA Draft EIS and the comments received, the Board identified the South 336th Street Alternative as the Preferred Alternative for evaluation in the Final EIS (Motion M2021-81, December 2021). The Preferred Alternative is evaluated along with the two other alternatives in this Final EIS.

2.2.7 Federal Environmental Review Process

After publication of the 2021 SEPA Draft EIS, Sound Transit identified potential funding opportunities with FTA. Subsequently, FTA issued a notice of intent to prepare an EIS in the Federal Register on July 19, 2023. This was followed by a 30-day comment period.

To reduce duplication of process, FTA and Sound Transit prepared a Draft EIS as a combined NEPA/SEPA document. Since a Draft EIS under SEPA was already published, the document served as a Draft EIS under NEPA and a Supplemental Draft EIS under SEPA. This document has been prepared under both SEPA and NEPA and is the Final EIS.

2.2.8 Design Updates

After publication of the 2021 SEPA Draft EIS and the December 2021 Board action, Sound Transit advanced the design for OMF South. Design updates were primarily driven by operational needs, comments received during the 2021 SEPA Draft EIS comment period, and coordination with the city of Federal Way.

One design update that Sound Transit identified is the need for a test track to allow LRVs to be tested without using the mainline tracks. Sound Transit currently relies on accessing the mainline revenue track at night to test vehicles at higher speeds after service has ended and outside of maintenance and inspection times. As the existing track, structures, and systems infrastructure grows and ages, the need for night-time maintenance will likely increase, reducing the available windows for vehicle testing and commissioning. A dedicated test track would allow Sound Transit to test trains both during the day and overnight, reducing the amount of time it takes to test vehicles and improving employee safety by keeping testing off the mainline.

For the Preferred and South 344th Street alternatives, the test track would run east of and parallel to the mainline tracks from S 324th Street to just south of S 336th Street. This widens the permanent footprint of the mainline tracks from the 2021 SEPA Draft EIS by approximately 15 feet where the tracks are parallel and slightly wider at the ends of the test track. There would also be an access road that would parallel the mainline track and test track alignment through

Belmor Mobile Home Park (Belmor), along with a test track facility separate from the OMF South site. This 1,000-square-foot building would include a breakroom and facilities for employees working at the test track.

In addition to the test track, Sound Transit revised the site configuration for the Preferred Alternative to address Federal Way street vacation requirements (a street vacation relinquishes the public's right to use a street and returns it to private property) and local design standards as well as to address other developmental and operational needs. The design updates for the Preferred Alternative included the following:

- The main site entrance was moved from SR 99 to S 341st Place, which slightly changes the expected traffic circulation patterns.
- 18th Place S was extended approximately 1,450 feet to connect S 340th Street and S 336th Street as a replacement for the removal of 20th Avenue S. The extended street would include a bike/pedestrian trail to provide public amenities.
- 21st Avenue S was extended approximately 650 feet to connect to S 344th Street to avoid creating a nonconforming cul-de-sac.
- Frontage improvements (including road widening) were added on the south side of S 336th Street to meet city requirements.
- The OMF South site was expanded to the southwest to provide more space for buildings and yard area.
- The OMF South site and internal track configuration were modified to a parallelogram shape to allow for a wider stream and wetland corridor on the east side of the OMF between the site and I-5.
- Existing culverts that carry the West Fork Hylebos Creek Tributary under S 336th Street and the East Fork Hylebos Creek Tributary under S 344th Street would be replaced.

Design of the Preferred Alternative is likely to continue to evolve as Sound Transit works to minimize and mitigate environmental impacts. No revisions have been made to the site designs for the South 344th Street or Midway Landfill alternatives since the 2021 SEPA Draft EIS.

2.3 Project Alternatives

2.3.1 No-Build Alternative

The No-Build Alternative represents the transportation system and environment as they would exist without the proposed project and provides a benchmark against which the build alternatives can be compared.

The No-Build Alternative assumes other planned projects would be built. This includes public and private projects as well as the other Link light rail system improvements listed in Sound Transit 3, such as extensions to West Seattle, Ballard, Everett, downtown Redmond, Issaquah, and Tacoma. The No-Build Alternative also assumes that the proposed North Corridor OMF would be constructed. Under the target schedule for Sound Transit's System Expansion Plan, each of these projects would be constructed and operating by 2042.

The Sound Transit 3 Plan assumed 460 LRVs would be needed to operate the system at the planned service levels. After the opening of University Link, this number increased to 496 LRVs to account for higher than anticipated ridership and additional capacity for a future extension of the light rail spine to Tacoma Mall. Under the No-Build Alternative, operations and maintenance functions for the entire system would be at the existing OMF Central, the existing OMF East in

Bellevue, and the proposed OMF in the North Corridor. The three facilities would have a combined capacity to support and store 352 LRVs, which is 144 fewer than the number needed to operate the system at the planned service levels.

Under the No-Build Alternative, impacts from the Sound Transit 3 projects listed above would still occur. As the FWLE and TDLE projects are within the study areas for the OMF South project alternatives, there are impacts that may be similar or that overlap with those of OMF South. FWLE is under construction with a forecasted in-service date of 2026. The impacts of FWLE have been addressed in the Federal Way Link Extension Final Environmental Impact Statement (Sound Transit 2016b). TDLE is currently undergoing environmental review under NEPA and SEPA by FTA and Sound Transit. The Tacoma Dome Link Extension Draft Environmental Impact Statement is expected to be published in mid-2024, with a forecasted in-service date of 2035.

As described in Section 2.2.4, Board Identification of Site Alternatives, the Board identified a preferred alternative that narrowed the location of the TDLE mainline tracks to an alignment that parallels I-5 south of the Federal Way Downtown Station. As a result, the mainline track alignment for the OMF South Preferred and South 344th Street alternatives south of the Federal Way Downtown Station are the same as the mainline track alignment proposed for TDLE. Thus, impacts from the mainline tracks would be primarily the same between the two projects.

For the purposes of this Final EIS, the analysis of the No-Build Alternative is generally based on the expected conditions in 2042, which is the future design year for the project. The year 2042 represents the first year after completion for many of the Sound Transit 3 projects. Due to the realigned capital program (Resolution R2021-05, August 2021) completion of some Sound Transit 3 projects may be delayed past 2042; however, 2042 provides a common future analysis year for forecasting ridership and determining potential impacts to air, noise, transportation, and other environmental elements from Sound Transit 3 projects.

The environmental impacts associated with FWLE and TDLE are considered part of the No-Build Alternative, along with other planned projects in the OMF South study areas. The Final EIS assumes that one of the TDLE build alternatives would be constructed with mainline tracks in the same location as described for the Preferred and South 344th Street alternatives. Under the No-Build Alternative, the mainline track could be constructed later in time.

2.3.2 Build Alternatives

Build alternatives evaluated in this Final EIS include the South 336th Street Alternative (the Preferred Alternative), the South 344th Street Alternative, and the Midway Landfill Alternative (Figure 2.3-1). Appendix C, Conceptual Design Drawings and Engineering Information, includes preliminary engineering design drawings of each of the alternatives. Since publication of the 2021 SEPA Draft EIS, the design of the Preferred Alternative has been advanced to between the 10 and 30 percent design level.

The Preferred Alternative would require the construction of approximately 1.4 miles of mainline tracks, and the South 344th Street Alternative would require approximately 1.8 miles of mainline tracks to connect the FWLE terminus to the OMF South facility (Figure 2.3-2). The Midway Landfill Alternative is adjacent to FWLE and would connect by lead tracks directly to the FWLE mainline tracks. For the Preferred and South 344th Street alternatives, the mainline tracks connecting those sites to the FWLE terminus would later also be used as TDLE mainline tracks if a proposed TDLE build alternative opens for service. The connecting section of mainline tracks would be constructed for the OMF South project as this facility would open several years before TDLE begins to serve the regional system.

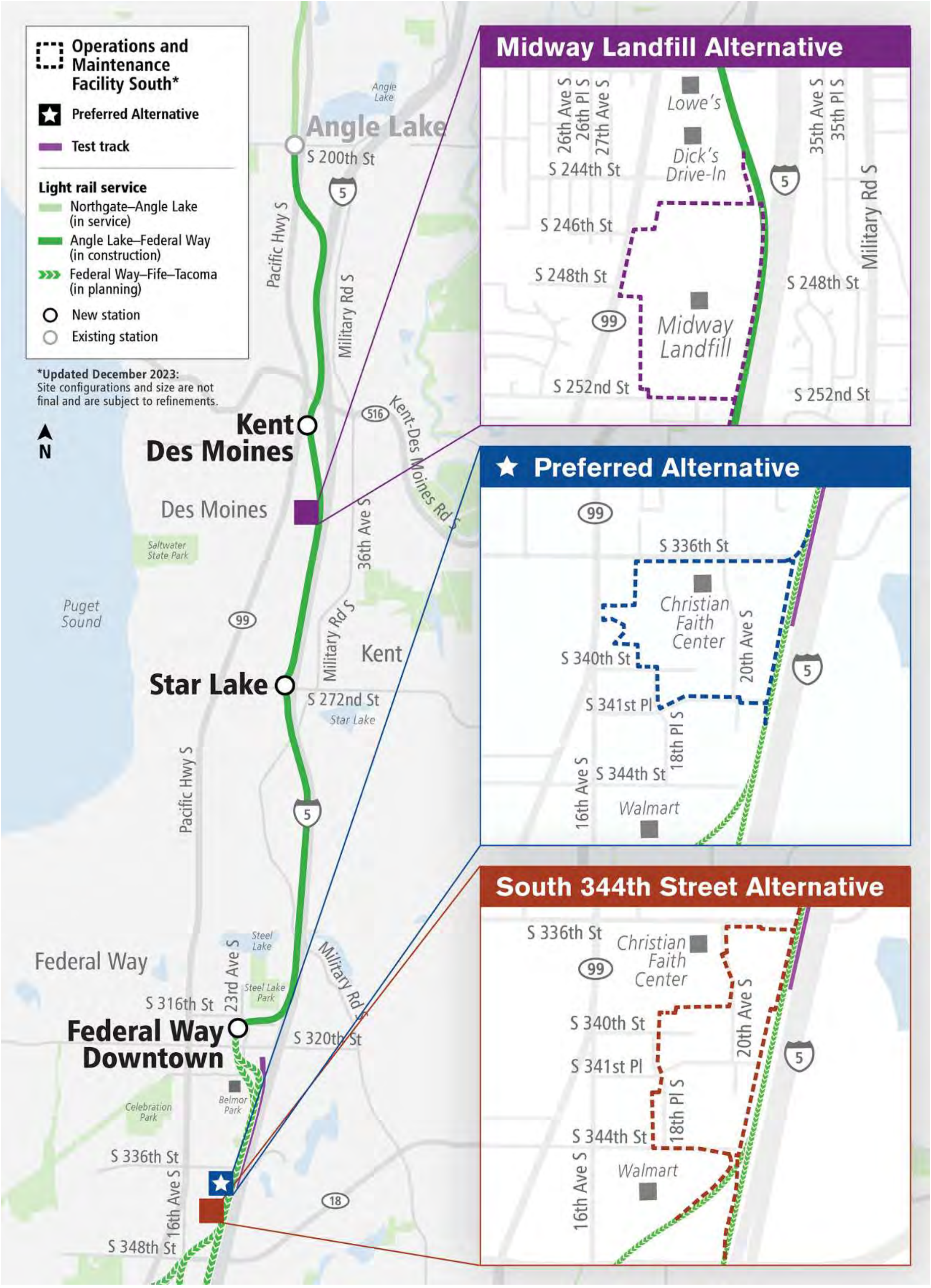
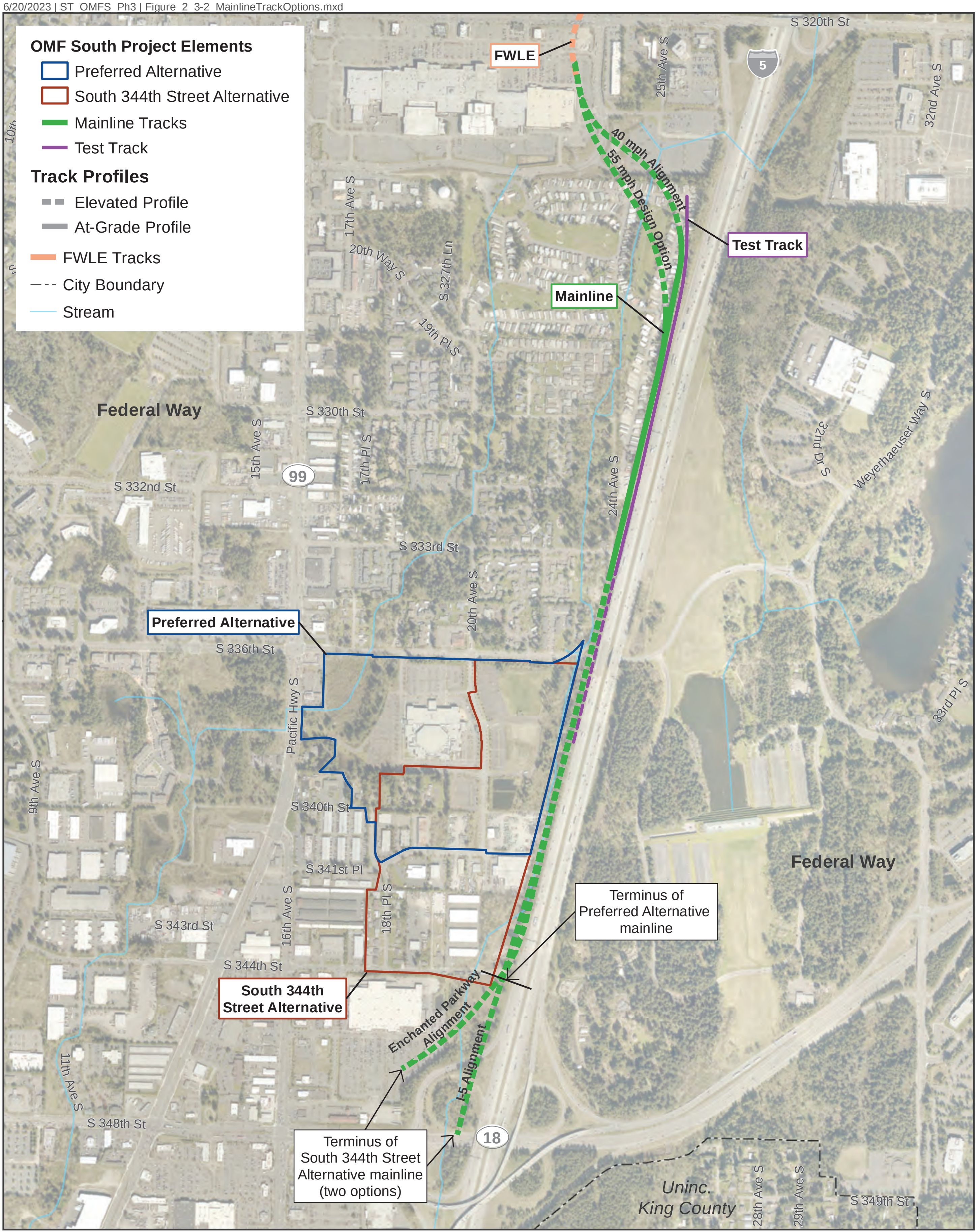

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
S 200th St
Kent Des Moines
Des Moines
Saltwater State Park
Puget Sound
Star Lake
S 272nd St
Kent
Federal Way
S 316th St
Federal Way Downtown
S 320th St
S 336th St
S 348th St
16th Ave S
23rd Ave S
Pacific Hwy S
Military Rd S
36th Ave S
Kent-Des Moines Rd S
Celebration Park
Belmor Park
Steel Lake
Steel Lake Park
Midway Landfill Alternative
Lowe's
Dick's Drive-In
Midway Landfill
S 244th St
S 246th St
S 248th St
S 252nd St
26th Ave S
26th Pl S
27th Ave S
35th Ave S
35th Pl S
Preferred Alternative
S 336th St
Christian Faith Center
S 340th St
S 341st Pl
S 344th St
18th Pl S
20th Ave S
Walmart
South 344th Street Alternative
5
99
516
18

Figure 2.3-1 Project Alternatives

6/20/2023 | ST OMFS Ph3 | Figure 2 3-2 MainlineTrackOptions.mxd


OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profiles
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
S 320th St
25th Ave S
5
32nd Ave S
10th
40 mph Alignment
55 mph Design Option
Test Track
Mainline
17th Ave S
20th Way S
S 327th Ln
19th Pl S
Federal Way
S 330th St
15th Ave S
17th Pl S
99
S 332nd St
24th Ave S
32nd Dr S
Weyerhaeuser Way S
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
Pacific Hwy S
33rd Pl S
9th Ave S
S 340th St
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
Terminus of Preferred Alternative mainline
Federal Way
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 348th St
18
Terminus of South 344th Street Alternative mainline (two options)
Uninc. King County
28th Ave S
29th Ave S
S 349th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 2.3-2

Mainline Track Options

Preferred and South 344th Street Alternatives

OMF South

The Preferred and South 344th Street alternatives would also include a test track adjacent to the mainline tracks. A test track adjacent to the Midway Landfill alternative would not be feasible because of the varying grades of the existing mainline tracks. Thus, under the Midway Landfill alternative, the analysis assumes LRV testing would continue on the mainline tracks.

2.3.2.1 South 336th Street Alternative (Preferred Alternative)

The Preferred Alternative is in Federal Way mainly between S 336th Street and S 341st Place and between I-5 and SR 99.

Mainline Tracks

The Preferred Alternative requires approximately 1.4 miles of connecting mainline tracks from the Federal Way Downtown Station to the site, including a tail track. These tracks would serve as revenue mainline tracks if TDLE is constructed as proposed.

There are two alignments for the connecting mainline tracks that have different design speeds for the curve near S 324th Street: the 40 mph Alignment and the 55 mph Design Option (Figure 2.3-2). The Preferred Alternative includes the 40 mph Alignment (Figure 2.3-3). Both the Preferred Alternative and Design Option have elevated tracks from the Federal Way Downtown Station to near S 328th Street and south of S 330th Street to the OMF South facility. The tracks would be at-grade between S 328th Street and S 330th Street. Also included as part of the mainline track structure would be TPSS, signal/communication bungalows, and end-of-track protection.

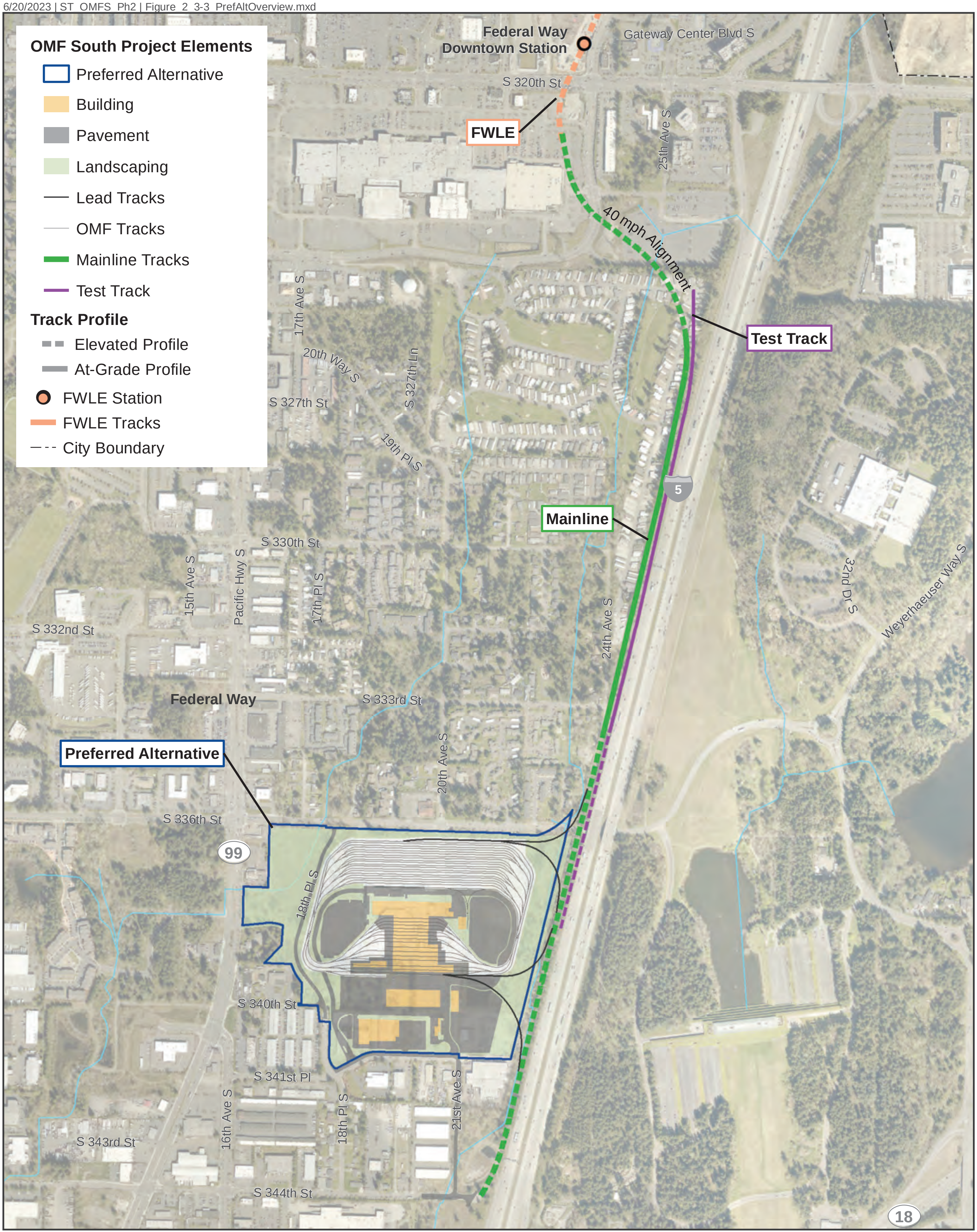
Tail tracks would extend approximately 1,000 feet past the southeast corner of the OMF South site. The tail tracks would allow trains to access the Link system from the south if the northern lead tracks were out of service. Train speeds would be less than 5 mph because the trains would be coming to a stop to allow them to reverse direction and head north.

In addition to the mainline and tail tracks, a 0.9-mile test track would run parallel to the east side of the mainline tracks from S 324th Street to just south of S 336th Street. The test track would be at the same elevation as the mainline tracks, except for the north end of the track near S 324th Street, where the test track would be at grade and the mainline tracks would be elevated. A small (1,000-square-foot) building near the test track would include a breakroom and facilities for employees.

OMF South Site

The Preferred Alternative site is approximately 66 acres. It includes the OMF building, the MOW building, the Link System-Wide Storage building, storage tracks, parking, training tracks, and yard areas. There would be approximately 480 parking spaces, including spaces for employees, visitors, accessible parking, and nonrevenue Sound Transit vehicles. The yard area would be approximately 6.7 acres. Figure 2.3-4 shows a conceptual layout (note that storage tracks are labeled OMF Tracks in the figure).

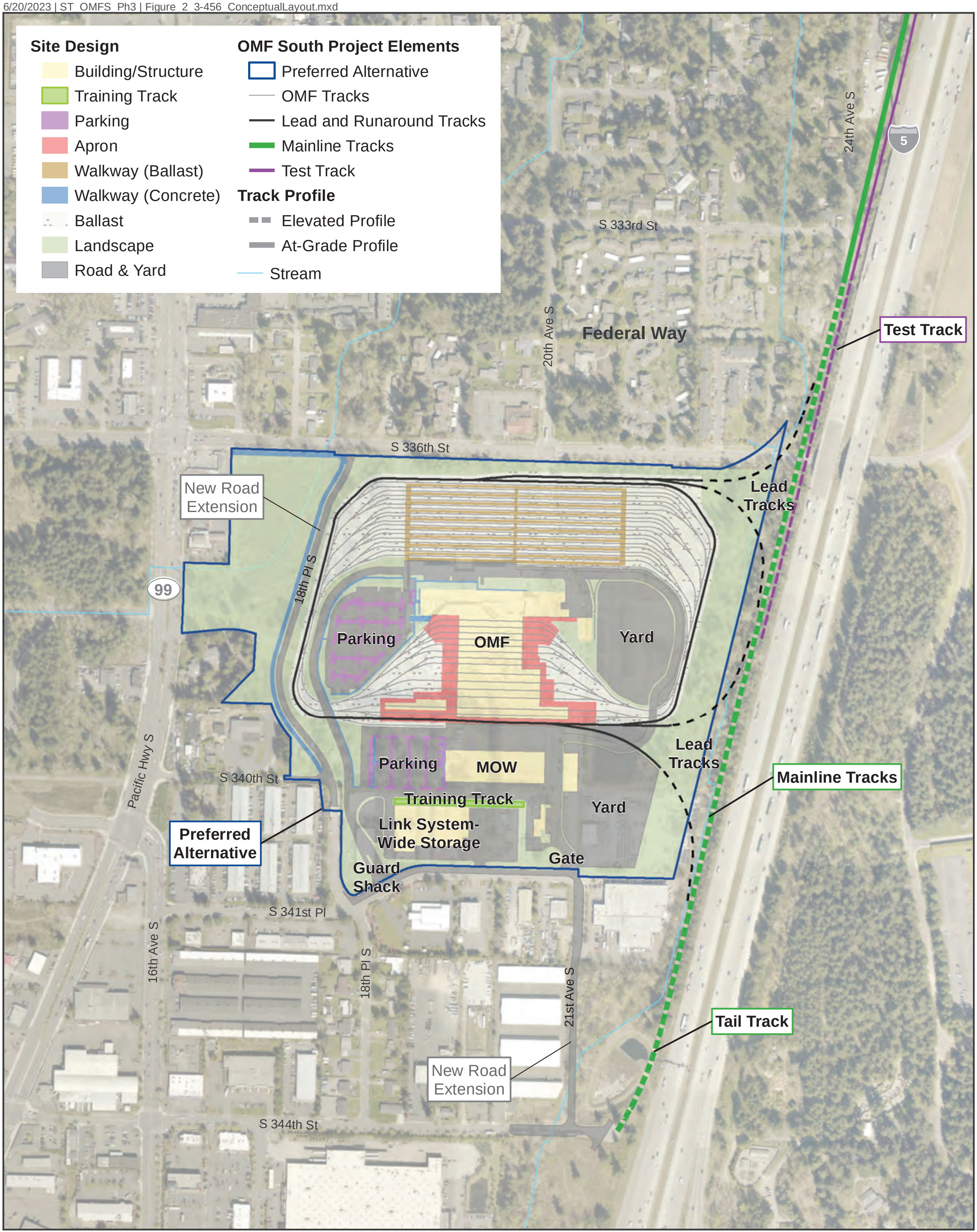
Lead tracks would allow LRVs to access the mainline tracks. Two elevated lead tracks would extend from the northeast corner of the site to the mainline tracks and would each be approximately 800 feet long. Similarly, two elevated lead tracks, each approximately 1,000 feet long, would extend from the southeast corner of the site connecting to the tail tracks.


OMF South Project Elements
Preferred Alternative
Building
Pavement
Landscaping
Lead Tracks
OMF Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Federal Way Downtown Station
Gateway Center Blvd S
S 320th St
FWLE
25th Ave S
40 mph Alignment
Test Track
17th Ave S
20th Way S
S 327th Ln
S 327th St
19th Pl S
5
Mainline
S 330th St
15th Ave S
Pacific Hwy S
17th Pl S
32nd Dr S
Weyerhaeuser Way S
S 332nd St
24th Ave S
Federal Way
S 333rd St
Preferred Alternative
20th Ave S
S 336th St
99
18th Pl S
S 340th St
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
S 343rd St
S 344th St
18
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 2.3-3
Preferred Alternative Site and Connecting Mainline Track

6/20/2023 | ST_OMFS_Ph3 | Figure_2_3-456_ConceptualLayout.mxd


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
24th Ave S
5
S 333rd St
20th Ave S
Federal Way
Test Track
S 336th St
New Road Extension
Lead Tracks
99
18th Pl S
Parking
OMF
Yard
Pacific Hwy S
S 340th St
Parking
MOW
Lead Tracks
Mainline Tracks
Training Track
Yard
Preferred Alternative
Link System-Wide Storage
Guard Shack
Gate
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 2.3-4
Conceptual Layout
Preferred Alternative

OMF South

The Preferred Alternative would include a replacement for 20th Avenue S along the west side of the site that would extend 18th Place S from S 336th Street to S 340th Street. Additionally, 21st Avenue S would be extended south to a new intersection with S 344th Street. The cul-de-sac at the eastern end of S 344th Street would move west to avoid the new tail tracks. If the Preferred Alternative is selected to be built, Sound Transit would continue to explore site designs to minimize ecosystem impacts, which could include modifying the locations of buildings, track, and 18th Place South within the site boundaries. Appendix K contains a discussion of a potential Preferred Alternative design refinements that could reduce ecosystem impacts.

2.3.2.2 South 344th Street Alternative

The South 344th Street Alternative is in Federal Way between S 336th Street and S 344th Street and between I-5 and 18th Place S.

Mainline Tracks

The South 344th Street Alternative requires approximately 1.8 miles of connecting mainline tracks from the Federal Way Downtown Station to the site, including a tail track. As with the Preferred Alternative, these tracks would also serve as revenue mainline tracks if TDLE is constructed as proposed. The 40 mph Alignment (Preferred) and the 55 mph Design Option are the same as described for the Preferred Alternative. The South 344th Street Alternative also includes a test track and a test track facility that would be the same as described for the Preferred Alternative.

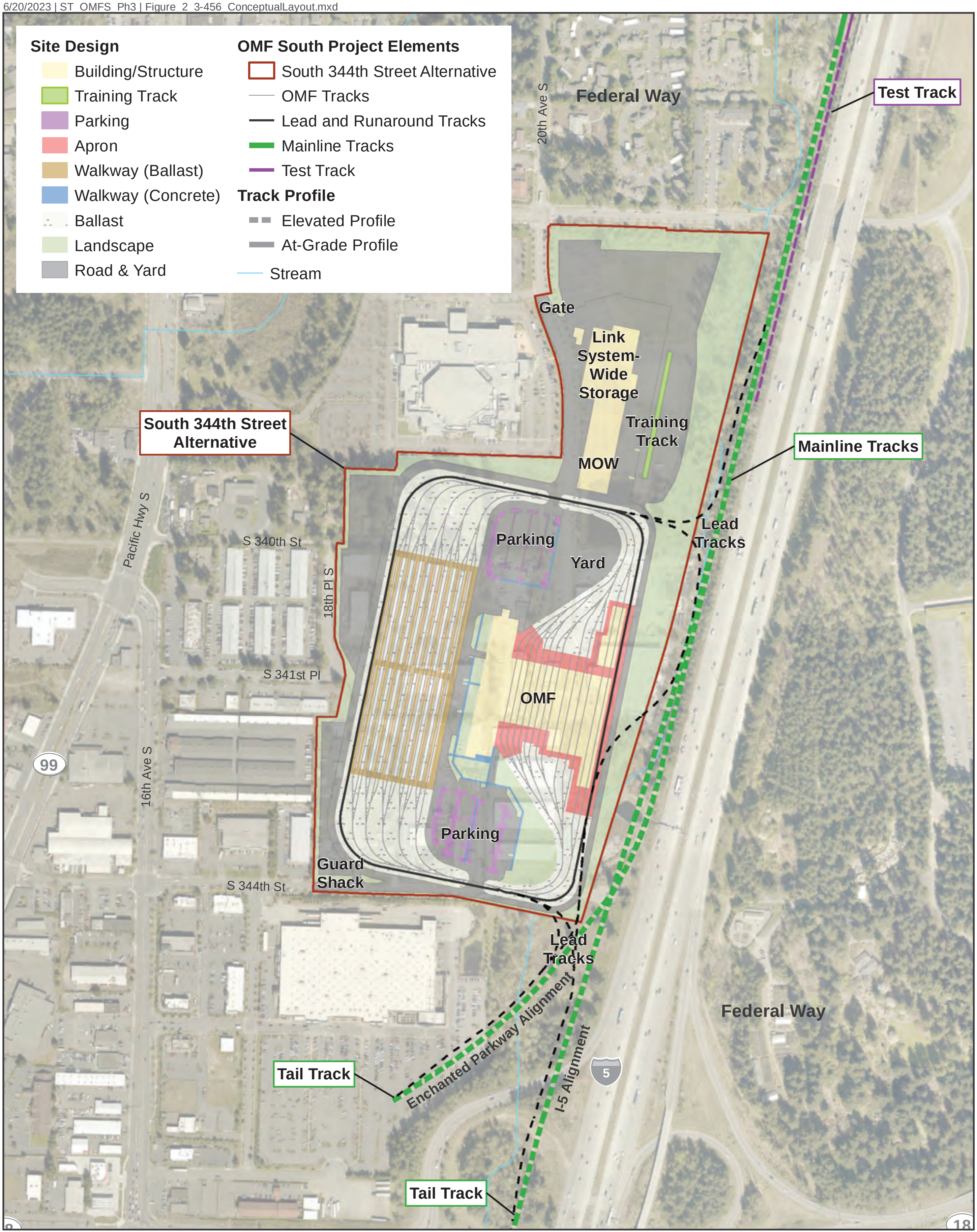
As with the Preferred Alternative, tracks would extend past the southeast corner of the site to serve as tail tracks. These tail tracks would allow trains to access the Link system from the south if the northern lead tracks were out of service. Train speeds would be less than 5 mph because the trains would be coming to a stop to allow them to reverse direction and head north. There are two options for the South 344th Street Alternative tail tracks that correspond with design alternatives for TDLE: the Enchanted Parkway alignment and the I-5 alignment. Both options are completely elevated, with the Enchanted Parkway alignment extending approximately 1,100 feet south of the site and the I-5 alignment extending approximately 1,400 feet south of the site.

OMF South Site

The South 344th Street Alternative site is approximately 64 acres. It includes the OMF building, the MOW building, the Link System-Wide Storage building, storage tracks, training tracks, parking, and yard areas. There would be approximately 480 parking spaces, including spaces for employees, visitors, accessible parking, and spaces for nonrevenue Sound Transit vehicles. The yard area would be approximately 8.2 acres. Figure 2.3-5 shows a conceptual layout.

The site would also require lead tracks for vehicles to access the mainline tracks. The elevated lead tracks would leave the northeast corner of the site and be approximately 1,100 feet long. Similarly, approximately 1,600 feet of elevated lead tracks would leave the southeast corner of the site to connect to the mainline tail tracks for the Enchanted Parkway alignment; approximately 1,300 feet of elevated lead tracks would be needed to connect the site to the mainline tail tracks for the I-5 alignment.

6/20/2023 | ST_OMFS_Ph3 | Figure_2_3-456_ConceptualLayout.mxd


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
Federal Way
20th Ave S
Test Track
Gate
Link System-Wide Storage
Training Track
MOW
South 344th Street Alternative
Mainline Tracks
Pacific Hwy S
S 340th St
18th Pl S
Parking
Yard
Lead Tracks
S 341st Pl
OMF
99
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
Enchanted Parkway Alignment
I-5 Alignment
Federal Way
Tail Track
5
Tail Track
18
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 2.3-5
Conceptual Layout
South 344th Street Alternative

OMF South

2.3.2.3 Midway Landfill Alternative

The Midway Landfill Alternative is in Kent between S 246th Street and S 252nd Street and between I-5 and SR 99.

Mainline Tracks

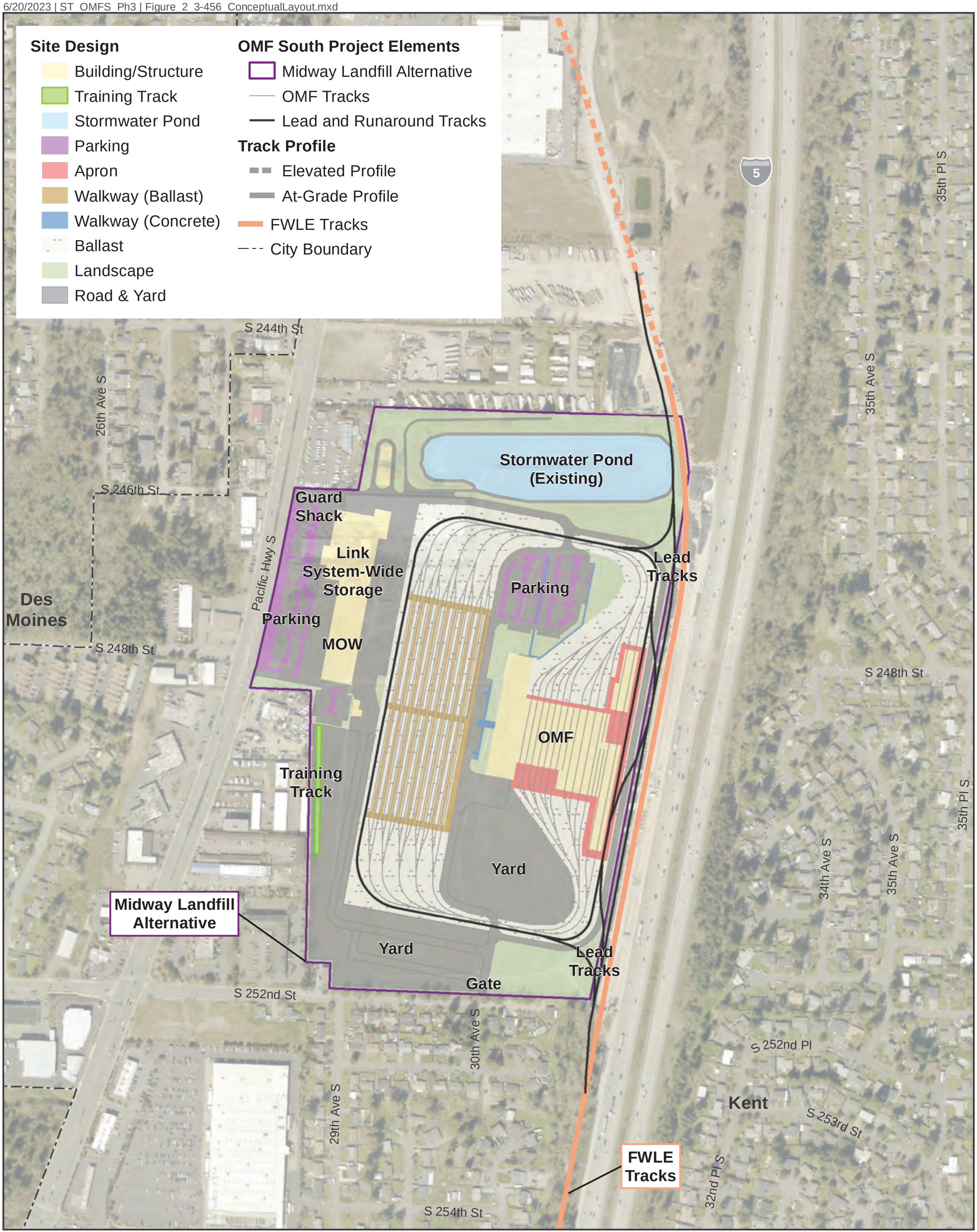
Because the site would be adjacent to FWLE, which is scheduled to open as an active light rail line prior to the opening of OMF South, there would be no need to build additional mainline tracks. Unlike the Preferred and South 344th Street alternatives, the Midway Landfill Alternative would not include a test track because of the varying grades of the existing mainline tracks. Instead, it is anticipated that LRV testing would continue to occur on the mainline tracks.

OMF South Site

The programmed site area of the Midway Landfill Alternative is approximately 68 acres. It includes the OMF building, the MOW building, the Link System-Wide Storage building, storage tracks, training tracks, parking, and yard areas. There would be approximately 480 parking spaces, including spaces for employees, visitors, accessible parking, and nonrevenue Sound Transit vehicles. The yard area encompasses approximately 8.3 acres. Figure 2.3-6 shows a conceptual site layout. There are three subsurface construction design options for the Midway Landfill Alternative, discussed further in Section 2.3.5, Midway Landfill Site Subsurface Construction Design Options.

The Midway Landfill Alternative would connect to the mainline tracks via a series of lead tracks between the Kent/Des Moines and South 272nd Street stations. An approximately 3,200-foot-long lead track would run parallel to the FWLE mainline tracks, and five shorter (approximately 400 foot-long) lead tracks would connect it to the site. The lead track parallel to FWLE would be elevated for approximately 35 percent of its length; the shorter lead tracks would be primarily at grade.

6/20/2023 | ST OMFS Ph3 | Figure 2 3-456 ConceptualLayout.mxd


Site Design
🟨 Building/Structure
🟩 Training Track
🟦 Stormwater Pond
🟪 Parking
🟥 Apron
🟫 Walkway (Ballast)
🟦 Walkway (Concrete)
Ballast
🟩 Landscape
⬜ Road & Yard
OMF South Project Elements
Midway Landfill Alternative
OMF Tracks
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
5
35th Pl S
S 244th St
26th Ave S
S 246th St
Stormwater Pond (Existing)
Guard Shack
Link System-Wide Storage
Pacific Hwy S
Lead Tracks
Parking
35th Ave S
Des Moines
Parking
MOW
S 248th St
S 248th St
OMF
Training Track
35th Pl S
Yard
34th Ave S
35th Ave S
Midway Landfill Alternative
Yard
Lead Tracks
Gate
S 252nd St
30th Ave S
S 252nd Pl
Kent
S 253rd St
29th Ave S
FWLE Tracks
32nd Pl S
S 254th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 2.3-6
Conceptual Layout
Midway Landfill Alternative

2.3.3 Overview of Construction Approach

This section provides an overview of potential construction activities and timing that would apply to each build alternative. Activities include civil construction (which includes site preparation, primary construction, and finish construction), systems installation, testing, and startup activities.

Major civil construction activities are:

- Demolition (buildings, pavement)
- Clearing and vegetation removal
- Installing erosion/siltation controls
- Site grading, fill, compaction, and excavation
- Hauling debris and excavated material
- Importing fill, building materials, and equipment
- Utility extensions, relocations, or disruptions
- Stormwater drainage system improvements
- Construction activity in or near water bodies or sensitive areas
- Contaminated soil and water management
- Elevated structure construction
- Retaining wall construction
- Pile driving or drilling shafts
- Temporary partial or full roadway and lane closures and detour routes
- Temporary partial or limited access to properties
- Building construction
- Track and overhead catenary system (trolley wire) construction
- Constructing temporary roadways for access to and through the construction site
- Constructing new and improving existing roadways
- Landscaping

2.3.4 Construction Methods, Sequence, and Activities

Sound Transit would develop a construction plan during project design to establish the various construction phases and contracts, their estimated schedule and duration, and appropriate sequencing. Sound Transit is currently planning to use a design-build delivery method. Under design-build, one firm completes final design and construction of the project.

While all alternatives would require utility relocation, a noteworthy relocation required for the Preferred and South 344th Street alternatives involves the Bonneville Power Administration (BPA) towers near S 324th Street. The proposed mainline track alignment crosses under the transmission lines just east of the 23rd Avenue S and S 324th Street intersection. The BPA lines would need to be raised to provide the necessary clearance between the top of the mainline track rail to the lowest sag of the transmission line. BPA determined that the existing towers could not be modified, and four new towers would be needed to raise the lines.

Typical construction would occur on a 5- to 6-day workweek schedule, primarily during daytime hours. In some situations (such as when street detours are involved or when daytime construction periods need to be shortened to reduce impacts), additional shifts, all-week, nighttime, or 24-hour construction activities could be necessary. Table 2.3-1 shows the anticipated durations of the site preparation and facility construction phases for each alternative. These phases would overlap to varying degrees depending on the alternative.

Table 2.3-1 Estimated OMF South Construction Durations

Alternative	Site Preparation	Facility Construction	Total[1]
Preferred Alternative	1 year, 5 months	2 years, 3 months	3 years, 4 months
South 344th Street	1 year, 6 months	2 years, 4 months	3 years, 5 months
Midway Landfill – Platform	4 years, 1 month	2 years, 3 months	6 years, 2 months
Midway Landfill – Hybrid	5 years, 7 months	3 years, 1 month	8 years, 8 months
Midway Landfill – Full Excavation	4 years, 4 months	2 years, 9 months	7 years, 1 month

Note:

(1) Duration totals reflect the overlap of some site preparation and facility construction activities and rounding of months.

Grading and excavation would reuse suitable excavated soils as on-site embankment when feasible. Excess excavated material would be removed and hauled to a permitted disposal site. Truck hauling would require a loading area, staging space for trucks awaiting loading, and provisions to prevent tracking soil on public streets. Truck haul routes would require coordination with local jurisdictions and potentially the Washington State Department of Transportation (WSDOT). This would allow surface hauling activities to be concentrated during daytime periods to minimize potential impacts from noise on sensitive receptors such as residences, or to avoid peak traffic periods. Truck haul routes are summarized in Section 3.2, Transportation, and are discussed in detail in Appendix G1, Transportation Technical Report. Section 3.12, Geology and Soils, discusses the estimated excavation and fill volumes for each build alternative.

2.3.5 Midway Landfill Site Subsurface Construction Design Options

Public interest in pursuing the Midway Landfill as a potential OMF South site was raised early in the scoping process. The site has several favorable attributes: it’s a mostly vacant site in an appropriate location within the Link system (South Corridor and adjacent to mainline tracks that will be operational when the facility opens); it’s publicly owned and operated by Seattle Public Utilities (SPU); and it would provide an opportunity to put a U.S. Environmental Protection Agency (EPA)-designated Superfund cleanup site back into productive use.

There are also risks involved with the site. It is a former landfill. There is a cap to control hazardous emissions and reduce surface water infiltration, and there is an active methane gas extraction system. As time passes, decomposition of waste in the landfill is causing settling at different rates, which creates engineering challenges as well as concerns for safety during construction and long-term operation and maintenance. Finally, as a Superfund site, the Midway Landfill is under active monitoring and reporting to ensure that the cleanup measures continue to function as planned. See Section 3.13, Hazardous Materials, for more discussion of the history of the landfill and the cleanup efforts.

SPU submitted comments during the Scoping period for the 2021 SEPA Draft EIS, indicating an interest in exploring options to develop the site for the proposed OMF South. Kent and Federal Way expressed similar interest.

In 2019, Sound Transit conducted two workshops with representatives from SPU, WSDOT, Kent, Federal Way, and Seattle to discuss how to identify potential design options to address differential settlement on the landfill in anticipation of its potential use as an OMF. Based on the workshops Sound Transit developed five potential subsurface construction design options for building an OMF on the landfill, all of which would be compatible with the current FWLE design. These options are documented in the Midway Landfill Site Engineering Optimization Report (Appendix D1). After further analysis — including consideration of compatibility for the connection to the FWLE mainline tracks and a strong preference for tracks to be built on a slab at grade to provide long-term stability — Sound Transit narrowed the number of potential subsurface construction design options to three. These three subsurface construction design options, designated as Platform, Hybrid, and Full Excavation, are discussed in more detail in Appendix D3, Conceptual Landfill Site Reuse Plan. Sound Transit did not identify a recommended subsurface construction design option.

Table 2.3-2 lists the site preparation requirements for each subsurface construction design option.

Table 2.3-2 Midway Landfill Preparation Material Requirements

Subsurface Construction Design Option	Excavation (cubic yds)	Material Removed from Site (cubic yds)	Total Fill Required (cubic yds)	On Site Material Available for Reuse as Fill (cubic yds)	New Fill Material Required (cubic yds)	Concrete Import (cubic yds)
Platform	1,010,000	670,000	340,000	340,000	0	531,000
Hybrid	4,270,000	2,560,000	2,950,000	1,710,000	1,240,000	165,000
Full Excavation	4,870,000	2,920,000	3,560,000	1,950,000	1,610,000	0

Platform

Under this subsurface construction design option, OMF South would be built on a 3.5-foot-thick concrete platform supported on approximately 700 drilled shafts. The platform would be approximately 35 acres. The concrete-filled drilled shafts would be approximately 10 feet in diameter, distributed on an approximately 35-foot by 70-foot grid under the buildings, track and drainage vault area. Average shaft lengths would range from 120 feet to 180 feet below finished grade. Due to the number of drilled shafts, this subsurface construction design option would require removing the entire soil and geomembrane cap system that overlays the landfill and replacing it after the shafts have been installed. The platform would then be constructed on top of the new cap, which would be designed to meet the regulatory requirements for the remedial controls to contain the landfill waste and hazardous emissions and to prevent precipitation from reaching the buried refuse where it could contaminate groundwater. Depending on the final elevation of the platform, lead tracks from the site may need to be elevated to connect to the FWLE mainline.

Pits, approximately 6 feet deep, would be built within the concrete platform to access the underside of the LRVs. These pits would be necessary for each of the subsurface construction design options. Conduits under the concrete platform would run utility lines for maintenance access. Figure 2.3-7 is a cross section of the Platform subsurface construction design option.

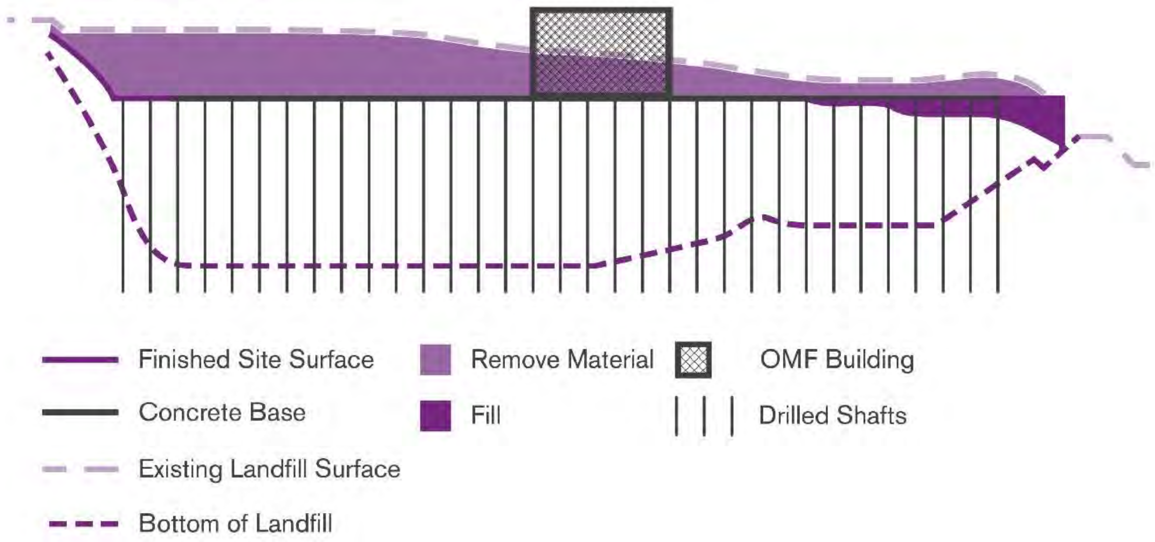

Finished Site Surface
Concrete Base
Existing Landfill Surface
Bottom of Landfill
Remove Material
Fill
OMF Building
Drilled Shafts

Figure 2.3-7 Platform Subsurface Construction Design Option Cross Section

Hybrid

Under this subsurface construction design option, the entire landfill cap system would be removed and replaced. Approximately 4.3 million cubic yards of loose landfill material would be excavated, and a ground improvement process called deep dynamic compaction would be used to prepare the site for construction. Excavated material would be screened to determine if it is suitable for reuse. If the material passes the screening, it would be kept on site. Unsuitable material would be exported for approved offsite disposal.

The Hybrid subsurface construction design option includes a 1-foot-thick concrete slab over a 3-foot-thick beam system built to support facilities sensitive to settlement, including tracks, parking, and roads. This slab and beam system would be about 30 acres. Approximately 110 concrete-filled drilled shafts would provide additional building support where needed. Approximately 1.2 million cubic yards of loose material would be brought to the site. Figure 2.3-8 is a cross section of the Hybrid subsurface construction design option.

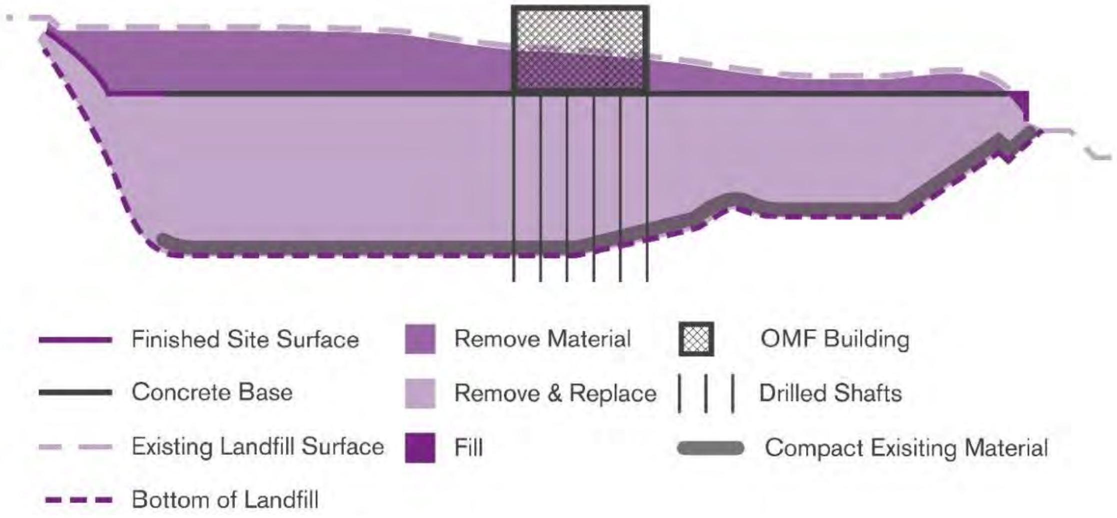

Finished Site Surface
Concrete Base
Existing Landfill Surface
Bottom of Landfill
Remove Material
Remove & Replace
Fill
OMF Building
Drilled Shafts
Compact Exisiting Material

Figure 2.3-8 Hybrid Subsurface Construction Design Option Cross Section

Full Excavation

This subsurface construction design option was designed to completely excavate the landfill and backfill it with soil that the OMF would be built on. Excavation of the landfill would produce roughly 4.9 million cubic yards of loose material, 3.0 million cubic yards of which would be hauled to an approved disposal site. Approximately 1.6 million cubic yards of suitable soil would be imported. Figure 2.3-9 is a cross section of the Full Excavation subsurface construction design option.

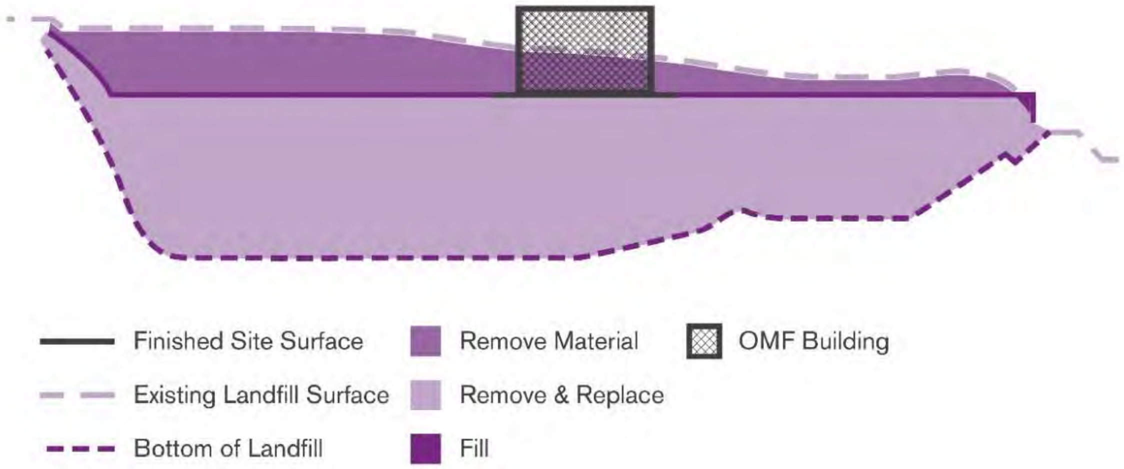


Figure 2.3-9 Full Excavation Subsurface Construction Design Option Cross Section

2.3.6 Staging Areas and Construction Easements

Construction activities would primarily be within the limits of the property being acquired for the project. Temporary construction easements would be necessary in limited locations along the boundaries of some of the alternative sites, mainline, and lead tracks.

2.4 Environmental Commitments and Sustainability

Sound Transit views environmental stewardship as a responsibility of all employees, contractors, and consultants. To that end, the agency integrates environmental ethics and sustainable business practices into its planning, design, construction, and operations.

The agency goes beyond regulation in its commitment to environmental stewardship and sustainability. Sound Transit's Environmental Policy states that the agency will satisfy all applicable laws and regulations and mitigate environmental impacts consistent with Sound Transit's policies, as well as strive to exceed compliance, restore the environment, avoid environmental degradation, and prevent pollution and conserve resources (Sound Transit 2004). Sound Transit's 2007 Sustainability Initiative builds on this and identifies sustainability objectives as also addressing social and economic development issues.

Sound Transit implements these commitments through a certified ISO 14001 Environmental and Sustainability Management System. The Board-approved long- and short-term goals for the management system's environmental and sustainability objectives are found in Sound Transit's 2015 and 2019 Sustainability Plan updates (Sound Transit 2019f). Examples of environmental or best management practices that are integrated into the project design and implementation include measures to minimize project impacts, such as stormwater control, appropriate compensation for affected properties, due diligence work to address hazardous materials, and construction plans that keep the community informed. As part of the preliminary engineering for the OMF South project, Sound Transit is continuing to investigate project-specific opportunities to contribute towards Sound Transit's goal of being carbon neutral by 2050.

In order to design the project for climate change resilience, in 2022 Sound Transit updated its 2013 Puget Sound Climate Change Science white paper to reflect the most recent scientific data available for the region. Sound Transit is also assessing how flood risk may affect resilience of the proposed design and design standards for the project alternatives. By assessing climate-related changes and vulnerabilities in the project planning stages, Sound Transit can include adaptation measures to support resilient infrastructure operations. Examples of potential adaptations include sizing culverts to accommodate future stream flows; installing sensors to monitor track temperatures, including air conditioning or shading around signal boxes; and raising ground-level infrastructure in areas of localized flooding.

In addition to meeting environmental commitments for its projects, Sound Transit seeks to avoid and minimize impacts where possible. To this end, Sound Transit will continue to explore design options for the Preferred Alternative, with a goal of further reducing environmental impacts. Where adverse impacts cannot be avoided, Sound Transit identifies potential measures to mitigate the adverse impacts to the extent feasible.

2.5 Funding and Opinion of Probable Cost

The opinion of probable cost is presented in ranges in Table 2.5-1. Cost estimates at this early phase of project development (approximately 10 percent design) are for comparative purposes only using a "Unit Cost Library" assembly methodology for cost estimating and do not represent the project budget. Sound Transit has developed high-level conceptual cost estimates for all alternatives evaluated in the Final EIS. Sound Transit establishes a project budget when design has advanced and a project's baseline budget and schedule is established prior to the start of construction.

The current level of project design includes uncertainties regarding the project scope, engineering data, mitigation requirements, schedule, and project delivery methods. To account for these uncertainties, the Opinion of Probable Cost is provided in a range. These conceptual estimates focus on the project elements that are defined consistently across alternatives, that capture the essential physical features of alternatives, and that help distinguish alternatives from one another.

In addition to the "Unit Cost Library" cost estimate, Sound Transit completed a more detailed estimate, applying a "bottoms up" cost methodology for the Preferred Alternative. Preliminary information from this methodology indicates cost growth of 33 percent attributable to the change in estimating methodology, inflation factors, market conditions, design development, and scoping changes. Sound Transit anticipates that the South 344th Street and Midway Landfill alternatives would have a similar increase if a "bottoms up" cost methodology was applied to those alternatives.

Capital projects across the Puget Sound region are experiencing the effects of inflationary factors including increases in the cost of materials and labor. Sound Transit employs Value Management evaluations and procurement strategies to establish final project budgets, supporting prudent expenditure of public funds. Each project estimate throughout the various design phases will therefore need to be evaluated and adjusted specifically considering current market conditions. This market conditions adjustment is independent of escalation and will fluctuate with economics and the value of any given project considered by the marketplace.

Table 2.5-1 Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives

Alternative	Real Estate and Relocation[1]	Final Design and Construction[2]	Total Capital Preliminary Estimate	Annual Operating Estimate
Preferred Alternative				
Mainline Track	$19 M to $22 M	$338 M to $427 M	$356 M to $449 M	$1.2 M
OMF Site	$155 M to $186 M	$1.3 B to $1.7 B	$1.5 B to $1.8 B	$12 M
South 344th Street Alternative				
Mainline Track	$25 M to $59 M	$503 M to $636 M	$528 M to $695 M	$1.5 M
OMF Site	$147 M to $176 M	$1.3 B to $1.7 B	$1.5 B to $1.9 B	$12 M
Midway Landfill Alternative[3]				
Platform	$44 M to $52 M	$2.8 B to $3.5 B	$2.8 B to $3.5 B	$13 M
Hybrid	$44 M to $52 M	$2.2 B to $2.8 B	$2.3 B to $2.9 B	$13 M
Full Excavation	$44 M to $52 M	$2.1 B to $2.6 B	$2.1 B to $2.7 B	$13 M

Notes:

(1) All cost estimates are reported in 2023 dollars. They do not account for future escalation of construction or operational costs. This estimating methodology and accuracy is consistent with AACE International, Inc. for projects at the 10 percent level of design.

(2) Design and construction costs based on Sound Transit's Unit Cost Library values.

(3) The Midway Landfill Alternative does not include a test track.

The opinion of probable cost includes the following elements:

- Construction, including demolition and work to prepare the site (e.g., earthwork); trackway/mainline; train control electrical, signal, and communication systems; maintenance and administrative facilities; and associated improvements.
- Property acquisition, including relocation assistance.
- Design, permitting, agency administration, and program management.

In addition, estimates for construction change orders and an unallocated contingency were made as a percentage of the above estimates. Estimates for annual operating costs include long-term expenses to maintain the property, buildings, and other facilities as well as operating costs for the trains to deploy each morning before passenger service begins and return to the OMF each night after passenger service has shut down. Annual maintenance expenses for the mainline tracks for the Preferred and South 344th Street alternatives would apply until TDLE is completed. The annual operating cost estimates for the Midway Landfill Alternative are higher than those for the Preferred or South 344th Street alternatives because it would likely require additional annual expenses to mitigate for potential risks posed by settlement and methane gas over the lifespan of the facility. In addition, the Midway Landfill Alternative would have higher operating costs for the trains to deploy each morning before passenger service begins and return to the OMF each night after passenger service has shut down because it would be farther from the proposed southern terminus of TDLE compared to the Preferred and South 344th Street alternatives.

2.6 Next Steps and Schedule

FTA and Sound Transit prepared this Final EIS that documents and responds to substantive comments received on the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS. The Board will next consider the alternatives evaluated in the Final EIS and select the project to be built.

FTA is also anticipated to publish a Record of Decision (ROD) for the project, which will document its findings as to whether the project has met the requirements of NEPA and related environmental regulations. The ROD will describe FTA's environmental determination on the project, the alternatives considered, the basis for the decision to approve the project, and the required mitigation measures. Issuance of the ROD completes FTA's NEPA process and is a prerequisite for federal funding or approvals.

Because SEPA requires that the Board's final decision on the project be informed by the Final EIS, the Final EIS must be issued independently of the ROD so that Sound Transit's decision can later be incorporated into the ROD. As a result of these regulatory requirements under SEPA, it will not be practical to issue a combined Final EIS and ROD, and they will be issued as separate documents.

After the Board selects the project to be built and FTA issues a ROD, Sound Transit will initiate the final design process, proceed with property acquisition, conduct construction planning, and apply for other permits and approvals. During final design, project elements will be further defined, including, but not limited to, the site orientation, number of buildings, mainline height, stormwater facilities, utility relocations, and staging areas.

All build alternatives would need approval from the Federal Highway Administration (FHWA) to construct and operate lead or mainline tracks within the interstate right-of-way. If the Board selects to build the Preferred Alternative or the South 344th Street Alternative, BPA would require environmental review for the relocation of their facilities in Federal Way. Regulatory agencies and local jurisdictions issuing permits for the project may use and rely on this environmental review to satisfy their NEPA and SEPA requirements.

2.6.1 Project Schedule

The project schedule is shown in Table 2.7-1. The current schedule is to begin final design and construction in 2024. The forecasted in-service date is 2032 for the Preferred Alternative, but Sound Transit is also pursuing measures to advance the opening earlier (potentially 2030). The Final EIS analysis evaluates the potential environmental impacts of OMF South at full buildout.

Table 2.7-1 Project Schedule

Preliminary Design and Environmental Review	Time Period
Early Scoping and Public Outreach	Spring to Fall 2018
Environmental Scoping	Spring 2019
Sound Transit Board Identifies SEPA Draft EIS Alternatives	May 2019
2021 SEPA Draft EIS Published	March 2021
2021 SEPA Draft EIS Comment Period	March 5 to April 19, 2021
Sound Transit Board Identifies Preferred Alternative	December 16, 2021
FTA Assumes Federal Lead Agency Status under NEPA	March 2023
NEPA Draft/SEPA Supplemental Draft EIS Published	September 22, 2023
Final EIS Published	June 7, 2024
Sound Transit Board Selects Project to Be Built	2024
FTA Issues Record of Decision	2024
Final Design, Construction, and Operation Targets[1]	
Final Design, Permitting, and Construction	2024 to 2037
OMF South Forecasted In-Service Date	2032 to 2037

Notes:

(1) The dates are presented in a range to reflect the schedule for all build alternatives.

2.6.2 Benefits and Disadvantages of Delaying Project Implementation

As required by SEPA, this section discusses the benefits and disadvantages of delaying the proposed project instead of approving it now.

Delaying the project would postpone impacts associated with project construction but would also postpone realizing a major component of the region's long-range plans for managing growth and transportation and the opportunity to link neighborhoods to Puget Sound regional employment centers.

There are several disadvantages of delaying implementation of the proposed project:

- A delay would compromise Sound Transit's ability to receive, test, and commission additional LRVs and therefore could delay the opening of light rail extensions under Sound Transit 3, including extensions to Tacoma and West Seattle.
- Delaying OMF South would require Sound Transit to operate the expanded system at a lower level of service than planned and/or delay some or all of the planned Sound Transit 3 light rail extensions until additional operations and maintenance capacity is developed. Degraded levels of service could include increased headways (less frequent trains serving stations) and decreased passenger capacity (operating three-car rather than four-car trains).
- Lower service levels and less light rail passenger capacity could result in fewer commuters using transit and secondary impacts on bus transit service in those corridors planned to be served by Link light rail. Those commuters may continue using automobiles instead, resulting in greater vehicular and greenhouse gas emissions.
- A delay in the proposed project would delay construction expenditures within the local and regional economy and the benefits that flow from such spending.
- Delaying the proposed project would likely result in higher construction costs due to inflation.

3 AFFECTED ENVIRONMENT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

3.1 Introduction

This chapter discusses the affected environment, impacts, and mitigation measures for each element of the environment. Each section contains a brief introductory description of the subject matter along with a description of the study area for that element of the environment, followed by three sections: affected environment, environmental impacts, and mitigation measures.

The affected environment section includes a description of the potentially impacted resources within the study area. The environmental impacts section discusses impacts to the environment in the following order: No-Build Alternative, long-term impacts (for all build alternatives), construction impacts (for all build alternatives), avoidance and minimization of impacts, and indirect impacts. The mitigation measures section describes proposed steps to address the identified environmental impacts.

The extent of the study area for the OMF South project depends on the environmental resource being evaluated and is described for each resource. Typically, the study area consists of the construction limits for the Preferred, South 344th Street, and Midway Landfill alternatives and the surrounding area, though for some resources (for example, Air Quality and Greenhouse Gas Emissions) impacts are evaluated at a regional level. For many resources, the Preferred and South 344th Street alternative study areas, including proposed mainline tracks, overlap and discussions are combined. For other resources, the Preferred and South 344th Street alternative study areas are discussed separately in order to better differentiate potential impacts between the two alternatives.

3.2 Transportation

This section describes the existing transportation environment and potential impacts associated with the OMF South project alternatives. It evaluates the potential operational and construction impacts of OMF South, including the traffic activity from employees coming to and departing from the site and truck trips and haul routes needed during construction. For the transportation analysis, two study areas were defined. Due to their close proximity and anticipated impacts to similar intersections, a single study area was identified for the Preferred and South 344th Street alternatives. The study area for the Preferred and South 344th Street alternatives includes the proposed mainline in addition to the OMF and lead tracks connecting to the mainline. The elevated mainline track for the Preferred and South 344th Street alternatives would cross several roadways within the study area. Because all of these crossings would be grade separated from the mainline, there would not be impacts to traffic operations. A second study area, which includes the OMF site and lead tracks connecting to existing mainline, was identified for the Midway Landfill Alternative.

A more detailed discussion of the affected environment and impacts to transportation resources is provided in Appendix G1, Transportation Technical Report.

3.2.1 Affected Environment

3.2.1.1 Transportation Network

Preferred and South 344th Street Alternatives Study Area

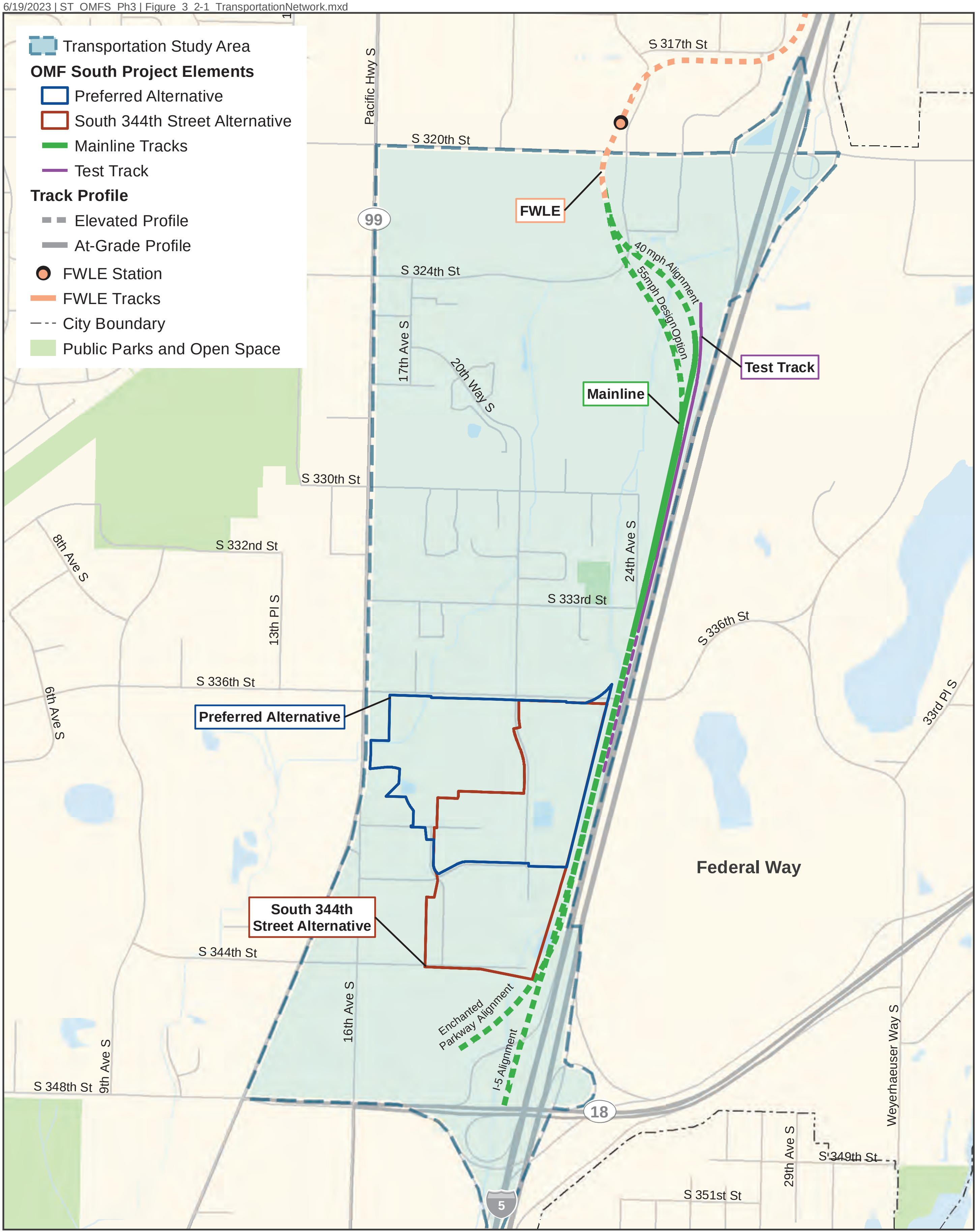
All streets in the Preferred and South 344th Street alternatives study area are in Federal Way. The street network and classifications in the study area include arterial, collector, and local streets. Speed limits range from 25 to 40 miles per hour (mph), with the exception of I-5, which has a speed limit of 60 mph through the study area.

Nine intersections were analyzed in the Preferred and South 344th Street alternatives study area. They include uncontrolled intersections and those controlled by a traffic signal or stop signs. Figure 3.2-1 shows the Preferred and South 344th Street alternatives study area and street network. Figure 3.2-2 shows the nine intersections studied for the Preferred and South 344th Street alternatives.

Midway Landfill Alternative Study Area

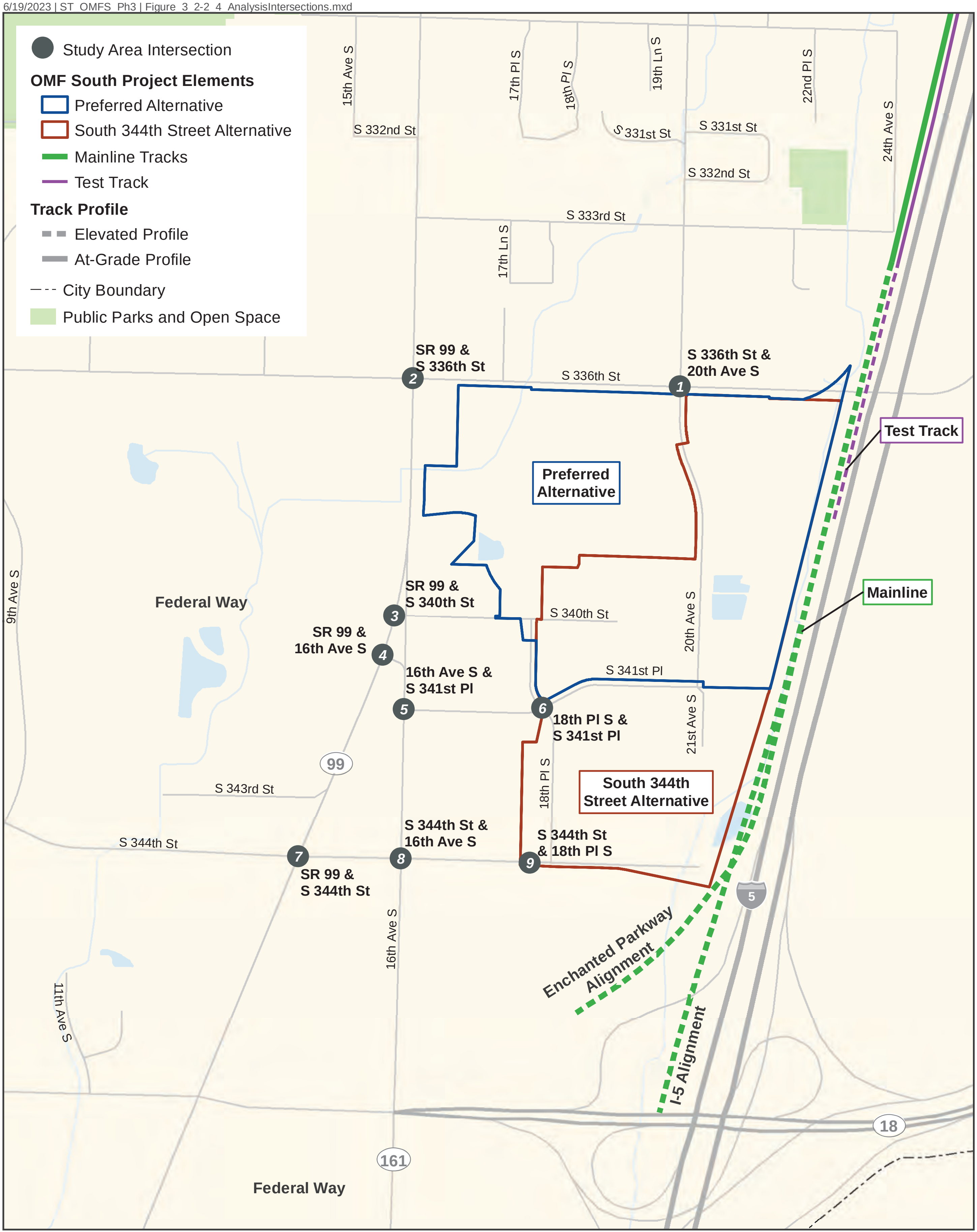
The street network and classifications in the Midway Landfill Alternative study area include arterial, collector, and local streets, all of which are in Kent. Speed limits range from 25 to 45 mph, except for I-5, which has a speed limit of 60 mph through the study area. Figure 3.2-3 shows the Midway Landfill Alternative study area and street network. Figure 3.2-4 shows the intersections studied for the Midway Landfill Alternative.

Nine intersections in the Midway Landfill Alternative study area were originally analyzed in the 2021 SEPA Draft EIS. They include uncontrolled intersections and those controlled by a traffic signal or stop signs. However, Kent does not require analysis of commercial driveways on the east side of SR 99 unless there is a direct impact on a public right-of-way on the west side of SR 99. Therefore, the analysis of intersections 2 through 4 is not described here but is included in Appendix G1, Transportation Technical Report. All other intersections are summarized below.


Transportation Study Area
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
S 317th St
S 320th St
Pacific Hwy S
99
FWLE
40 mph Alignment
55mph Design Option
S 324th St
17th Ave S
20th Way S
Test Track
Mainline
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
33rd Pl S
6th Ave S
Preferred Alternative
Federal Way
South 344th Street Alternative
S 344th St
16th Ave S
Enchanted Parkway Alignment
I-5 Alignment
9th Ave S
S 348th St
18
Weyerhaeuser Way S
29th Ave S
S 349th St
S 351st St
5
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

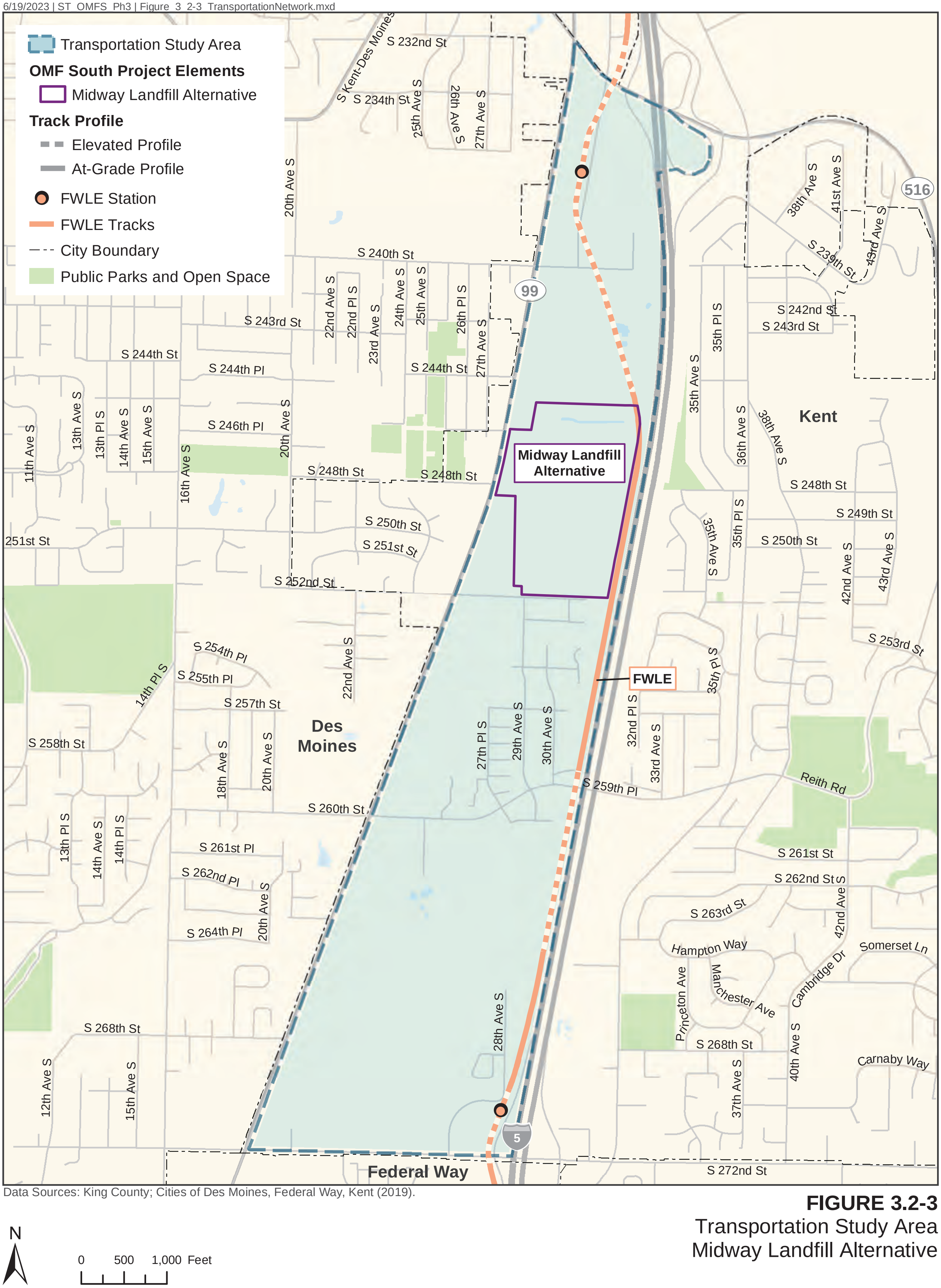
FIGURE 3.2-1
Transportation Study Area
Preferred and
South 344th Street Alternatives
OMF South


● Study Area Intersection
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
S 336th St &
20th Ave S
S 336th St
1
2
Test Track
Preferred
Alternative
Mainline
9th Ave S
Federal Way
SR 99 &
S 340th St
3
SR 99 &
16th Ave S
4
S 340th St
20th Ave S
16th Ave S &
S 341st Pl
5
S 341st Pl
6
18th Pl S &
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
South 344th
Street Alternative
S 344th St
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
7
8
9
SR 99 &
S 344th St
5
16th Ave S
Enchanted Parkway
Alignment
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.2-2
Study Area Analysis Intersections
Preferred and
South 344th Street Alternatives
OMF South

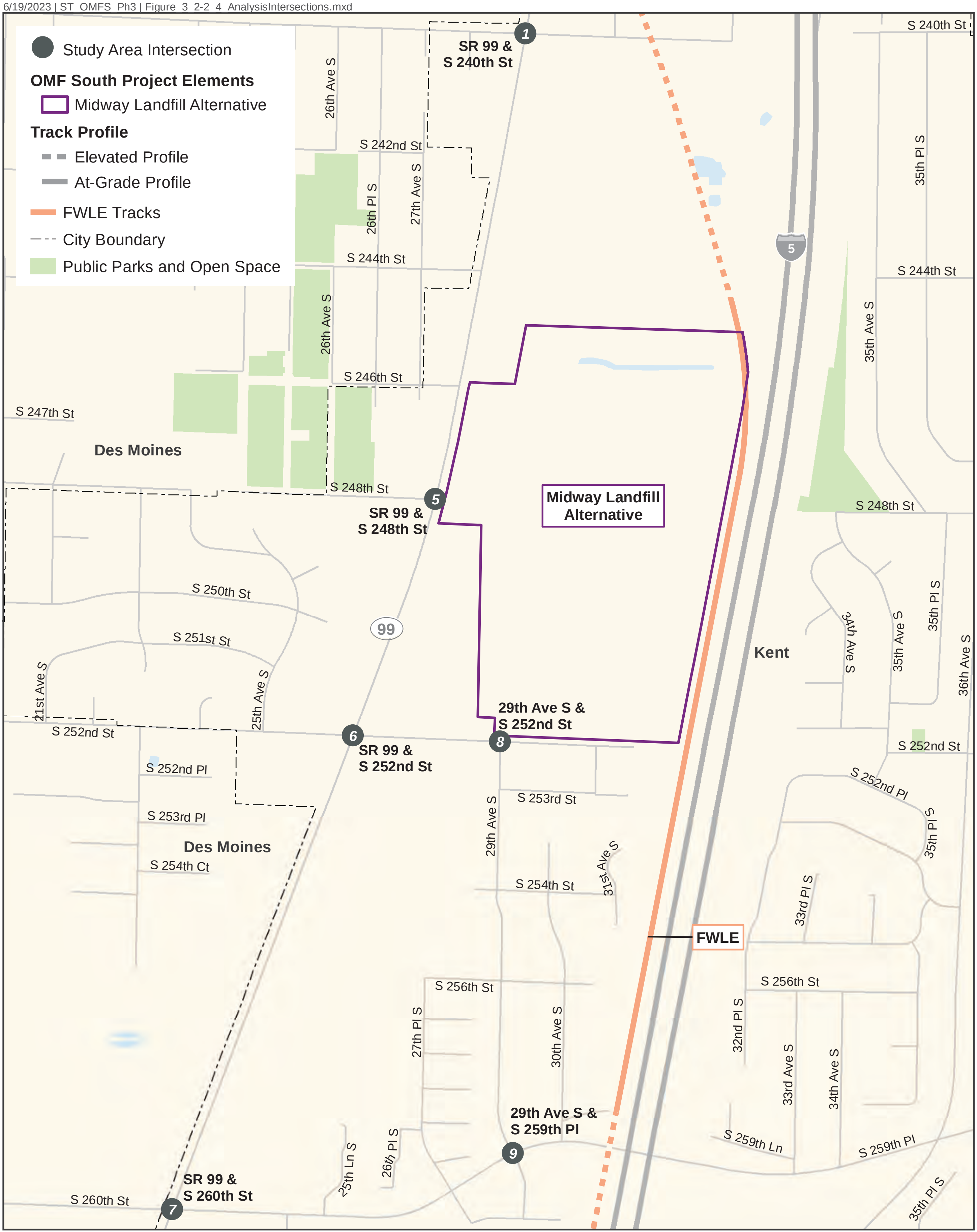

Transportation Study Area
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
Midway Landfill Alternative
FWLE
Kent
Des Moines
Federal Way
99
516
5
S 232nd St
S Kent-Des Moines
S 234th St
S 240th St
S 243rd St
S 244th St
S 244th Pl
S 246th Pl
S 248th St
S 250th St
S 251st St
251st St
S 252nd St
S 254th Pl
S 255th Pl
S 257th St
S 258th St
S 259th Pl
S 260th St
S 261st Pl
S 262nd Pl
S 264th Pl
S 268th St
S 272nd St
S 239th St
S 242nd St
S 249th St
S 253rd St
S 261st St
S 262nd St
S 263rd St
Reith Rd
Hampton Way
Manchester Ave
Princeton Ave
Cambridge Dr
Somerset Ln
Carnaby Way
N
0 500 1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.2-3
Transportation Study Area
Midway Landfill Alternative

OMF South

6/19/2023 | ST_OMFS_Ph3 | Figure_3_2-2_4_AnalysisIntersections.mxd



● Study Area Intersection
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Public Parks and Open Space
1 SR 99 & S 240th St
5 SR 99 & S 248th St
6 SR 99 & S 252nd St
7 SR 99 & S 260th St
8 29th Ave S & S 252nd St
9 29th Ave S & S 259th Pl
Midway Landfill Alternative
FWLE
Des Moines
Kent
99
5
S 240th St
S 242nd St
S 244th St
S 246th St
S 247th St
S 248th St
S 250th St
S 251st St
S 252nd St
S 252nd Pl
S 253rd Pl
S 253rd St
S 254th Ct
S 254th St
S 256th St
S 259th Ln
S 259th Pl
S 260th St
21st Ave S
25th Ave S
25th Ln S
26th Ave S
26th Pl S
27th Ave S
27th Pl S
29th Ave S
30th Ave S
31st Ave S
32nd Pl S
33rd Ave S
33rd Pl S
34th Ave S
35th Ave S
35th Pl S
36th Ave S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.2-4
Study Area Analysis Intersections
Midway Landfill Alternative

OMF South

3.2.1.2 Arterial and Street Operations

Within the study areas, intersections were chosen for analysis based on their potential to be directly affected, such as by a change in channelization, signal control, or station trips, as well as their potential to be indirectly affected by changes in volume due to trips accessing the system. Intersections were classified as signalized, stop controlled, or uncontrolled. All intersection operations were analyzed in the AM and PM peak periods. The AM peak period is between 6 and 9 a.m. and the PM peak period is between 3 and 6 p.m.

Traffic operations were measured using the LOS method, which is defined in terms of average intersection delay on a scale ranging from A to F, depending on the delay conditions at the intersection. LOS A represents the best conditions with minimal delay, and LOS F represents the worst conditions with severe congestion. Table 3.2-1 summarizes the criteria used to define LOS.

Table 3.2-1 Average Control Delay Used in Level of Service

LOS[1]	Signalized Intersections (seconds per vehicle)	Unsignalized Intersections (seconds per vehicle)	Traffic Flow Characteristics (seconds per vehicle)
A	< 10	< 10	Virtually free flow; completely unimpeded
B	> 10 and < 20	> 10 and < 15	Stable flow with slight delays; less freedom to maneuver
C	> 20 and < 35	> 15 and < 25	Stable flow with delays; less freedom to maneuver
D	> 35 and < 55	> 25 and < 35	High density but stable flow
E	> 55 and < 80	> 35 and < 50	Operating conditions at or near capacity; unstable flow
F	> 80	> 50	Forced flow; breakdown conditions

Source: Highway Capacity Manual 2010 (Transportation Research Board 2010)

Note:

(1) The LOS criteria are based on control delay, which includes initial deceleration delay, final deceleration delay, stopped delay, and queue move-up time.

Traffic operations were also measured by volume-to-capacity (v/c) ratio, defined as a fraction representing the ratio of traffic volume to the capacity of a given roadway. The v/c ratio is measured on a decimal scale, with 0.0 representing excessive capacity and anything greater than 1.0 representing congestion where volume has exceeded roadway capacity. A v/c ratio can be calculated for either the intersection as a whole or by approach. Table 3.2-2 shows the relationship between v/c ratio and the aforementioned LOS analysis procedure by average vehicle delay.

Table 3.2-2 Planning and Operational Level of Service

Analysis Procedure	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Planning (v/c ratio)	0.00–0.60	0.61–0.70	0.71–0.80	0.81–0.90	0.91–1.00	>1.00
Operational delay(s) (seconds per vehicle)	0–10	10–20	20–40	40–60	60–80	>80

Sources: Interim Materials on Highway Capacity (Transportation Research Board 1980) and Highway Capacity Manual 2000 (Transportation Research Board 2000)

Impact Thresholds

WSDOT, Federal Way, and Kent have established LOS or v/c standards, shown in Table 3.2-3. These standards are used to determine whether mitigation is warranted for projects that impact arterial and street operations by comparing the overall intersection LOS and v/c ratios for the No-Build Alternative and the build alternatives. Impacts would occur if the build alternatives would result in traffic operations performing below the acceptable LOS or v/c ratio when the intersection or roadway segment would operate at or above the acceptable LOS or v/c ratio under the No-Build Alternative. Impacts may also occur if traffic operations under the build alternative reduce the LOS from E to F or if the delay in an LOS F condition is worsened by more than 10 seconds.

Table 3.2-3 Level of Service Standards

Agency	AM LOS Standard or V/C Ratio	PM LOS Standard or V/C Ratio
WSDOT	• LOS D for Highways of Statewide Significance (e.g., SR 99)	• LOS D for Highways of Statewide Significance
Federal Way	Not applicable	• 1.2 v/c ratio for signalized intersections outside of City Center • 1.0 v/c ratio for unsignalized intersections outside of City Center
Kent	Not applicable	• LOS E for non-SR 99 corridors • WSDOT LOS standard for SR 99

Note:

(1) Federal Way and Kent do not have LOS or v/c standards for AM peak period operations.

Current Levels of Service

In the Preferred and South 344th Street alternatives study area, all intersections operate at or better than WSDOT LOS standards for the roadway in the AM peak hour. The intersection at SR 99/S 336th Street (intersection #2) currently operates at LOS E in the PM peak hour, which is below WSDOT standards. All intersections in the Midway Landfill Alternative study area operate at or better than WSDOT and Kent standards for the roadway in the AM peak hour. The intersection at SR 99/S 248th Street (intersection #5) currently operates at LOS E in the PM peak hour, which is below WSDOT standards.

3.2.1.3 Freight

WSDOT has designated roadways as freight routes and has classified them based on the annual tonnage that is transported along a road in a particular year. This classification system is called the Freight Goods Transportation System. The classifications range from roadways that carry more than 20,000 tons in 60 days to more than 10 million tons annually, as summarized in Table 3.2-4. Existing freight routes within the study areas are shown in figures provided in Appendix G1, Transportation Technical Report.

Table 3.2-4 Freight Goods Transportation System Classification System

FGTS Classification	Annual Gross Tonnage
T-1	Over 10,000,000
T-2	4,000,000 to 10,000,000
T-3	300,000 to 4,000,000
T-4	100,000 to 300,000
T-5	Over 20,000 in 60 days

Source: WSDOT 2020

Preferred and South 344th Street Alternatives Study Area

There are three designated freight routes in the Preferred and South 344th Street alternatives study area: I-5 is designated as a T-1 route, SR 99 is designated as a T-3 route, and 23rd Avenue S from S 322nd Street to S 324th Street is designated as a T-3 route. Federal Way also designates SR 99 and 16th Avenue S as freight routes.

Midway Landfill Alternative Study Area

There are four designated freight routes in the Midway Landfill Alternative study area: I-5 is designated as a T-1 route, and SR 99, S 259th Place, and S 260th Place are designated as T-3 routes. Kent also designates SR 99 as a freight route.

3.2.1.4 Transit

King County Metro Transit (Metro), Sound Transit, and Pierce Transit provide service in and through the study areas, with regional and local bus fixed-route service to transit centers, park-and-rides, and bus stops. Bus stops are primarily on SR 99, but also include some stops on 20th Avenue S, S 336th Street, and 16th Avenue S. Neither light rail nor commuter rail service is currently provided. Existing transit routes are shown in figures provided in Appendix G1, Transportation Technical Report.

Preferred and South 344th Street Alternatives Study Area

Metro Routes 177, 182, 193, and 903 and Pierce Transit Routes 402, 500, and 501 provide bus service in the Preferred and South 344th Street alternatives study area. These routes provide both peak-only and all-day bus service. The Federal Way/S 320th Street Park & Ride is within the Preferred and South 344th Street alternatives study area. It is served by Metro routes 177, 182, 193, and 903 and Pierce Transit routes 402, 500, and 501. Parking is available and free for transit customers. It has 877 spaces and had a utilization rate of 1.3 percent in the first quarter of 2023 (King County Metro 2023).

Midway Landfill Alternative Study Area

Metro Route 165 and the RapidRide A Line provide all-day bus service in the Midway Landfill Alternative study area.

3.2.1.5 Nonmotorized Network

In general, the opportunities for nonmotorized (bicycle and pedestrian) circulation in the study areas are limited. Sidewalks are provided on most arterial streets, and marked crosswalks are provided at signalized intersections. I-5 restricts most opportunities for pedestrian and bicycle connections east of the study areas, and most east-west streets are dead ends. Each study area has only one crossing of I-5: S 336th Street in the Preferred and South 344th Street alternatives study area and S 259th Street in the Midway Landfill Alternative study area.

Preferred and South 344th Street Alternatives Study Area

In the Preferred and South 344th Street alternatives study area, north-south pedestrian circulation is provided via SR 99, 16th Avenue S, 18th Place S, 20th Avenue S, and 23rd Avenue S. East-west pedestrian travel is facilitated by S 324th Street, S 336th Street, S 340th Street, S 341st Place, and S 344th Street. Bicycle facilities in the Preferred and South 344th Street alternatives study area include eastbound and westbound bicycle lanes on S 336th Street, east of 20th Avenue S, and a greenway[1] on 20th Avenue S, S 341st Place, 18th Place S, and S 344th Street. Federal Way recently installed shared lane markings for bicycles on 25th Avenue S, north of the South 320th Park & Ride. Figure 3.2-5 shows the existing pedestrian and bicycle facilities within the Preferred and South 344th Street alternatives study area and its vicinity.

Midway Landfill Alternative Study Area

The Midway Landfill and other large developments restrict north-south nonmotorized circulation in the Midway Landfill Alternative study area north of S 252nd Street, and SR 99 provides the only north-south pedestrian connection between S 240th Street and S 252nd Street. The street network south of S 252nd Street has a more developed grid and offers better opportunities for nonmotorized circulation. East-west circulation is similarly restricted. While SR 99 is considered a shared bicycle facility, there are no designated bicycle facilities that travel within or through the Midway Landfill Alternative study area. Figure 3.2-6 shows the existing pedestrian and bicycle facilities within the Midway Landfill study area and its vicinity.

3.2.1.6 Parking

All private parking is associated with businesses in the study areas, and there are no pay-for-parking facilities. Several off-street private business parking lots are available for use by employees and patrons within the study areas.

Preferred and South 344th Street Alternatives Study Area

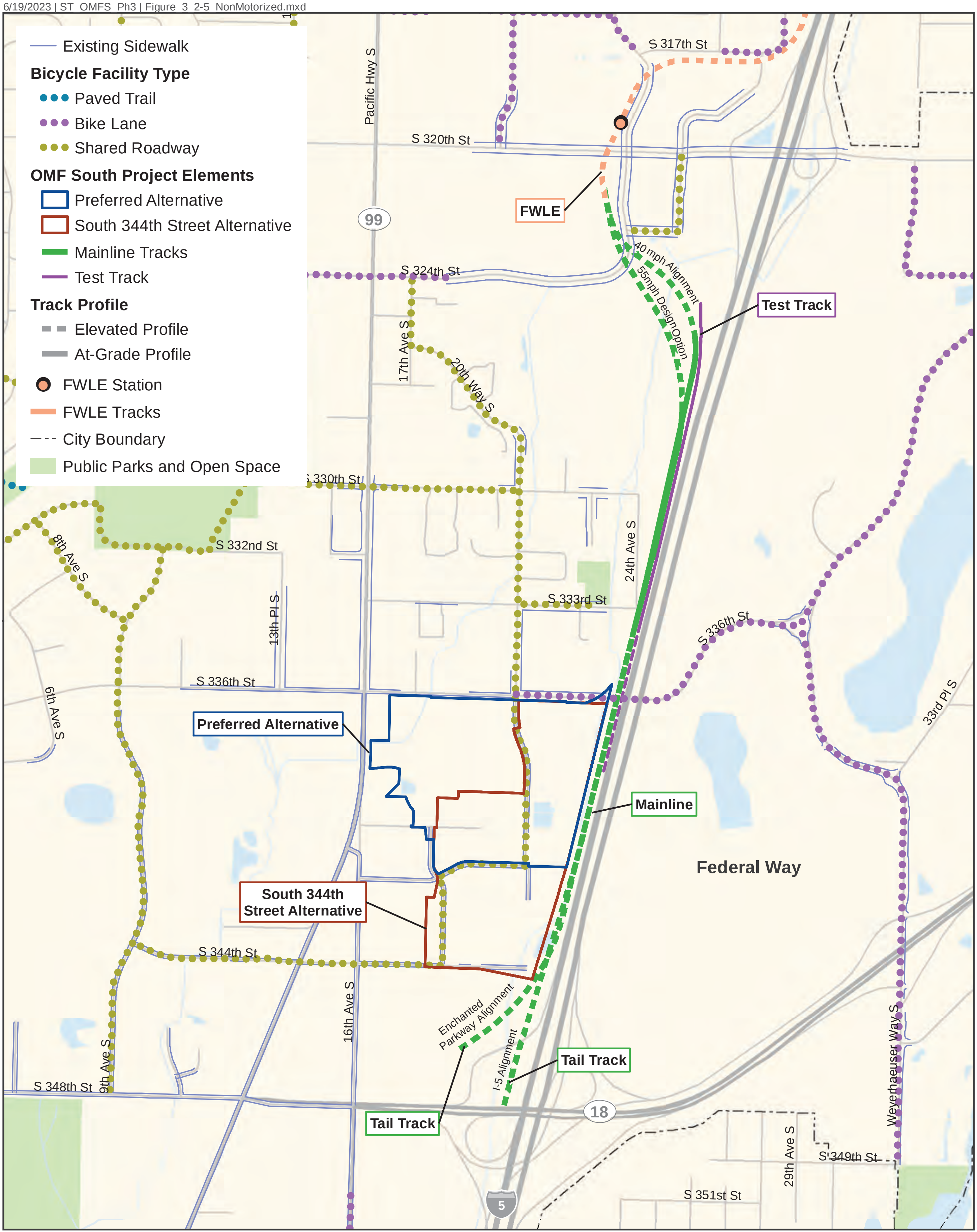
On-street parking is limited in the Preferred and South 344th Street alternatives study area. It is permitted between 8 a.m. and 6 p.m. on the west side of 18th Place S, north of S 341st Place; on the north side of S 341st Place; and on the south side of S 344th Street, east of 18th Place S. It is also permitted along 21st Avenue S, subject to weight restrictions.

Midway Landfill Alternative Study Area

Unrestricted (free, with no time restrictions) on-street parking is permitted on most residential streets south of the landfill property in the Midway Landfill Alternative study area. On-street parking is not permitted on SR 99, S 240th Street, S 259th Street, or S 260th Street.

---

[1] A greenway is a bicycle facility that consists of shared lane markings and guide signs along mostly residential or other low-speed or low-volume roads.


Existing Sidewalk
Bicycle Facility Type
Paved Trail
Bike Lane
Shared Roadway
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
S 317th St
Pacific Hwy S
S 320th St
FWLE
99
S 324th St
40 mph Alignment
55mph Design Option
Test Track
17th Ave S
20th Way S
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Preferred Alternative
Mainline
Federal Way
South 344th Street Alternative
S 344th St
16th Ave S
Enchanted Parkway Alignment
I-5 Alignment
Tail Track
9th Ave S
S 348th St
Tail Track
18
29th Ave S
Weyerhaeuser Way S
S 349th St
S 351st St
5

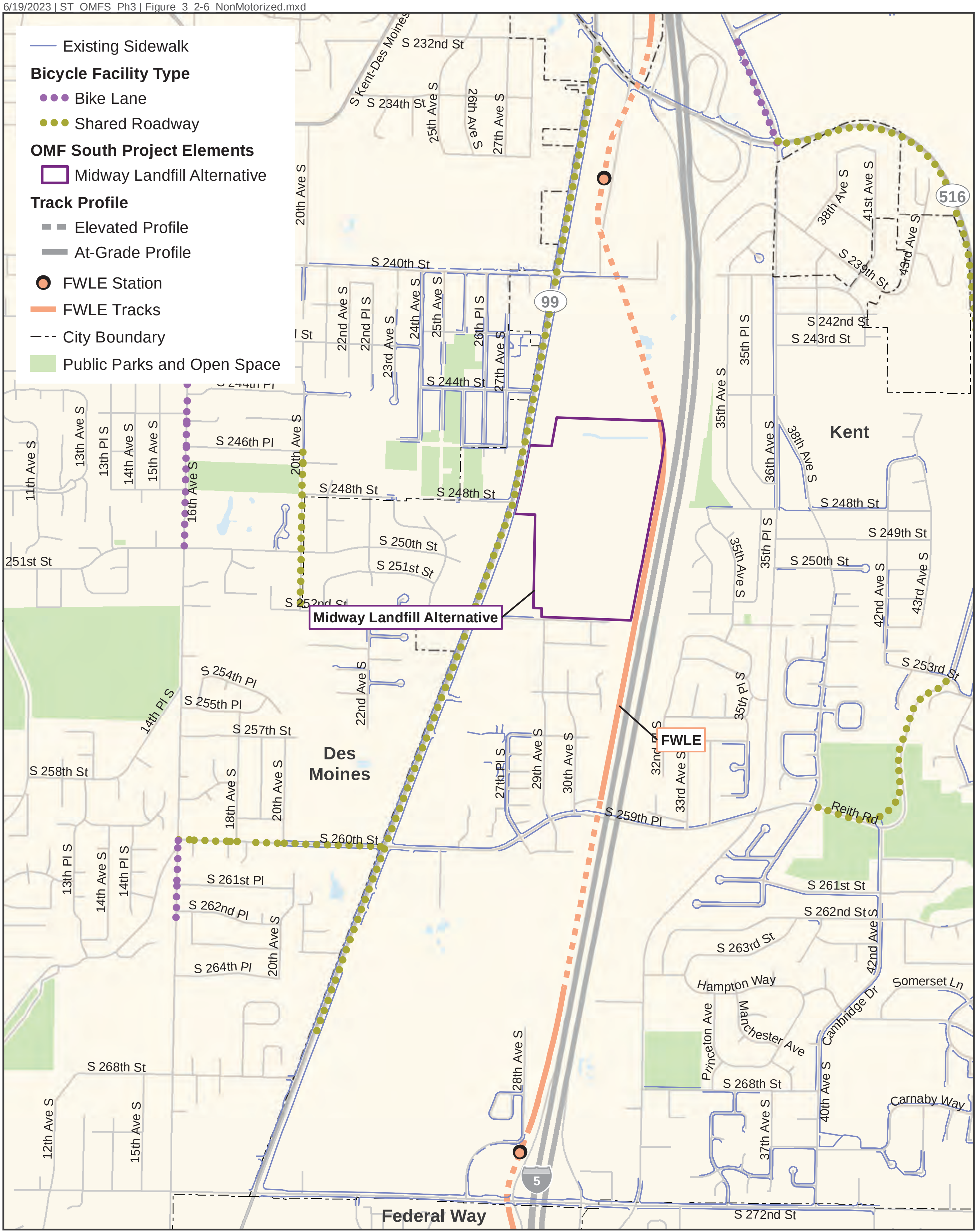
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.2-5
Existing Bicycle and Pedestrian Facilities
Preferred and
South 344th Street Alternatives
OMF South

6/19/2023 | ST_OMFS_Ph3 | Figure_3_2-6_NonMotorized.mxd


Existing Sidewalk
Bicycle Facility Type
Bike Lane
Shared Roadway
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
Midway Landfill Alternative
FWLE
Des Moines
Kent
Federal Way
99
516
5
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
20th Ave S
S 240th St
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
S 244th Pl
S 246th Pl
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
20th Ave S
S 248th St
S 248th St
S 250th St
S 251st St
251st St
S 252nd St
S 254th Pl
S 255th Pl
14th Pl S
22nd Ave S
S 257th St
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Ave S
33rd Ave S
S 259th Pl
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 262nd Pl
20th Ave S
S 264th Pl
S 268th St
12th Ave S
15th Ave S
28th Ave S
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
S 248th St
S 249th St
35th Pl S
35th Ave S
S 250th St
42nd Ave S
43rd Ave S
S 253rd St
35th Pl S
Reith Rd
S 261st St
S 262nd St
42nd Ave S
S 263rd St
Hampton Way
Somerset Ln
Princeton Ave
Manchester Ave
Cambridge Dr
S 268th St
40th Ave S
37th Ave S
Carnaby Way
S 272nd St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.2-6
Existing Bicycle and Pedestrian Facilities
Midway Landfill Alternative

3.2.1.7 Safety

Historical collision data was collected from WSDOT for the 3-year period from January 2016 to December 2018. Over 60 percent of collisions in both study areas resulted in property damage only. Approximately 30 percent of collisions in each study area resulted in minor or possible injuries.[2] In both study areas, no notable mitigating factors were provided for the fatal and serious injury crashes other than two: one due to driver inattention and one due to driver disregard for a traffic signal. The top two common types of collisions in the study areas were rear end and angle (T-bone), respectively.

Preferred and South 344th Street Alternatives Study Area

During the 3-year period a total of 224 collisions occurred at intersections and roadway segments in the study area, with no fatal crashes and two serious injury crashes. The intersection at SR 99/S 336th Street had the highest number of collisions (64), followed by the SR 99/16th Avenue S intersection (45 collisions). Nineteen collisions occurred in the SR 99 business access transit lane, representing 30 percent of all roadway segment collisions.

Federal Way has established a collision threshold for intersections of 1 crash per million entering vehicles and a collision threshold for segments of 10 crashes per million vehicle miles traveled (City of Federal Way 2019). Locations exceeding the thresholds may indicate safety inadequacies as well as prioritized locations for safety.

Four intersections and no roadway segments in the Preferred and South 344th Street Alternatives study area exceed the collision rate thresholds for Federal Way:

- SR 99/S 336th Street
- SR 99/16th Avenue S
- SR 99/S 344th Street
- S 344th Street/18th Place S

Midway Landfill Alternative Study Area

During the 3-year period a total of 261 collisions occurred at intersections and roadway segments in the study area, including four fatal crashes and six serious injury crashes. Of these, two fatal crashes and two serious injury crashes occurred at the intersection of SR 99 and S 240th Street. The intersections at SR 99/S 240th Street, SR 99/S 260th Street, and SR 99/S252nd Street had the most collisions, with 56, 57, and 47 collisions, respectively. Collisions at these three intersections comprised 61 percent of the total collisions in the study area.

SR 99 between S 240th Street and S 260th Street had the most roadway segment collisions (63). Eleven collisions occurred in the SR 99 business access transit lane, representing 17 percent of total collisions along roadway segments.

---

[2] WSDOT defines minor injury as “One or more persons in a crash had a non-life threatening injury such as: lump on the head, abrasion, bruise, or minor laceration” and possible injury as “One or more persons in a crash had: momentary unconsciousness, claim of injury, limping, complaint of pain, or nausea. These injuries are those reported by the person or indicated by their behavior, but where no wounds or injuries are readily evident.”

3.2.2 Environmental Impacts

3.2.2.1 No-Build Alternative

Under the No-Build Alternative, impacts from construction and operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. This includes TDLE, for which mainline track construction overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

Arterial and Street Operations

Few improvements are planned by Federal Way and Kent that would alter the roadway network and intersections in the study areas under the No-Build Alternative. The following projects are planned by Federal Way in the Preferred and South 344th Street alternatives study area. Only the first project listed has secured funding.

- Add a southbound auxiliary lane on 16th Avenue S from S 344th Street to S 348th Street (the auxiliary lane from S 347th Street to S 348th Street is complete).
- Extend 20th Avenue S to S 344th Street.

In the Midway Landfill Alternative study area, the following projects are planned by Kent. Only the first project listed has secured funding.

- Construct two new streets, 32nd Avenue S from S 240th Street to S 244th Street and S 244th Street from SR 99 to 32nd Avenue S, including sidewalks and bike lanes.
- Change the signal phasing at the S 260th Street/SR 99 intersection to include flashing yellow arrows on the eastbound and westbound approaches as part of FWLE.
- Change the signal phasing at the S 240th Street/SR 99 intersection.
- Add westbound dual left-turn lanes and an eastbound right-turn pocket at the S 260th Street/SR 99 intersection.

Traffic volumes are forecast to increase throughout both study areas between existing conditions and the 2042 AM and PM peak hours. Future volumes under the No-Build Alternative were forecast for the Preferred and South 344th Street alternatives study area using a growth rate of 0.8 percent per year. Future volumes for the Midway Landfill Alternative study area used growth rates of 1.11 and 1.12 percent per year for AM and PM peak hour volumes, respectively.

The traffic operations analysis compared future traffic volumes under the No-Build Alternative at the same study intersections analyzed under existing conditions. Figures showing the forecast 2042 AM and PM peak hour operations and turning movements for the No-Build Alternative are provided in Appendix G1, Transportation Technical Report.

No intersections in the Preferred and South 344th Street alternatives study area are forecast to operate below the LOS or v/c ratio standards for the roadway during the 2042 AM or PM peak hours for the No-Build Alternative. LOS at the SR 99/S 336th Street intersection is forecast to slightly improve from LOS E to LOS D. This improvement is due to signal timing optimization.

In the Midway Landfill Alternative study area, the SR 99/S 248th Street intersection is forecast to operate at LOS F during the 2042 AM peak hour for the No-Build Alternative, which is below the WSDOT LOS standards for SR 99. This intersection currently operates at LOS D during the AM peak hour, which meets WSDOT LOS standards. During the 2042 PM peak hour, the SR 99/S 248th Street intersection is forecast to continue operating below the LOS standards, as it does under existing conditions, dropping to LOS F from its current operation at LOS E.

Freight

Under the No-Build Alternative, freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections with increased congestion.

Transit

Under the No-Build Alternative, FWLE and TDLE would expand light rail service to Tacoma through the study areas, and other projects would expand service to Redmond, West Seattle, Ballard, Northgate, Lynnwood, Everett, south Kirkland, and Issaquah. Bus service on the northern and southern boundaries of the Midway Landfill Alternative study area is expected to increase with the opening of the Kent/Des Moines station near Highline College as part of FWLE. No additional service is planned on SR 99. Some additional bus service is planned along 16th Avenue S in the Preferred and South 344th Street alternatives study area. Metro plans to provide less peak-oriented bus service on I-5 through the study areas in 2042.

It is assumed that Sound Transit would reduce bus service levels on I-5 through the study areas in 2042 because Link light rail will replace much of the current north-south service from south Puget Sound cities toward downtown Seattle and the University District. Existing Sound Transit bus routes that currently provide service to cities north of Tacoma will generally be truncated at the Tacoma Dome and Fife Link stations, where riders will transfer to or from Link. It is also assumed that Pierce Transit would truncate bus service via Routes 402 and 500 in the Preferred and South 344th Street alternatives study area at frequencies comparable to those under existing conditions. Route 501 would be discontinued and would no longer provide service in the Preferred and South 344th Street alternatives study area.

Under the No-Build Alternative, Sound Transit would not have the capacity to receive, test, commission, store, maintain, and deploy the expanded fleet of LRVs needed to support existing and planned future expansions of the light rail system at planned service levels. As a result, light rail operations would be less efficient than they would otherwise be with the facility and Sound Transit would not be able to meet expected ridership demand.

Nonmotorized Network

Under the No-Build Alternative, pedestrian and bicycle facilities would be improved in accordance with adopted local plans. The Transportation Element of the Federal Way Comprehensive Plan calls for installation of bicycle lanes on S 336th Street between SR 99 and 20th Ave S and planned trails through the Federal Way/S 320th Street Park & Ride.

Nonmotorized volumes are expected to increase in the Midway Landfill Alternative study area as a result of land use regulations that encourage mixed uses and higher residential densities in Kent’s Midway Subarea. The Midway Subarea is located in the western portion of Kent and is bound to the north by SR-516 (Kent-Des Moines Road), to the south by South 272nd Street, and by the city of Des Moines along the entire western border. The Midway Subarea Plan envisions a conceptual, expanded pedestrian and bike path framework in the study area, including north-south improvements connecting S 244th Street to S 252nd Street through the conceptual layout of the Midway Landfill Alternative project site.

Parking

Under the No-Build Alternative, the quantity of on-street parking along streets within the study areas is not assumed to change. On-street parking utilization is expected to stay the same because the land uses within the study areas are not expected to change, as shown by the comprehensive plans for Federal Way and Kent. Any new developments within the study areas would be expected to provide adequate off-street parking for their use.

Safety

The expected increase in traffic volumes in the study area could increase collision frequencies for both motor vehicle and nonmotorized users in the study area. Planned roadway and intersection projects could improve safety through rechannelization, improved sight lines, or the addition of turn lanes. The construction of new bicycle and pedestrian facilities would improve safety and predictability for both motor vehicle and nonmotorized users in the study area by clearly identifying conflict points.

3.2.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Arterial and Street Operations

For all build alternatives, all track crossings of existing or planned roadways would be elevated and would therefore not impact traffic operations. For the Preferred and South 344th Street alternatives, this applies to all mainline and tail track design options.

All access points to the OMF South sites would be controlled by fenced rolling gates, one of which would be at a guard house, with access to the site granted via guard house staff or by an automated system, such as electronic key cards. Two scenarios were evaluated to help understand how different gate operations could impact the local transportation system during the peak hour:

- Free-flow movement into each OMF South site without consideration of the effect of opening and closing the rolling gate.
- Vehicle movement into the site with consideration of estimated timing for each gate opening and closing. (This evaluation was completed without the use of the Synchro software because staffed guard houses and gate operations cannot be evaluated with the software.)

Approximately 610 people would be employed at the facility, arriving and departing over the course of three shifts. Employees would arrive at staggered times throughout each shift. A portion of the day and graveyard shift staffing estimates was assumed to enter/exit the OMF South site in the AM and PM peak hours, as shown in Table 3.2-5. All employees were assumed to arrive in single-occupancy vehicles to evaluate a worst-case scenario. The amount of freight traffic to and from the OMF South site is anticipated to be minimal, particularly during the AM and PM peak hours, because deliveries would primarily occur during off-peak hours. Therefore, freight traffic was not factored into the analysis.

The peak hour vehicle trips generated at the facility were assigned to study area roadways and intersections based on existing travel patterns. Existing trips from properties that would be acquired for the project under all alternatives were removed. Existing trips that would be affected by changes in the roadway network under the Preferred and South 344th Street alternatives were rerouted to other intersections or intersection movements. This resulted in a decrease in volume for some intersection movements in both study areas.

Table 3.2-5 Forecast Auto Volumes for the Build Alternatives 2042 AM and PM Peak Hours

Alternative	Inbound AM	Inbound PM	Outbound AM	Outbound PM
Preferred and South 344th Street Alternatives	69	0	11	57
Midway Landfill Alternative	69	0	11	57

Gate operations were assessed to determine whether intersections would be affected. The first gate operation scenario (without the gate opening and closing between vehicles) assumed free-flow movement into each site. Therefore, no additional queueing and delays would result at the gates, and no spillback would occur that could impact intersection operations.

The second scenario assumed the gates would open and close between vehicles. Assuming that 75 percent of inbound and outbound vehicles arrive at gate-managed driveways during a peak 15-minute period either before shift change (AM peak hour) or after shift change (PM peak hour), the access gates should have sufficient capacity to accommodate the inbound and outbound vehicles trips without additional queueing and delays that would impact intersection operations.

Because neither scenario resulted in queuing and delays associated with gate operations, the traffic operations presented in the following sections did not incorporate any impacts associated with access into each OMF South site.

Freight

The build alternatives are not anticipated to negatively affect truck circulation or truck routes on the local street network in the study area. There are no at-grade light rail track roadway crossings that would cause delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

Transit

Bus service network under the build alternatives would be the same as the No-Build Alternative, which includes the transit service modifications planned in conjunction with FWLE and TDLE. Additional bus service levels or rerouting to the facility are not anticipated for any alternatives.

Development of OMF South would provide Sound Transit with additional capacity to receive, test, commission, store, maintain, and deploy an expanded fleet of LRVs for planned Link service. This capacity would provide for more efficient operation of the existing system and allow Sound Transit to accommodate the planned future expansions of the light rail system to meet the expected ridership demand.

Parking

Under the build alternatives, some existing off-street parking would be removed. Construction of any of the build alternatives and improvements to the surrounding roadways would reduce on-street parking in the study areas as well. However, the loss of on-street parking is anticipated to be minimal.

Up to approximately 480 spaces would be needed for on-site parking for employees, visitors, and nonrevenue vehicles. See Chapter 2 for conceptual layouts, including parking, for each build alternative.

Safety

As with the No-Build Alternative, traffic volumes in the study area are forecast to increase by 2042, which could increase collision frequencies for both motor vehicle and nonmotorized users in the study area. However, the roadway, intersection, and nonmotorized improvements identified under the No-Build Alternative and applicable for the build alternatives would improve safety for motor vehicle and nonmotorized users in the study areas under the build alternatives. OMF South would not result in any adverse safety impacts to intersections, including those with over one crash per million entering vehicles.

With the exception of site driveways, OMF South, including the mainline tracks from the Federal Way Downtown Station to the Preferred and South 344th Street alternatives sites, would not intersect with existing roadways, highways, sidewalks, bicycle lanes, or nonmotorized trails. All tracks would be elevated over these transportation facilities and would not present conflicts for drivers, buses, freight, pedestrians, or cyclists. All vertical support elements would be sited to comply with transportation safety requirements. Site driveways would be designed to meet or exceed all local and state safety standards; thus, no new safety issues are expected to be introduced, and existing safety issues would not be exacerbated.

The mainline tracks would be constructed immediately adjacent to the southbound I-5 clear zone (the area beyond the edge of the traveled roadway) within the I-5 right-of-way. While the mainline track would generally maintain clear zone standards, there may be locations where the minimum widths cannot be met. In such instances, deviations from clear zone distances would require approval from WSDOT or FHWA. Failure to meet the standard width of the clear zone could result in impacts to safety conditions and an increase in collision frequencies. In areas where minimum clear zone conditions cannot be maintained, guardrails, barriers, or impact attenuators, such as water-filled jersey barriers or sand filled barrels, would be provided to shield vehicles from roadside hazards. As a result, the mainline tracks along I-5 are not anticipated to have any quantifiable impact to safety along I-5.

Preferred Alternative

Arterial and Street Operations

The Preferred Alternative would have three access points along S 341st Place. The first would be a visitor/employee entrance with a guard house east of 18th Place S. All employees would enter the site at this location. Access would allow for left-in, left-out, right-in, and right-out at S 341st Place. The second and third access points would be west of 21st Avenue S; however, these entrances would not be used for daily employee access to the site. There would be no turn restrictions at the second or third driveway location.

The Preferred Alternative would close 20th Avenue S from S 336th Street to S 341st Place. A new roadway would be constructed on the west side of the OMF site, extending 18th Place S to S 336th Street. This extension of 18th Place S would add a new three-legged intersection to the south side of S 336th Street. The new S 336th Street/18th Place S Extension intersection would be a two-way stop-controlled (TWSC) intersection with access for left-in, left-out, right-in, and right-out.

In addition, 21st Avenue S would be extended south from S 341st Place to S 344th Street in order to satisfy city code requirements. Development of the Preferred Alternative would not interfere with plans to add a southbound auxiliary lane on 16th Avenue S, as described under the No-Build Alternative.

Tables 3.2-6 and 3.2-7 show AM and PM peak hour LOS and v/c ratios (where applicable) for the Preferred Alternative intersections compared to the No-Build Alternative. Note that Federal Way does not evaluate impacts based on AM peak period operations. Under the Preferred Alternative, no intersections are forecast to operate below the LOS or v/c ratio standards during the AM or PM peak hours. Figure 3.2-7 shows the 2042 AM and PM peak hour operations at intersections within the study area.

Freight

The Preferred Alternative is not anticipated to negatively affect truck circulation or truck routes on the local street network. The mainline tracks would not have any at-grade roadway crossings; therefore, there would not be delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

Transit

Depending on the mainline alignment, up to 50 parking spaces in the Federal Way/S 320th Street Park & Ride would be removed as part of the Preferred Alternative to accommodate the elevated mainline tracks and a relocated BPA transmission line tower. Given the size of the Federal Way/S 320th Street Park & Ride and its low utilization, sufficient parking would still be available to accommodate demand. WSDOT has indicated that the loss of these stalls would not require replacement.

Nonmotorized Network

Under the Preferred Alternative, nonmotorized volumes would increase as described for the No-Build Alternative. The conceptual layout of the Preferred Alternative would eliminate the existing 20th Avenue S greenway between S 336th Street and S 344th Street; however, it would maintain the existing bicycle network by including bicycle lanes along the extended segment of 18th Place S and extending the eastbound bicycle lanes on S 336th Street from 20th Avenue S to SR 99. It could also impact the future alignment of the planned trails through the Federal Way/S 320th Street Park & Ride but would not necessarily preclude them.

Parking

Development of the mainline for the Preferred Alternative would require the permanent removal of approximately 10 parking stalls from the east side of The Commons at Federal Way shopping mall. There would be an abundance of parking stalls remaining at The Commons at Federal Way. Nearby developments along 18th Place S, S 341st Place, and S 344th Street currently use street parking that would be removed; however, several of these properties would be acquired as part of the project. Impacts associated with acquisitions are discussed in Section 3.3, Acquisitions, Displacements, and Relocations. No adverse impacts to parking are expected.

Impacts to the Federal Way/S 320th Street Park & Ride are described above under Transit.

Table 3.2-6 Preferred Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection[1]	Control Type	Agency Standard	No-Build Alternative LOS 2, 3	No-Build Alternative Delay (seconds) 2, 3	No-Build Alternative V/C Ratio 2, 3	Preferred Alternative LOS 2, 3	Preferred Alternative Delay (seconds) 2, 3	Preferred Alternative V/C Ratio 2, 3
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.52	N/A	N/A	0.52
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A	D	46	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	19	N/A	C	20	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	28	N/A	D	36	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.15	N/A	N/A	0.17
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.06
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	18	N/A	B	19	N/A
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.39	N/A	N/A	0.38
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.04	N/A	N/A	0.03
11	18th Place S Extension/S 336th Street	TWSC	N/A	-	-	-	N/A	N/A	0.01
12	18th Place S/S 340th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.01

Notes:

(1) Intersection 10 (SR99/Driveway), as discussed in the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS, is no longer included because the site entrance has moved to S 341st Place, east of Intersection 6 (18th Place S/S 341st Place). Intersections 11 and 12 are new intersections formed with the extension of 18th Place S.

(2) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(3) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

Table 3.2-7 Preferred Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection[1]	Control Type	Agency Standard	No-Build Alternative LOS [2, 3]	No-Build Alternative Delay (seconds) [2, 3]	No-Build Alternative V/C Ratio [2, 3]	Preferred Alternative LOS [2, 3]	Preferred Alternative Delay (seconds) [2, 3]	Preferred Alternative V/C Ratio [2, 3]
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.66	N/A	N/A	0.65
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	54	N/A	D	49	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A	C	16	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	N/A	C	35	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.38	N/A	N/A	0.45
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	16	N/A	C	34	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.51	N/A	N/A	0.50
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.04
11	18th Place S Extension/S 336th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.11
12	18th Place S/S 340th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.01

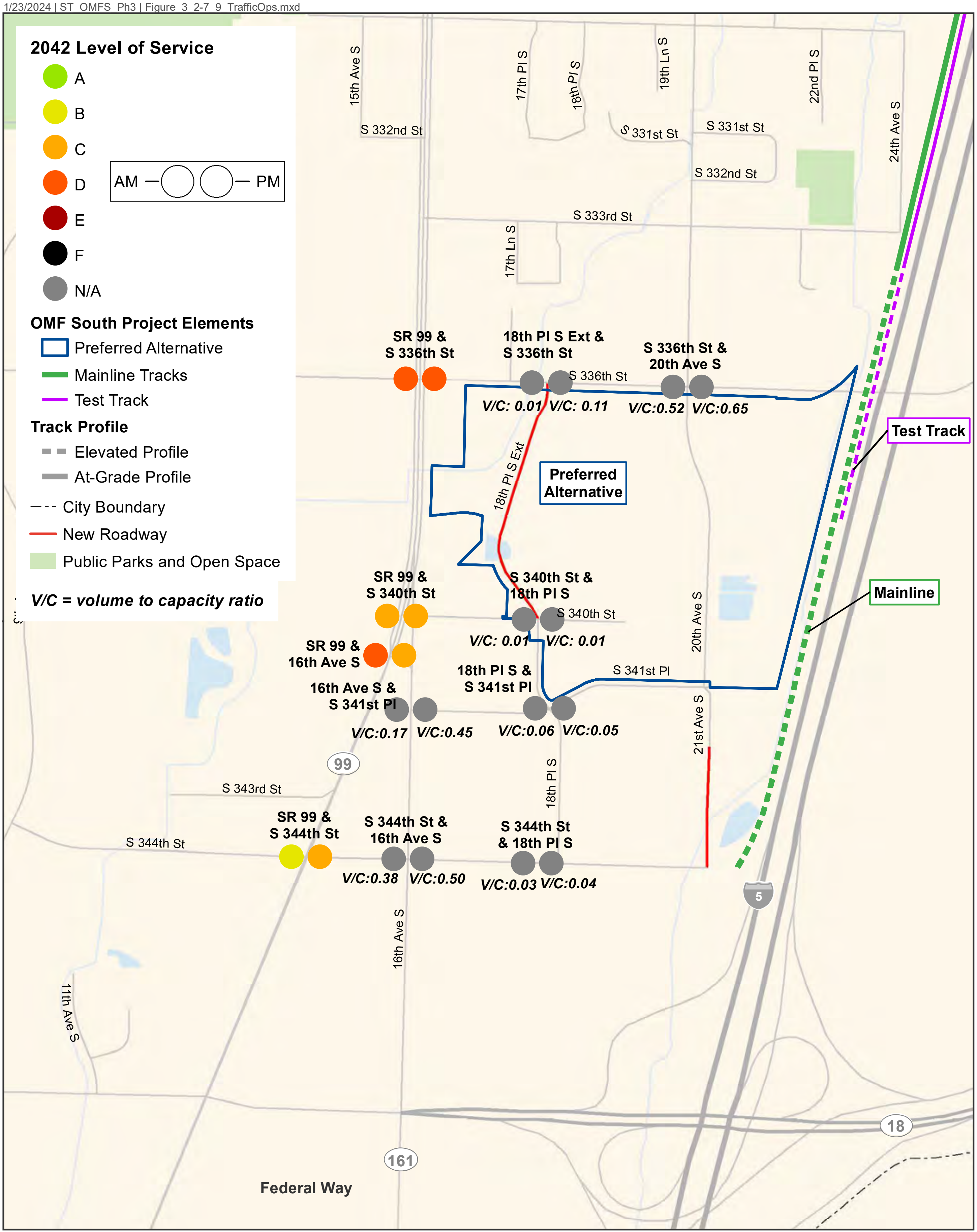
Notes:

(1) Intersection 10 (SR99/Driveway), as discussed in the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS, is no longer included because the site entrance has moved to S 341st Place, east of Intersection 6 (18th Place S/S 341st Place). Intersections 11 and 12 are new intersections formed with the extension of 18th Place S.

(2) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(3) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

1/23/2024 | ST OMFS Ph3 | Figure 3 2-7 9 TrafficOps.mxd


2042 Level of Service
A
B
C
D
E
F
N/A
AM
PM
OMF South Project Elements
Preferred Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
18th Pl S Ext &
S 336th St
S 336th St &
20th Ave S
S 336th St
V/C: 0.01
V/C: 0.11
V/C:0.52
V/C:0.65
Test Track
18th Pl S Ext
Preferred Alternative
SR 99 &
S 340th St
S 340th St &
18th Pl S
S 340th St
Mainline
V/C: 0.01
V/C: 0.01
20th Ave S
SR 99 &
16th Ave S
18th Pl S &
S 341st Pl
S 341st Pl
16th Ave S &
S 341st Pl
V/C:0.17
V/C:0.45
V/C:0.06
V/C:0.05
21st Ave S
99
S 343rd St
18th Pl S
SR 99 &
S 344th St
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
S 344th St
V/C:0.38
V/C:0.50
V/C:0.03
V/C:0.04
5
16th Ave S
11th Ave S
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.2-7
2042 Build Alternative AM and PM Peak Hour Traffic Operations
Preferred Alternative

OMF South

South 344th Street Alternative

Arterial and Street Operations

The South 344th Street Alternative would have two access points. The first would be a visitor/employee access with a guard house at the intersection of S 344th Street/18th Place S, allowing for access to SR 99 via 16th Avenue S or S 344th Street. All employees would enter the site at this location. A second access would be provided at 20th Avenue S, south of S 336th Street, with direct access to the signalized intersection at S 336th Street; however, it would not be for daily employee access to the site. At the intersection at 18th Place S/S 341st Place, the south and east legs would be removed, as they would be occupied by the OMF site.

This alternative would close 20th Avenue S approximately 300 feet south of S 336th Street and preclude the planned extension of 20th Avenue S from S 341st Place to S 344th Street described under the No-Build Alternative. Drivers would still have access to the Christian Faith Center via 20th Avenue S, and nonmotorized travelers wishing to access the remaining streets in the southern part of the study area would be required to do so via 16th Avenue S or SR 99. The project would not interfere with plans to add a southbound auxiliary lane on 16th Avenue S, as described under the No-Build Alternative.

Tables 3.2-8 and 3.2-9 show AM and PM peak hour LOS and v/c ratios (where applicable) for the South 344th Street Alternative intersections compared to the No-Build Alternative. Note that Federal Way does not evaluate impacts based on AM peak period operations. Under the South 344th Street Alternative, no intersections are forecast to operate below the LOS or v/c ratio standards for the roadway or highway during the AM or PM peak hours. Nearby uses, such as the Christian Faith Center, generate large traffic volumes outside of the weekday AM or PM peak hours. Given the planned arrival and departure times for staff at the facility, traffic generated by OMF South is not anticipated to interfere with events at the Christian Faith Center. Figure 3.2-8 shows the 2042 AM and PM peak hour operations at the intersections within the study area.

Freight

The South 344th Street Alternative is not anticipated to negatively affect truck circulation or truck routes on the local street network. The mainline would not have any at-grade roadway crossings; therefore, there would not be delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

Transit

Depending on the mainline alignment, up to 50 parking spaces in the Federal Way/S 320th Street Park & Ride would be removed as part of the South 344th Street Alternative to accommodate the elevated mainline and a relocated BPA transmission line tower. Given the size of the Federal Way/S 320th Street Park & Ride and its low utilization, it is estimated that sufficient parking would still be available to accommodate demand if 50 parking spaces were removed.

Table 3.2-8 South 344th Street Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2	No Build Alternative Delay (seconds) 1, 2	No Build Alternative V/C Ratio 1, 2	South 344th Street Alternative LOS 1, 2	South 344th Street Alternative Delay (seconds) 1, 2	South 344th Street Alternative V/C Ratio 1, 2
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.52	N/A	N/A	0.52
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A	D	52	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	19	N/A	A	0	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	28	N/A	D	36	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.15	N/A	N/A	0.02
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.00
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	18	N/A	B	18	N/A
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.39	N/A	N/A	0.40
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.04	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

Table 3.2-9 South 344th Street Alternative 2042 PM Peak Hour Traffic Operations

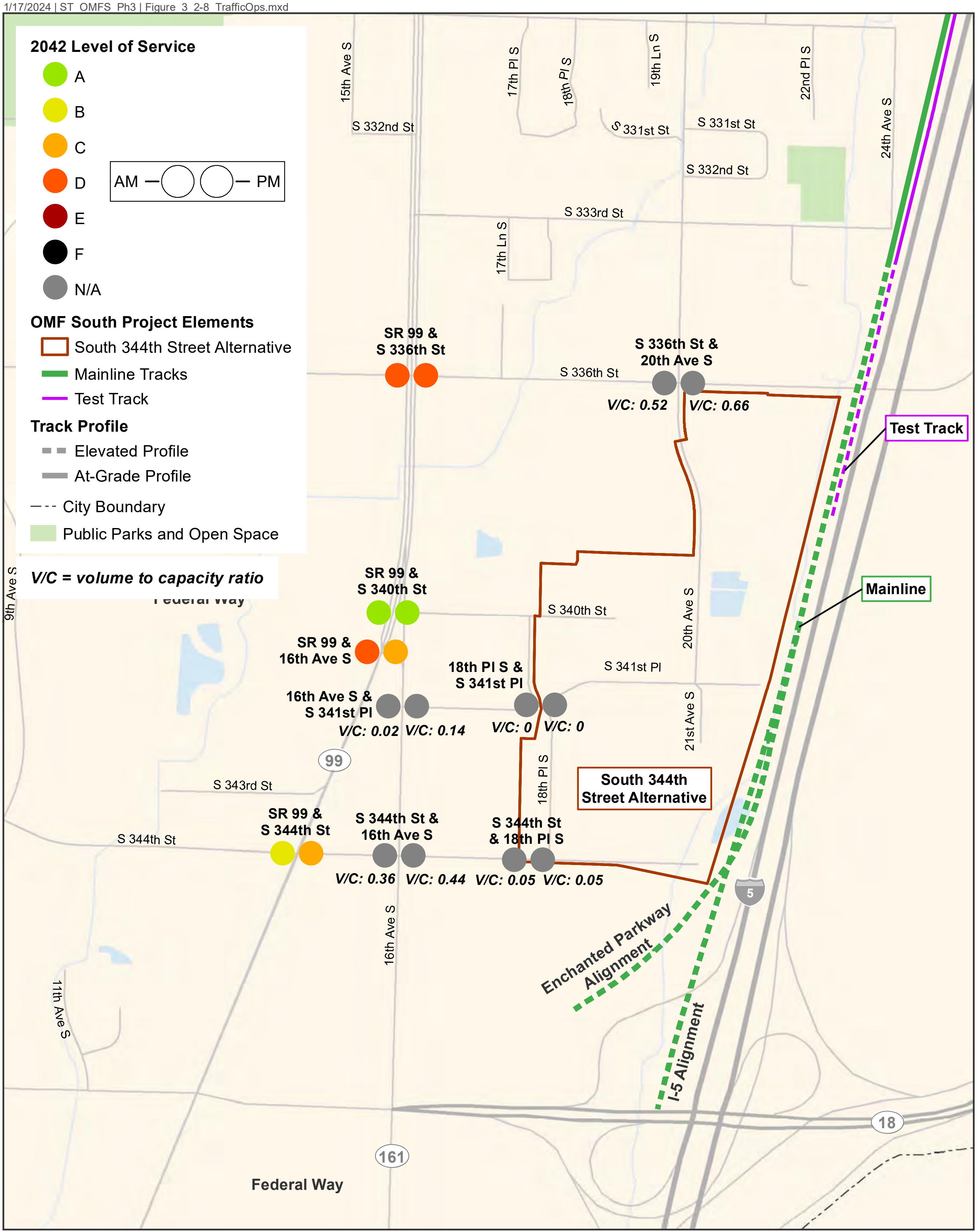
ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2	No Build Alternative Delay (seconds) 1, 2	No Build Alternative V/C Ratio 1, 2	South 344th Street Alternative LOS 1, 2	South 344th Street Alternative Delay (seconds) 1, 2	South 344th Street Alternative V/C Ratio 1, 2
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.66	N/A	N/A	0.66
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	54	N/A	D	51	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A	A	0	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	N/A	C	33	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.38	N/A	N/A	0.14
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.00
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	16	N/A	C	34	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.51	N/A	N/A	0.44
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

1/17/2024 | ST_OMFS_Ph3 | Figure_3_2-8_TrafficOps.mxd


2042 Level of Service
A
B
C
D
E
F
N/A
AM
PM
OMF South Project Elements
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
V/C = volume to capacity ratio
SR 99 & S 336th St
S 336th St & 20th Ave S
V/C: 0.52
V/C: 0.66
Test Track
Mainline
SR 99 & S 340th St
SR 99 & 16th Ave S
18th Pl S & S 341st Pl
16th Ave S & S 341st Pl
V/C: 0.02
V/C: 0.14
V/C: 0
V/C: 0
South 344th Street Alternative
SR 99 & S 344th St
S 344th St & 16th Ave S
S 344th St & 18th Pl S
V/C: 0.36
V/C: 0.44
V/C: 0.05
V/C: 0.05
Enchanted Parkway Alignment
I-5 Alignment
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
S 336th St
9th Ave S
Federal Way
S 340th St
20th Ave S
S 341st Pl
21st Ave S
99
18th Pl S
S 343rd St
S 344th St
5
16th Ave S
11th Ave S
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.2-8

2042 Build Alternative AM and PM Peak Hour Traffic Operations
South 344th Street Alternative

OMF South

Nonmotorized Network

Under the South 344th Street Alternative, nonmotorized volumes would increase similarly to the No-Build Alternative. As shown in Figure 3.2-5, there are limited existing nonmotorized facilities in the study area. Pedestrian and bicycle facilities would generally be developed in a manner comparable to the No-Build Alternative outside the project footprint. However, this alternative would eliminate the greenway on 20th Avenue S, S 341st Place, 18th Place S, and S 344th Street. Pedestrians and cyclists would continue to be able to travel on the existing sidewalks on SR 99 between S 336th Street and S 344th Street, and Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street for nonmotorized users. The South 344th Street Alternative could also impact the future alignment of the planned trails through the Federal Way/S 320th Street Park & Ride but would not necessarily preclude them.

Parking

Development of the mainline for the South 344th Street Alternative would require the permanent removal of approximately 10 stalls from the east side of The Commons at Federal Way shopping mall and approximately 20 from the southeast portion of the Walmart property south of S 344th Street. The South 344th Street Alternative would also displace on-street parking adjacent to developments along 21st Avenue S, S 341st Place east of 18th Place S, and S 344th Street east of 18th Place S. There would be an abundance of parking stalls remaining at The Commons at Federal Way and at Walmart. Most developments that may currently use on-street parking along 18th Place S, S 341st Place, and S 344th Street would be acquired as part of the project. Impacts associated with acquisitions are discussed in Section 3.3, Acquisitions, Displacements, and Relocations.

The South 344th Street Alternative may displace up to five on-street parking spaces on the south side of S 344th Street, east of 18th Place S, that may currently be used to access developments that would not be acquired. However, there would be ample space remaining for on-street parking along the south side of S 344th Street, and no adverse parking impacts are expected.

Impacts to the Federal Way/S 320th Street Park & Ride are described above under Transit.

Midway Landfill Alternative

Arterial and Street Operations

Development of the Midway Landfill Alternative would not change the existing roadway network or interfere with the potential for development of planned improvements within the study area as described under the No-Build Alternative. Three access points to the site would be provided: a visitor/employee access with a guard house at SR 99/S 246th Street, a gated employee-only access at SR 99/S 248th Street, and a gated access at S 252nd Street/30th Avenue S. Neither the S 246th Street nor S 248th Street entrance would be signalized.

The project would modify the existing S 246th Street driveway to allow left turns into the site by southbound drivers. Due to the presence of existing medians, left turns out of the site would not be permitted at S 246th Street or S 248th Street. It is assumed that most employees would enter and exit through the SR 99/S 246th Street entrance, while the remaining employees using the parking area closest to the MOW and Link System-Wide Storage facilities would use the southernmost driveway at SR 99/S 248th Street.

Tables 3.2-10 and 3.2-11 show AM and PM peak hour LOS for the Midway Landfill Alternative study area intersections compared to the No-Build Alternative. Note that Kent does not evaluate impacts based on AM peak period operations. One intersection (intersection #5) is forecast to operate below the LOS standards during the AM peak period under the No-Build Alternative. The Midway Landfill Alternative would reduce the delay at this intersection in the AM peak because trips currently using the driveway would no longer do so. Southbound queueing at the SR 99 intersections is not anticipated to extend beyond the current and constructed storage lengths of the left-turn lanes. There are no impacts on LOS from the Midway Landfill Alternative.

Table 3.2-10 Midway Landfill Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection[5]	Control Type	Agency Standard	No Build Alternative LOS [1, 2, 3, 4]	No Build Alternative Delay (seconds) [1, 2, 3, 4]	Midway Landfill Alternative LOS [1, 2, 3, 4]	Midway Landfill Alternative Delay (seconds) [1, 2, 3, 4]
1	SR 99/S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	23	C	22
5	SR 99/S 248th Street (New Driveway)	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***F***	***53***	***E***	***36***
6	SR 99/S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	A	7	A	7
7	SR 99/S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	47	D	47
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	C	22	C	22

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(2) Intersections were analyzed using the Synchro outputs for signalized intersections and Highway Capacity Manual 2010 outputs for unsignalized intersections (Transportation Research Board 2010).

(3) At signalized intersections utilizing HCM 6th Edition methodology (Transportation Research Board 2016), U-turn movements were added to left-turn movements to allow for analysis.

(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

(5) Kent does not require analysis of commercial driveways on the east side of SR 99 unless there is a direct impact on a public right-of-way on the west side of SR 99. Therefore, the analysis of intersections 2 through 4 are not described below but are included in Appendix G1, Transportation Technical Report.

Table 3.2-11 Midway Landfill Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection[5]	Control Type	Agency Standard	No Build Alternative LOS 1, 2, 3, 4	No Build Alternative Delay (seconds) 1, 2, 3, 4	Midway Landfill Alternative LOS 1, 2, 3, 4	Midway Landfill Alternative Delay (seconds) 1, 2, 3, 4
1	SR 99/S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	D	39
5	SR 99/S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***F***	***97***	***F***	***102***
6	SR 99/S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	36	D	36
7	SR 99/S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	41	D	41
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	E	38	E	38

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagation upstream and downstream between intersections.

(2) Intersections were analyzed using the Synchro outputs for signalized intersections and Highway Capacity Manual 2010 outputs for unsignalized intersections (Transportation Research Board 2010).

(3) At signalized intersections utilizing HCM 6th Edition methodology (Transportation Research Board 2016), U-turn movements were added to left-turn movements to allow for analysis.

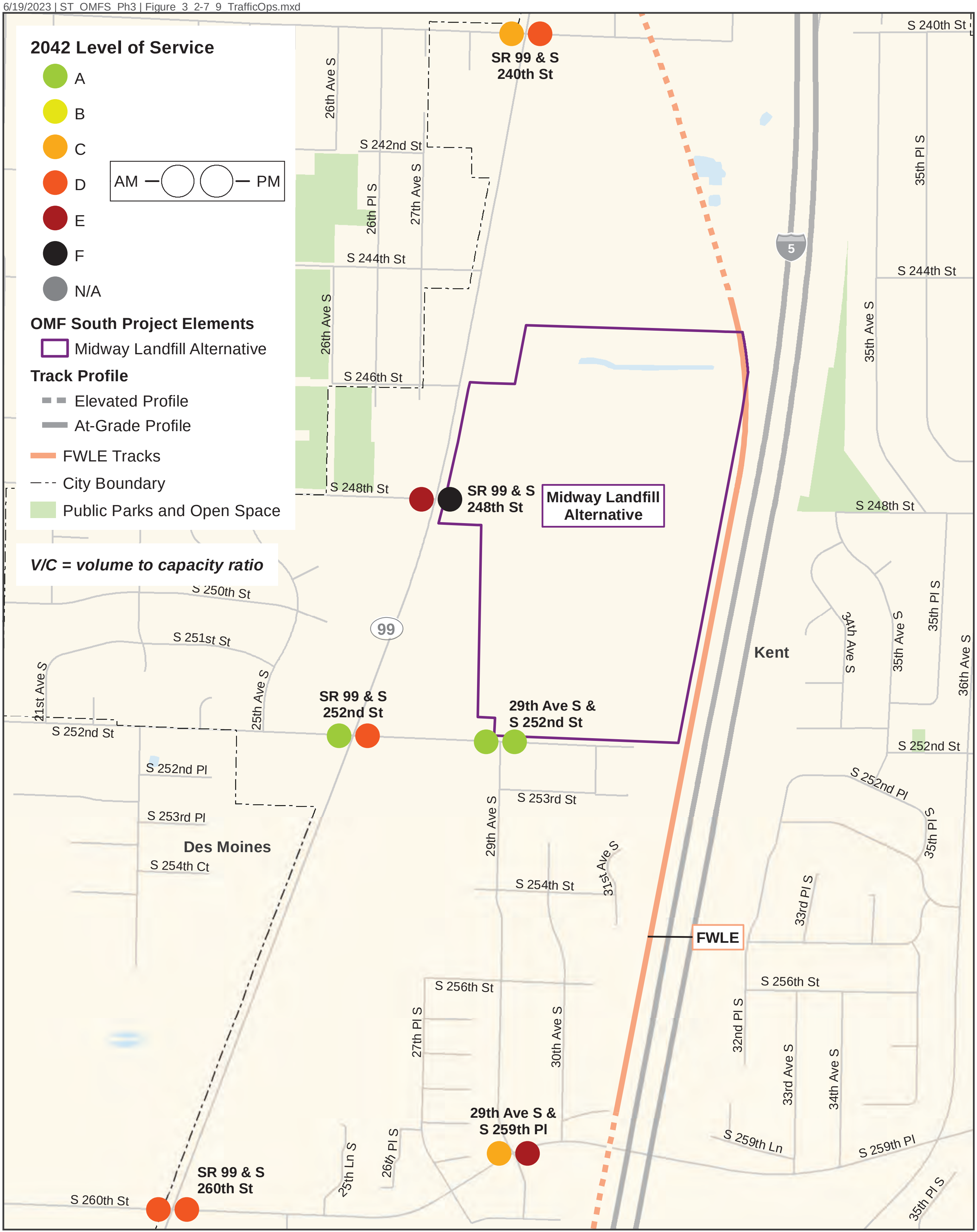
(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

(5) Kent does not require analysis of commercial driveways on the east side of SR 99 unless there is a direct impact on a public right-of-way on the west side of SR 99. Therefore, the analysis of intersections 2 through 4 are not described below but are included in Appendix G1, Transportation Technical Report.

During the PM peak hour, the intersection at SR 99/S 248th Street is forecast to operate at LOS F, which is below the standard for SR 99. While this intersection is forecast to operate below standard under the No-Build Alternative, the Midway Landfill Alternative would increase delay by 5 seconds beyond no-build conditions. Since the increased delay is less than 10 seconds, it would not be considered an impact. No other intersections within the Midway Landfill Alternative study area are forecast to operate below the LOS standards.

Figure 3.2-9 shows the 2042 AM and PM peak hour operations at the Midway Landfill Alternative study intersections.

6/19/2023 | ST OMFS Ph3 | Figure 3 2-7 9 TrafficOps.mxd


2042 Level of Service
● A
● B
● C
● D
● E
● F
● N/A
AM ○○ PM
OMF South Project Elements
▭ Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Public Parks and Open Space
V/C = volume to capacity ratio
SR 99 & S 240th St
SR 99 & S 248th St
SR 99 & S 252nd St
29th Ave S & S 252nd St
29th Ave S & S 259th Pl
SR 99 & S 260th St
Midway Landfill Alternative
FWLE
Kent
Des Moines
99
5
S 240th St
S 242nd St
S 244th St
S 246th St
S 248th St
S 250th St
S 251st St
S 252nd St
S 252nd Pl
S 253rd Pl
S 253rd St
S 254th Ct
S 254th St
S 256th St
S 259th Ln
S 259th Pl
S 260th St
21st Ave S
25th Ave S
25th Ln S
26th Ave S
26th Pl S
27th Ave S
27th Pl S
29th Ave S
30th Ave S
31st Ave S
32nd Pl S
33rd Ave S
33rd Pl S
34th Ave S
35th Ave S
35th Pl S
36th Ave S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

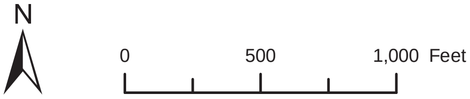

N
0
500
1,000 Feet

FIGURE 3.2-9

2042 Build Alternative AM and PM Peak Hour Traffic Operations
Midway Landfill Alternative

OMF South

Transit

The existing pair of Metro RapidRide stops at SR 99/S 246th Street would need to be permanently relocated to accommodate development of the Midway Landfill Alternative.

The Midway Landfill Alternative does not include a dedicated test track. Sound Transit would continue testing LRVs on existing mainline tracks during off-peak periods and at night during non-revenue hours when the rail system is closed to passenger service. This would limit the daily time available to test and commission vehicles because those same tracks are used for passenger service and movement of rail vehicles during maintenance and inspection periods. This could result in insufficient vehicle quantities available to meet system expansion requirements under Sound Transit 3. In addition, the lack of a dedicated test track would slow the rehabilitation and replacement of the existing fleet of LRVs. As a result, light rail operations would be less efficient than they would otherwise be, and Sound Transit may not be able to meet expected ridership demand.

Nonmotorized Network

Under the Midway Landfill Alternative, nonmotorized volumes would increase similarly to the No-Build Alternative. As shown in Figure 3.2-6, there are limited existing nonmotorized facilities in the study area, none of which would be eliminated by the project. Pedestrian and bicycle facilities would generally be developed in a manner comparable to the No-Build Alternative. However, facilities that were planned to cross through the site area would not be developed, such as the unfunded north-south improvements that would connect S 244th Street to S 252nd Street through the Midway Landfill Alternative study area. Should future nonmotorized facilities be developed north of the Midway Landfill Alternative, a north-south shared-use path, parallel to I-5, could be developed by others east of OMF South (between I-5 and OMF South) to provide a connection to the area south of the project site.

Parking

The Midway Landfill Alternative would not remove formal on-street parking areas. Depending on the extent of roadway improvements, there could be a loss of intermittent gravel shoulder areas on the north side of S 252nd Street, which may currently be used for parking by local residents. However, this would have a minimal impact as the residences have private driveways, and there are informal parking areas that would remain on the south side of the street.

3.2.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Each build alternative would require some preparatory demolition and earthwork that would generate truck trips in addition to material delivery and general construction vehicle activity throughout the duration of construction. Because most construction-period traffic would occur while hauling material to and from the site during site preparation, the estimated volumes of truck traffic presented for each alternative focus on that period of peak construction traffic to present the worst-case scenario. Similarly, because the construction staging areas, origin of the import material, and destination for export material are unknown at this time, the volumes forecast on each roadway segment represent the highest possible volumes for all daily construction activity. A single potential roadway identified as a haul route could be used for all daily truck trips, or the total daily volumes could be distributed among multiple roadways.

Impacts associated with construction truck activities were calculated by assigning a passenger car equivalent (PCE) for each truck trip, which converts the number of trucks to an estimated number of passenger cars. The Highway Capacity Manual recommends a range of PCE factors for trucks from 1.1 to 2.5 (Transportation Research Board 2010).

For the purposes of this analysis, it was assumed that material would be transported to and from the site in dump trucks with trailers that have a capacity of 20 cubic yards. Given their size and slower operating speeds, these trucks were assigned a PCE value of 2.5, meaning one construction truck is equivalent to two-and-a-half passenger cars. Table 3.2-12 summarizes the peak daily and hourly truck trips and PCE values anticipated for the three build alternatives during site preparation, including the three Midway Landfill Alternative subsurface construction design options. More detail is discussed for each build alternative below.

Table 3.2-12 Estimated Truck Activity and Passenger Car Equivalency Values Associated with Site Preparation for the Build Alternatives

Alternative	Peak Daily Truck Trips	Peak Daily PCE[1] Value	Peak Hourly Truck Trips	Peak Hourly PCE[1] Value
Preferred Alternative				
Mainline[2]	120	300	10	25
OMF Site	45	113	4	10
Total	**165**	**413**	**14**	**35**
South 344th Street Alternative				
Mainline[2]	120	300	10	25
OMF Site	77	193	7	18
Total	**197**	**493**	**17**	43
Midway Landfill Alternative				
Platform	71	178	7	18
Hybrid	564	1,410	48	120
Full Excavation	554	1,385	48	120

Notes:

(1) PCE = passenger car equivalency. Given their size and slower operating speeds, trucks were assigned a PCE value of 2.5, meaning one construction truck is equivalent to two-and-a-half passenger cars.

(2) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

On-street parking on roadways where frontage improvements will be installed would be impacted during construction.

Preferred Alternative

Site preparation work for the OMF is expected to take approximately 1 year and 5 months, assuming 12-hour workdays, 6 days per week. The development scenario for the Preferred Alternative assumes reuse of 80 percent of on-site material. There would be about 45 round trip truck trips during the daily 12-hour construction period (24 export truck trips and 21 import truck trips).

Construction access would be provided at three locations: S 336th Street at 20th Avenue S, SR 99 at the existing driveway to the Christian Faith Center, and S 341st Place at 20th Avenue S. Construction access for mainline track construction from the Federal Way Downtown

Station to the site would occur at S 324th Street, S 330th Street, and S 336th Street. Trucks would access northbound and southbound I-5 at the S 320th Street and S 348th Street interchanges via SR 99. To minimize impacts to traffic circulation during construction and meet Federal Way requirements, Sound Transit would extend 18th Place S or construct a temporary public roadway through the construction site prior to closure of 20th Avenue S.

Table 3.2-13 summarizes average annual daily trips (AADT) on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT. The haul routes include state facilities, including SR 99, SR 18 (S 348th Street), and I-5, as well as several collector and arterial streets. The estimated daily truck PCE trips associated with site preparation could represent up to 22.6 percent of existing single direction traffic on collector and arterial roadways and up to 1.9 percent of the existing single direction AADT for all state facilities, with the highest percentages at on- and off-ramps. Figure 3.2-10 displays the location of AADT counts for the Preferred Alternative.

Table 3.2-13 Estimated Hourly Truck Activity at the Preferred and South 344th Street Alternatives Compared with Existing AADT

Intersection/Roadway Segment	Existing AADT (Both Directions)[1]	Existing AADT (Single Direction)[1]	Preferred Alternative Daily Truck Trips as a Percentage of Single Direction AADT	South 344th Street Alternative Daily Truck Trips as a Percentage of Single Direction AADT
S 320th Street: SR 99 to I-5	> 35,000	> 17,500	< 0.6%	< 1.1%
S 324th Street: SR 99 to 23rd Avenue S	5,000–15,000	2,500–7,500	1.5–4.5%	2.6–7.7%
S 330th Street: SR 99 to 24th Avenue S	1,000–5,000	500–2,500	4.5–22.6%	7.7–38.6%
S 336th Street: SR 99 to I-5	5,000-15,000	2,500-7,500	1.5-4.5%	2.6–7.7%
S 344th Street: SR 99 to I-5	< 1,000	< 500	> 22.6%	> 38.6%
I-5 Off-Ramp: I-5 SB to SW 320th Street	N/A	15,000	0.8%	1.3%
I-5 On-Ramp: EB SW 320th to NB I-5	N/A	9,900	1.1%	1.9%
I-5 On-Ramp: EB SW 320th to SB I-5	N/A	9,400	1.2%	2.1%
I-5 Off-Ramp: NB I-5 to SW 320th	N/A	9,100	1.2%	2.1%
I-5: S 330th Street	191,000	95,500	0.1%	0.2%
I-5: S 336th Street	191,000	95,500	0.1%	0.2%
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5	N/A	24,000	0.5%	0.8%
I-5 Off-Ramp: NB I-5 to S 348th Street	N/A	6,100	1.9%	3.2%
I-5 On-Ramp: S 348th Street to I-5 NB	N/A	14,000	0.8%	1.4%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	5,900	1.9%	3.3%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	20,000	0.6%	1.0%

Table 3.2-13 Estimated Hourly Truck Activity at the Preferred and South 344th Street Alternatives Compared with Existing AADT (continued)

Intersection/Roadway Segment	Existing AADT (Both Directions)[1]	Existing AADT (Single Direction)[1]	Preferred Alternative Daily Truck Trips as a Percentage of Single Direction AADT	South 344th Street Alternative Daily Truck Trips as a Percentage of Single Direction AADT
S 348th Street: East of 16th Avenue S	70,000	35,000	0.3%	0.6%
SR 99: North of S 348th Street	19,000	9,500	1.2%	2.0%
SR 99: North of 18th Place S	32,000	16,000	0.7%	1.2%
SR 99: North of S 333rd Street	32,000	16,000	0.7%	1.2%
SR 99: North of S 324th Street	26,000	13,000	0.9%	1.5%
23rd Avenue S: S 320th Street to S 322nd Street	5,000-15,000	2,500-7,500	1.5-4.5%	N/A
20th Avenue S: S 336th Street to S 341st Place	1,500	750	15.1%	N/A
16th Avenue S: SR 99 to S 348th Street	27,000	13,500	0.8%	N/A

Sources: WSDOT Traffic GeoPortal, 2018. City of Federal Way 2010 Estimated Weekday Average Daily Traffic, 2011.

Note:

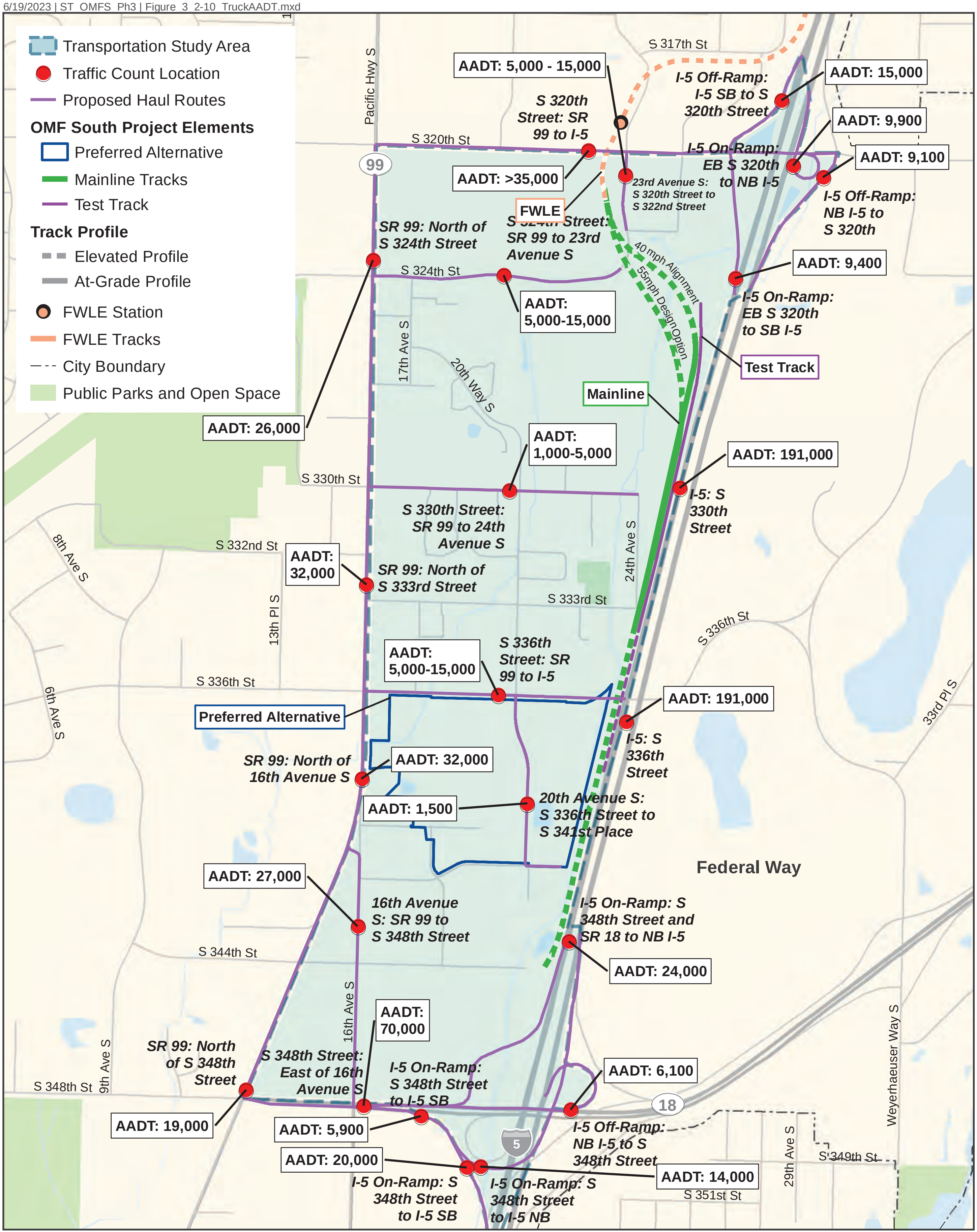
(1) WSDOT and Federal Way report annual average daily trips (AADT) for roadways. Where roadways are bidirectional, the AADT reported reflects both directions. Single direction volumes were determined by dividing bidirectional volumes in two.

Mainline construction, including the mainline tail tracks, is expected to take 15 months for both mainline alignments (40 mph Alignment and 55 mph Design Option). Construction of the mainline tracks would require temporary full and/or partial closures to streets that travel beneath them. Peak truck trips during mainline track construction are estimated to be up to 10 trucks per hour for concrete delivery, or up to 120 trips per day (300 PCE), assuming 12 hours per day of active construction, some of which may occur at night. A similar level of truck activity is expected for earthwork activities, but this would be focused on trucks hauling material during excavation and would not overlap with concrete delivery trucks. Haul routes for mainline track construction are anticipated to be the same as described above for OMF site construction.

If mainline track and site construction occur concurrently, truck trips on roadways would be expected to increase proportionately as compared with site construction only. Streets with the lowest existing AADT, such as S 336th Street and S 344th Street, would experience the highest relative growth in traffic compared to existing volumes. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours.

During construction of the Preferred Alternative, transit service on S 324th Street, S 336th Street, and 23rd Avenue S would likely be impacted. Buses may need to be rerouted and bus stops may need to be temporarily relocated in response to construction related road closures. Bus service may also be slower and less reliable in construction areas. Bus service into the Federal Way/S 320th Park & Ride may need to be rerouted to avoid construction areas.

6/19/2023 | ST_OMFS_Ph3 | Figure_3_2-10_TruckAADT.mxd



Transportation Study Area
Traffic Count Location
Proposed Haul Routes
OMF South Project Elements
Preferred Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
Pacific Hwy S
S 317th St
S 320th St
99
AADT: 5,000 - 15,000
S 320th Street: SR 99 to I-5
I-5 Off-Ramp: I-5 SB to S 320th Street
AADT: 15,000
AADT: 9,900
I-5 On-Ramp: EB S 320th to NB I-5
AADT: 9,100
AADT: >35,000
23rd Avenue S: S 320th Street to S 322nd Street
I-5 Off-Ramp: NB I-5 to S 320th
FWLE
S 324th Street: SR 99 to 23rd Avenue S
SR 99: North of S 324th Street
S 324th St
40 mph Alignment
55mph Design Option
AADT: 9,400
I-5 On-Ramp: EB S 320th to SB I-5
AADT: 5,000-15,000
17th Ave S
20th Way S
Test Track
Mainline
AADT: 26,000
AADT: 1,000-5,000
AADT: 191,000
S 330th St
I-5: S 330th Street
S 330th Street: SR 99 to 24th Avenue S
8th Ave S
S 332nd St
AADT: 32,000
SR 99: North of S 333rd Street
24th Ave S
S 333rd St
13th Pl S
S 336th St
AADT: 5,000-15,000
S 336th Street: SR 99 to I-5
S 336th St
6th Ave S
Preferred Alternative
AADT: 191,000
I-5: S 336th Street
33rd Pl S
SR 99: North of 16th Avenue S
AADT: 32,000
AADT: 1,500
20th Avenue S: S 336th Street to S 341st Place
Federal Way
AADT: 27,000
16th Avenue S: SR 99 to S 348th Street
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5
S 344th St
AADT: 24,000
16th Ave S
AADT: 70,000
Weyerhaeuser Way S
SR 99: North of S 348th Street
9th Ave S
S 348th St
S 348th Street: East of 16th Avenue S
I-5 On-Ramp: S 348th Street to I-5 SB
AADT: 6,100
18
AADT: 19,000
AADT: 5,900
I-5 Off-Ramp: NB I-5 to S 348th Street
29th Ave S
S 349th St
5
AADT: 20,000
AADT: 14,000
I-5 On-Ramp: S 348th Street to I-5 SB
I-5 On-Ramp: S 348th Street to I-5 NB
S 351st St
N
0
1,000
2,000 Feet

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.2-10

Existing Annual Average Daily Traffic Along Truck Haul Routes
Preferred Alternative

OMF South

Of the 877 parking spaces at the Federal Way/S 320th Street Park & Ride, about 650 spaces would be temporarily closed during mainline construction for both mainline alignments. In the first quarter of 2023, utilization of the Park & Ride was at 1.3 percent. While this facility has not been used at capacity in recent years, utilization could change with the opening of FWLE, which has a forecasted in-service date of 2026.

Because the construction area includes all of the S 336th Street programmed site area, the impacts to pedestrian and bicycle facilities during construction and upon completion of the facility would be similar. The current north-south greenway would be closed, and bicycle lanes would be reopened with construction of the extended 18th Place S roadway. Pedestrian and bicycle facilities on S 324th Street, S 330th Street, S 336th Street, S 340th Street, 341st Place, 18th Place S, 21st Avenue S, and 23rd Avenue S would be impacted during construction of right-of-way improvements in these areas.

Construction of the mainline would require the temporary closure of parking stalls on the east side of The Commons at Federal Way shopping mall.

South 344th Street Alternative

Site preparation work is expected to take approximately 1 year and 6 months, assuming 12-hour workdays, 6 days per week. The development scenario for the South 344th Street Alternative assumes reuse of 80 percent of on-site material. There would be about 77 truck trips during the daily 12-hour construction period (67 export truck trips and 10 import truck trips).

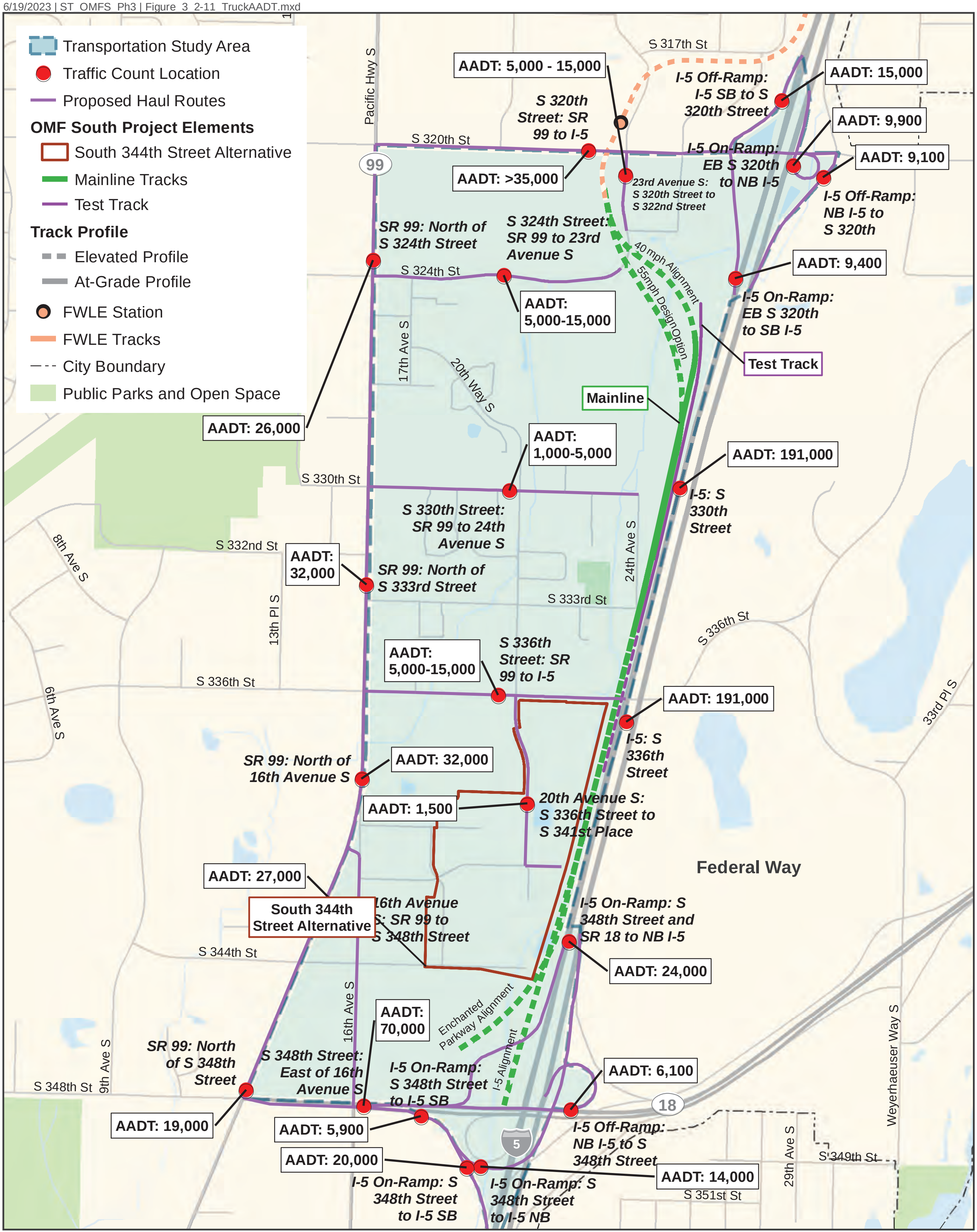
Construction access at the South 344th Street Alternative would be provided at two locations: S 336th Street at 20th Avenue S and via direct access from S 344th Street. Construction access for mainline track construction from the Federal Way Downtown Station to S 344th Street would occur at S 324th Street, S 330th Street, and S 336th Street. Trucks would access northbound and southbound I-5 at the S 320th Street and S 348th Street interchanges via SR 99.

Table 3.2-13 summarizes AADT on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT. The haul routes include state facilities, including SR 99, SR 18 (S 348th Street), and I-5, as well as several collector and arterial streets. The estimated daily truck PCE trips associated with site preparation for the South 344th Street Alternative could represent up to 38.6 percent of existing traffic on collector and arterial roadways. Daily truck PCE trips could represent as much as 3.2 percent of the existing single-day AADT for all state facilities, with the highest percentages at on- and off-ramps. Figure 3.2-11 displays the location of AADT counts.

Impacts from construction of the mainline tracks would be the same as described above for the Preferred Alternative.

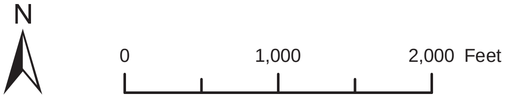
During construction of the S 344th Street Alternative, transit service on S 324th Street, S 336th Street, and 23rd Avenue S would likely be impacted. Buses may need to be rerouted and bus stops may need to be temporarily relocated in response to construction-related road closures. Bus service may also be slower and less reliable in construction areas. Bus service into the Federal Way/S 320th Park & Ride may need to be rerouted to avoid construction areas. Impacts to the Federal Way/S 320th Street Park & Ride would be the same as described for the Preferred Alternative.

6/19/2023 | ST_OMFS_Ph3 | Figure_3_2-11_TruckAADT.mxd



▨ Transportation Study Area
● Traffic Count Location
Proposed Haul Routes
OMF South Project Elements
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
AADT: 5,000 - 15,000
S 320th Street: SR 99 to I-5
AADT: >35,000
I-5 Off-Ramp: I-5 SB to S 320th Street
AADT: 15,000
AADT: 9,900
I-5 On-Ramp: EB S 320th to NB I-5
AADT: 9,100
I-5 Off-Ramp: NB I-5 to S 320th
23rd Avenue S: S 320th Street to S 322nd Street
SR 99: North of S 324th Street
S 324th Street: SR 99 to 23rd Avenue S
AADT: 5,000-15,000
AADT: 9,400
I-5 On-Ramp: EB S 320th to SB I-5
Test Track
Mainline
AADT: 26,000
AADT: 1,000-5,000
AADT: 191,000
I-5: S 330th Street
S 330th Street: SR 99 to 24th Avenue S
AADT: 32,000
SR 99: North of S 333rd Street
AADT: 5,000-15,000
S 336th Street: SR 99 to I-5
AADT: 191,000
I-5: S 336th Street
SR 99: North of 16th Avenue S
AADT: 32,000
AADT: 1,500
20th Avenue S: S 336th Street to S 341st Place
AADT: 27,000
South 344th Street Alternative
16th Avenue S: SR 99 to S 348th Street
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5
AADT: 24,000
AADT: 70,000
SR 99: North of S 348th Street
S 348th Street: East of 16th Avenue S
I-5 On-Ramp: S 348th Street to I-5 SB
AADT: 6,100
AADT: 19,000
AADT: 5,900
AADT: 20,000
I-5 Off-Ramp: NB I-5 to S 348th Street
AADT: 14,000
I-5 On-Ramp: S 348th Street to I-5 SB
I-5 On-Ramp: S 348th Street to I-5 NB
Federal Way
40 mph Alignment
55mph Design Option
Enchanted Parkway Alignment
I-5 Alignment
S 317th St
S 320th St
Pacific Hwy S
99
S 324th St
17th Ave S
20th Way S
S 330th St
S 332nd St
8th Ave S
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
S 344th St
16th Ave S
9th Ave S
S 348th St
18
5
29th Ave S
S 349th St
S 351st St
Weyerhaeuser Way S

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).



N
0
1,000
2,000 Feet

FIGURE 3.2-11

Existing Annual Average Daily Traffic Along Truck Haul Routes
South 344th Street Alternative

OMF South

The impacts to pedestrian and bicycle facilities during construction would be similar, as described under long-term impacts. The 20th Avenue S greenway between S 336th Street and S 344th Street would be closed, as would portions of 18th Place S and S 341st Place, effectively eliminating much of the existing street grid network in the southern part of the study area. Pedestrian facilities on S 324th Street, S 330th Street, S 341st Place, S 344th Street, 18th Place S, and 23rd Avenue S would be impacted during construction of right-of-way improvements in these areas.

Construction of the mainline would require the temporary closure of parking stalls on the east side of The Commons at Federal Way shopping mall and the Walmart property south of S 344th Street.

Midway Landfill Alternative

The three subsurface construction design options for the Midway Landfill Alternative would each have different construction and transportation impacts. In addition to earthwork, the Platform and Hybrid subsurface construction design options would include drilled shaft and concrete slab elements, which would occur concurrently and in coordination with the earthwork process. Depending on the subsurface construction design option, site preparation could take up to approximately 5 years and 7 months, assuming 12-hour workdays, 6 days per week. Estimated round-trip truck trips per day for export and import activities during construction are shown in Table 3.2-14.

Table 3.2-14 Estimated Truck Activity Associated with Site Preparation for Midway Landfill Alternative Subsurface Construction Design Options

Subsurface Construction Design Option	Export Material (tons)	Total Export Truck Trips per Day	Soil Import (cubic yards)	Concrete Import	Total Import Truck Trips per Day	Total Truck Trips per Day	Site Preparation Duration (years, months)
Platform	678,000	20	0	531,000	51	71	4 y, 1 m
Hybrid	2,592,000	280	1,240,000	165,000	284	564	5 y, 7 m
Full Excavation	2,956,500	280	1,610,000	0	274	554	4 y, 4 m

Excavated material from the Midway Landfill would require disposal at a Subtitle D landfill due to the anticipated extent of contaminated material. Within the Pacific Northwest, there are three possible landfill facilities in Washington and Oregon with between approximately 120 and 329 million tons of remaining capacity. Excavated material would first be hauled by truck to a regional transfer facility in the region before traveling to one of the landfills by rail.

Soil and concrete import activity would vary among the subsurface construction design options as well, with as few as 51 import truck trips per day for the Platform subsurface construction design option and up to 284 per day for the Hybrid subsurface construction design option. The estimates of truck traffic are conservative because at this time it is unknown how much excavated material could be reused as fill material elsewhere on the site.

The traffic analysis assumes all excavated material would be transported off site and all fill material would be imported to the site. Table 3.2-15 summarizes forecast daily and hourly truck activity associated with export and import for the Midway Landfill Alternative.

Table 3.2-15 Estimated Hourly Truck Activity Associated with Midway Landfill Alternative Subsurface Construction Design Options

Subsurface Construction Design Option	Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	Hourly PCE	Total Truck Trips per Day	Daily PCE
Platform	2	5	7	18	71	178
Hybrid	24	24	48	120	564	1,410
Full Excavation	24	24	48	120	564	1,410

Construction access to the site would be limited to a single driveway at SR 99 and S 246th Street. Outbound trucks exiting the site to transport excavated materials would travel north on SR 99 and access I-5 via SR 516 (Kent-Des Moines Road) to reach the intermodal terminal. Inbound trucks would travel south on I-5, exiting at S 272nd Street. They would travel westbound on S 272nd Street to SR 99, where they would turn north and travel to the site. Access to the site for outbound and inbound trucks would be via right turns into and out of the site. Trucks importing material would follow the same routes.

Due to their weight, large trucks would require additional time to accelerate to general-purpose traffic speeds on SR 99 when leaving the site and additional time to decelerate when entering the site. The substantial number of truck trips required for the Hybrid and Full Excavation subsurface construction design options would result in a greater potential to increase traffic congestion along SR 99 than the Platform subsurface construction design option or the Preferred or South 344th Street alternatives.

Table 3.2-16 summarizes AADT on streets that comprise the haul routes as well as the estimated truck trips as a percentage of existing single direction AADT. The haul routes include SR 99, SR 516, I-5, and S 272nd Street. Because the location of the intermodal facility and the origin of the import material are unknown at this time, the volumes forecast on the I-5 on- and off-ramps represent the maximum forecast for a given direction and would not be present on all ramps. For example, if the intermodal facility and the origin of the import material are to the north of the Midway Landfill Alternative, there would be no truck activity on the southbound I-5 on-ramp from SR 516 or the S 272nd Street off-ramp from northbound I-5.

The estimated daily PCE truck trips associated with the Platform subsurface construction design option would represent less than the Hybrid and Full Excavation subsurface construction design options, with no more than 2.9 percent of the existing single direction AADT compared to 7.7 to 22.7 percent for the Hybrid and Full Excavation subsurface construction design options. Daily PCE truck trips for all options would range from 0.2 to 1.3 percent on I-5. Figure 3.2-12 displays the location of AADT counts.

During construction of the Midway Landfill Alternative, buses may need to be rerouted off SR 99 and bus stops at S 246th Street and 252nd Street served by the King County Metro A Line may need to be temporarily relocated. Bus service may also be slower and less reliable through construction areas. Because FWLE would be operational by the time construction would begin, there would be some limited disruption of light rail service in order to connect the lead tracks of the OMF.

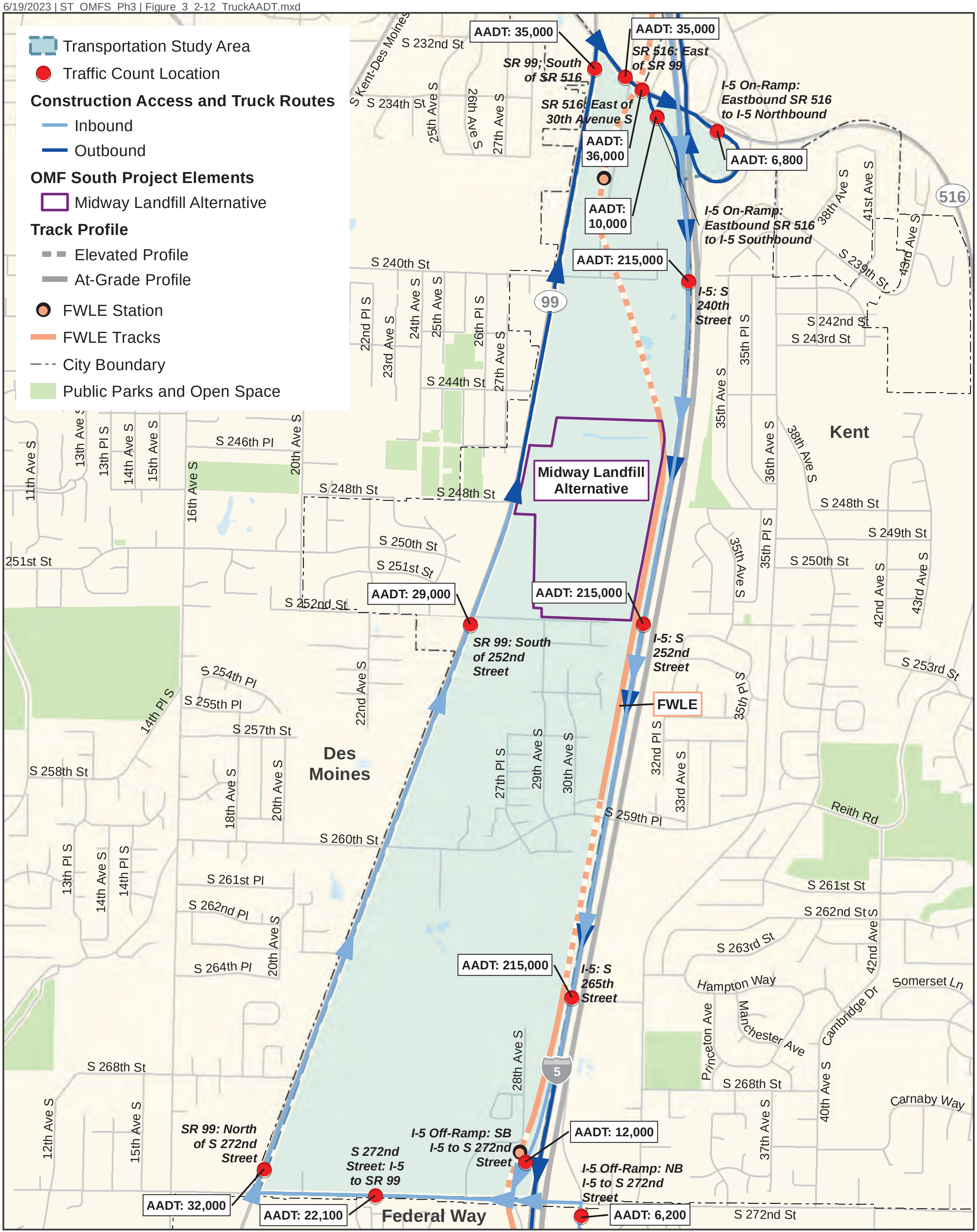
Table 3.2-16 Estimated Daily Truck Activity for the Midway Landfill Alternative Compared with Existing AADT

Intersection/Roadway Segment	AADT (Both Directions)[1]	AADT (Single Direction)[1]	Daily Truck Trips as a Percentage of Single Direction AADT Platform Option	Daily Truck Trips as a Percentage of Single Direction AADT Hybrid Option	Daily Truck Trips as a Percentage of Single Direction AADT Full Excavation Option
SR 99: South of SR 516	35,000	17,500	1.0%	8.1%	7.9%
SR 516: East of SR 99	35,000	17,500	1.0%	8.1%	7.9%
SR 516: East of 30th Avenue S	36,000	18,000	1.0%	7.8%	7.7%
I-5 On-Ramp: Eastbound SR 516 to I-5 Southbound	N/A	10,000	1.8%	14.1%	13.9%
I-5 On-Ramp: Eastbound SR 516 to I-5 Northbound	N/A	6,800	2.6%	20.7%	20.4%
I-5: S 240th Street	215,000	107,500	0.2%	1.3%	1.3%
I-5: S 224th Street	225,000	112,500	0.2%	1.3%	1.2%
I-5: S 252nd Street	215,000	107,500	0.2%	1.3%	1.3%
I-5: S 265th Street	215,000	107,500	0.2%	1.3%	1.3%
I-5 Off-Ramp: I-5 SB to S 272nd Street	N/A	12,000	1.5%	11.8%	11.5%
I-5 Off-Ramp: I-5 NB to S 272nd Street	N/A	6,200	2.9%	22.7%	22.3%
S 272nd Street: I-5 to SR 99	22,100	11,050	1.6%	12.8%	12.5%
SR 99: North of S 272nd Street	32,000	16,000	1.1%	8.8%	8.7%
SR 99: South of 252nd Street	29,000	14,500	1.2%	9.7%	9.6%

Sources: WSDOT Traffic GeoPortal, 2018. City of Kent Average Daily Traffic Volume, 2009

Note:

(1) WSDOT and Kent report annual average daily trips (AADT) for roadways. Where roadways are bidirectional, the AADT reported reflects both directions. Single direction volumes were determined by dividing bidirectional volumes in two.


Transportation Study Area
Traffic Count Location
Construction Access and Truck Routes
Inbound
Outbound
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
AADT: 35,000
SR 99: South of SR 516
AADT: 35,000
SR 516: East of SR 99
I-5 On-Ramp: Eastbound SR 516 to I-5 Northbound
SR 516: East of 30th Avenue S
AADT: 36,000
AADT: 6,800
AADT: 10,000
I-5 On-Ramp: Eastbound SR 516 to I-5 Southbound
AADT: 215,000
I-5: S 240th Street
Midway Landfill Alternative
AADT: 29,000
SR 99: South of 252nd Street
AADT: 215,000
I-5: S 252nd Street
FWLE
AADT: 215,000
I-5: S 265th Street
I-5 Off-Ramp: SB I-5 to S 272nd Street
AADT: 12,000
I-5 Off-Ramp: NB I-5 to S 272nd Street
AADT: 6,200
SR 99: North of S 272nd Street
AADT: 32,000
S 272nd Street: I-5 to SR 99
AADT: 22,100
Kent
Des Moines
Federal Way
99
516
5
S 232nd St
S 234th St
S 240th St
S 244th St
S 246th Pl
S 248th St
S 250th St
S 251st St
S 252nd St
S 254th Pl
S 255th Pl
S 257th St
S 258th St
S 259th Pl
S 260th St
S 261st Pl
S 262nd Pl
S 264th Pl
S 268th St
S 272nd St
S 242nd St
S 243rd St
S 249th St
S 253rd St
S 261st St
S 262nd St
S 263rd St
S 239th St
251st St
Reith Rd
Hampton Way
Manchester Ave
Princeton Ave
Cambridge Dr
Somerset Ln
Carnaby Way
S Kent-Des Moines

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
1,000
2,000 Feet

FIGURE 3.2-12

Existing Annual Average Daily Traffic Along Truck Haul Routes
Midway Landfill Alternative

OMF South

3.2.2.4 Avoidance and Minimization of Impacts

For all build alternatives, a construction transportation management plan addressing site access, traffic control, hauling routes, impacts to transit, construction employee parking, impacts to local businesses, and pedestrian and bicycle control in the area would be prepared per city of Kent or city of Federal Way requirements and in coordination with WSDOT, as applicable. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours or whether the parking and users of this access could be accommodated at an alternative location.

Other avoidance and minimization measures that would be determined during the final design and permitting process could include:

- Install advance warning signs and highly visible construction barriers and use flaggers where needed.
- Clearly sign and provide reasonable detour routes when cross streets are closed.
- Use lighted or reflective signage to direct drivers to truck-haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Use tools such as print, radio, posted signs, websites, and email to communicate information regarding street closures, hours of construction, business access, and parking impacts.
- Coordinate with transit providers to post advance notice signs prior to construction when bus stops need to be temporarily relocated or closed.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays, where practical.
- Cover potholes and open trenches, where possible, and use barriers to protect drivers from open trenches.

Any properties temporarily impacted during construction would be restored as closely as possible to their previous condition.

For the Preferred or South 344th Street alternatives, in locations where the mainline tracks do not meet clear zone standards and the tracks cannot be relocated, Sound Transit would work with WSDOT and FHWA to meet roadway standards by taking certain measures, such as regrading to reestablish a clear zone or installing guardrails, barriers, or impact attenuators. These measures would not adversely affect transportation safety in the study area.

3.2.2.5 Indirect Impacts

Indirect impacts are reasonably foreseeable impacts that could occur as a result of an action at some future time and in areas beyond the action’s direct impacts. As an example, indirect impacts often relate to additional changes in land use that could occur beyond those changes immediately caused by a development’s construction and operation, which could result in a change to overall traffic patterns. The OMF South build alternatives are not expected to induce future land use changes beyond their respective sites, which could otherwise result in indirect impacts to transportation.

Development of OMF South would provide Sound Transit with capacity to receive, test, commission, store, maintain, and deploy the fleet of light rail vehicles to support the Sound Transit 3 expanded light rail system. This capacity would provide for more efficient operation of the existing system and allow Sound Transit to accommodate the planned future expansions of the light rail system to meet the expected ridership demand. Expansion of the light rail system would have positive indirect impacts to transportation by providing an alternative to privately owned vehicles, which could reduce the amount of vehicle miles travelled (Sound Transit 2016).

3.2.3 Mitigation Measures

3.2.3.1 Long-Term Measures

OMF South is not anticipated to result in long-term operational impacts to freight, transit, nonmotorized transportation, parking, or safety. Therefore, no mitigation is proposed for those transportation elements. Construction impact mitigation measures are discussed below.

Depending on the subsurface construction design option, construction of the Midway Landfill Alternative could require ingress and egress by a substantially greater number of large trucks than for the Preferred or South 344th Street alternatives. To avoid potential traffic impacts on SR 99 from the number of additional trucks, short acceleration and deceleration lanes could be added to the construction entrance to the landfill site to allow outbound trucks to get up to speed and allow inbound trucks to slow down outside of the general-purpose lanes. Additional strategies to reduce impacts to local traffic during construction could include limiting truck activity during the peak traffic hours, which could extend the construction duration, or providing a direct connection to the I-5 corridor from the construction site. Such a connection would require approval by WSDOT and FHWA. If the Midway Landfill Alternative is selected, these mitigation measures would be confirmed during final design and permitting in coordination with Federal Way, WSDOT, and, if needed, FHWA.

Prior to closing a portion of the Federal Way/S 320th Street Park & Ride for construction, Sound Transit would work with King County Metro and WSDOT to determine its utilization rates and that of the nearby Federal Way Downtown Station. If the lots are at or near capacity, Sound Transit would implement alternative measures, such as routing transit riders that use these locations to available spaces at nearby park-and-ride lots, such as the Star Lake Park & Ride, or leasing parking lots or new parking areas within the vicinity of the temporarily closed lot.

3.3 Acquisitions, Displacements, and Relocations

This section discusses the potential impacts of acquisitions, displacements, and relocations associated with the OMF South project alternatives. The study area includes parcels that are anticipated to be permanently acquired for OMF South based on its current level of design. The study area for the relocation analysis includes Federal Way and Kent.

The acquisitions analysis considers two types of potentially affected parcels — partial and full acquisitions:

- **Partial acquisition** – A portion of a parcel would be acquired, but the current use and occupants would usually not be displaced. In some instances, such as with larger parcels that hold multiple uses, a business or residence on a parcel could be displaced while other uses and occupants might remain.
- **Full acquisition** – The entire parcel would be acquired, and all current occupants would be displaced. In some instances, full acquisitions include parcels that may not be entirely needed for the project but would be affected to the extent that current occupants would be substantially impacted.

For the purposes of this analysis, full and partial acquisitions are analyzed together as "potentially affected parcels." Potentially affected parcels in the study area and their existing land uses are identified in the sections below and are shown in figures located in Appendix H1, Potentially Affected Parcels. These impacts are an estimate based on conceptual designs (Appendix C, Conceptual Design Drawings and Engineering Information) to provide for a comparison of alternatives. The number and type of displacements may vary between what is included in the Final EIS and what is ultimately required during the design-build process. Final determinations of the property needs for the project, including acquisitions and displacements, will be based on the project's final design after Sound Transit completes the EIS process and selects the alternative to be built.

The acquisition and displacement data presented in this section are estimates based on 2022 King County assessor's data. Occupant types described in this report are based on available information at the time of this analysis and could change as the project is developed and constructed.

In addition to the permanently affected parcels, the project would require temporary construction easements (TCEs), permanent easements, and the permanent use of right-of-way owned by WSDOT and local jurisdictions. Permanent guideway and maintenance easements are included as potentially affected parcels in tables below and figures located in Appendix H1, Potentially Affected Parcels, but TCEs are not included in the analysis.

3.3.1 Affected Environment

3.3.1.1 Preferred Alternative

The Preferred Alternative site includes parcels with existing commercial, institutional, and vacant land uses. Several parcels within this alternative are owned by the Christian Faith Center and include a large church facility, a school and daycare center, parking lots, vacant fields designated as a future development site for athletic fields, and an academic center. The Preferred Alternative mainline, test, and tail tracks include WSDOT right-of-way and single- and multi-family residential, commercial, and institutional land uses.

3.3.1.2 South 344th Street Alternative

The South 344th Street Alternative site partially overlaps with the Preferred Alternative, which is directly to the north and includes many of the same land uses. The South 344th Street Alternative differs from the Preferred Alternative south of S 341st Place, where it includes additional residential, commercial, and institutional land uses. The South 344th Street Alternative mainline, test, and tail tracks include WSDOT right-of-way and single- and multi-family residential, commercial, and institutional land uses.

3.3.1.3 Midway Landfill Alternative

The Midway Landfill Alternative is along the western edge of the Midway Subarea Plan. This alternative includes existing landfill, commercial, and industrial uses.

3.3.2 Environmental Impacts

Sound Transit would acquire public and private property for the construction and operation of OMF South and its associated tracks, including the mainline, test, lead, and tail tracks. Acquisition estimates are based on the conceptual plans Sound Transit developed for the build alternatives. The level of acquisitions discussed in this section provides information useful for comparing alternatives. Estimates of displaced properties reflect the conditions at the time the analysis was conducted. Because property uses change over time, the number and/or type of displacements could vary between what is disclosed in this Final EIS and what would finally be required.

3.3.2.1 No-Build Alternative

Under the No-Build Alternative, impacts from construction and operation of the OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.3.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

To determine potential acquisitions and displacements for each build alternative, Sound Transit laid its proposed OMF South footprints over King County parcel data and high-resolution aerial imagery. The acquisitions analysis produced results for each build alternative separated by mainline track impacts and OMF site impacts. For the Preferred and South 344th Street alternatives, the mainline tracks include the test and tail tracks. For all build alternatives, the OMF site includes lead tracks connecting to the mainline tracks.

Table 3.3-1 below summarizes the number of potentially affected parcels and displacements by alternative.

Table 3.3-1 Potentially Affected Parcels and Displacements

Alternative	Affected Parcels	Displaced Businesses	Displaced Residences[1]	Displaced Religious Facilities	Other Displacements[2]
Preferred Alternative with 40 mph Alignment[3]	37	11	86	1	0
Preferred Alternative with 55 mph Design Option[3]	37	11	92	1	0
South 344th Street Alternative with 40 mph Alignment[3,4]	60	17	91	4	67
South 344th Street Alternative with 55 mph Design Option[3,4]	60	17	97	4	67
Midway Landfill Alternative	47	4	0	0	0

Notes:

(1) Residential displacements include individual apartment/condo units and mobile homes. For Belmor, displacements are based on the current configuration of mobile home pads, including both vacant and occupied pads.

(2) Includes individual GarageTown units. GarageTown is also counted as one business displacement under “Displaced Businesses.”

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) The number of affected parcels and displacements would be the same for the Enchanted Parkway and I-5 mainline tail track options.

Table 3.3-2 presents the potentially affected parcels by land use for each build alternative and impact type (e.g., mainline tracks, OMF site). For all the build alternatives, most of the affected parcels would be associated with the OMF site.

Table 3.3-2 Affected Parcels by Land Use

Alternative	Single Family Residential	Multi Family Residential[1]	Commercial/ Industrial	Public/ Institutional[2]	Vacant	Total
Preferred Alternative						
Mainline[3,4]	0	1	2	1	3	7
OMF Site	10	1	12	3	4	30
Total	**10**	**2**	**14**	**4**	**7**	**37**
South 344th Street Alternative						
Mainline[3,4,5]	0	1	3	1	4	9
OMF Site	21	0	22	4	4	51
Total	**21**	**1**	**25**	**5**	**8**	**60**
Midway Landfill Alternative						
OMF Site	14	0	11	13	9	47

Source: King County Assessor (2022)

Notes:

(1) Belmor is categorized as one “Multi-Family Residential” parcel but contains over 300 individual mobile home units (reflected in residential displacements).

(2) “Public/Institutional” land uses include religious facilities, park-and-rides, and utility properties.

(3) The number of affected parcels would be the same for the mainline 40 mph Alignment or 55 mph Design Option, but the 55 mph Design Option would displace a greater number of units within Belmor, as discussed below.

(4) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(5) The number of affected parcels would be the same for the Enchanted Parkway or I-5 mainline tail track options.

The following sections detail property impacts to existing land uses for each of the build alternatives. Appendix H1, Potentially Affected Parcels, includes figures and tables with parcel reference information.

Preferred Alternative

The mainline tracks would be primarily in the WSDOT I-5 right-of-way, except at the northern end where the proposed alignment transitions from the Downtown Federal Way Station to the WSDOT right-of-way. In this area, the Preferred Alternative would impact Belmor, a 63-acre mobile home park for adults 55 years and older that contains over 300 mobile home units and a nine-hole golf course. The 40 mph Alignment would displace slightly fewer units at Belmor than the 55 mph Design Option. Other parcels that would be affected by the mainline tracks include part of The Commons at Federal Way shopping center, the Federal Way/S 320th Street Park & Ride, as well as several vacant parcels.

Of the build alternatives, the Preferred Alternative OMF site would affect the fewest parcels. Additionally, it would have fewer business and residential displacements than the South 344th Street Alternative, but more than the Midway Landfill Alternative. Most of the affected parcels are single-family residential or commercial/industrial existing uses. The OMF site would displace one multi-family and 10 single-family residences. Most of these residences are adjacent to the I-5 right-of-way between S 333rd Street and S 336th Street, where the lead tracks would connect to the mainline tracks. As noted in Table 3.3-1, the OMF site would also displace 11 businesses and one religious facility, the Christian Faith Center.

Additionally, this alternative would require conversion of one WSDOT Resource Conservation Area (RCA; originally acquired under the Highway Beautification Act of 1965) to a transportation use within the I-5 right-of-way. Impacts are discussed in more detail in Section 3.7, Visual and Aesthetic Resources.

South 344th Street Alternative

The South 344th Street Alternative would have the most affected parcels, business displacements, and residential displacements of the OMF site build alternatives. The property impacts associated with the South 344th Street Alternative mainline north of the OMF site are the same as described for the Preferred Alternative. The mainline alignments would affect the same number of parcels, but the 55 mph Design Option would have more displacements than the 40 mph Alignment. The South 344th Street Alternative mainline tail tracks would affect two additional parcels south of the OMF South site. Both mainline tail track options, the Enchanted Parkway alignment and the I-5 alignment, would have the same number of affected parcels and displacements.

The South 344th Street Alternative OMF site would impact primarily single-family residential and commercial/industrial parcels. The OMF site would displace residences along S 340th Street and 18th Place S. It would also displace 17 businesses, including Ellenos Yogurt and GarageTown, which includes 67 individual units. Additional displacements include the Trinity Broadcasting tower and four religious facilities: Voice of Hope Church, Family Life Community Church, Redwood Church of God, and Tabernacle Temple of Praise. Unlike the Preferred Alternative, the South 344th Street Alternative would not displace the daycare center or Christian Faith Center church and school.

This alternative would also require conversion of two WSDOT RCAs to a transportation use within the I-5 right-of-way. Impacts are discussed in more detail in Section 3.7, Visual and Aesthetic Resources.

Midway Landfill Alternative

For the Midway Landfill Alternative, all affected parcels and displacements are associated with the OMF site because it would use the FWLE mainline tracks currently under construction. The Midway Landfill Alternative would have the fewest business displacements (4) and no residential displacements. The businesses include an insurance business, an optometry clinic, and two warehouse businesses. A majority of the affected public/institutional parcels are associated with the Midway Landfill, which is owned by the city of Seattle and managed by SPU.

3.3.2.3 Construction Impacts

During construction, additional properties would be needed for roadway improvements, culvert replacements, staging areas, construction access, and other temporary construction activities. Most construction activities would be accommodated within areas of permanent acquisition, although some activities would require TCEs on adjacent properties surrounding each alternative. A TCE allows for temporary use of a property during construction. When construction is complete, the property is restored as closely as possible to its previous condition or better, and the easement is terminated. These parcels are not included in the tables above or Appendix H1, Potentially Affected Parcels, because they would not permanently displace existing uses, and they are not anticipated to substantially disrupt existing uses. Additionally, the location and extent of TCEs are subject to change as the design for OMF South progresses.

3.3.2.4 Avoidance and Minimization of Impacts

The build alternatives identified for study in the EIS were carried forward, in part, to avoid or minimize impacts to residents and businesses. During design, the OMF South sites were configured to meet programming requirements while minimizing, to the extent feasible, acquisitions, displacements, and relocations. Where available, the mainline tracks would be located near or within public rights-of-way to reduce the number of private property impacts.

Any properties temporarily impacted during construction would be restored as closely as possible to their previous condition.

3.3.2.5 Indirect Impacts

The project could contribute to indirect impacts where existing land uses on acquired properties are converted to transportation uses following construction, thereby potentially impacting the future land uses of adjacent properties. These potential indirect impacts are discussed in Section 3.4, Land Use.

3.3.3 Relocation Opportunities

To determine the relocation opportunities in the project vicinity, Sound Transit researched market conditions for available residential and commercial real estate in Federal Way and Kent. Available property information is summarized in Tables 3.3-3 and 3.3-4. Although property uses may change before construction of OMF South, research indicates that there would be opportunities for displaced businesses, residents, and other property owners to relocate within the same general area. Some properties with unique characteristics, such as religious and industrial facilities, could be more challenging to relocate.

Table 3.3-3 Property Available for Relocation in the Study Area

Type of Property	Total Buildings/ Units	Total Square Feet[1]	Vacancy Rate[1]	Buildings Listed for Sale[2]	Estimated Units Available[3]
Office	441	7,015,982	10.13%	7	38
Industrial	816	50,588,093	4.74%	7	38
Retail	948	12,183,475	2.20%	8	23
Religious Facility	21	-	-	0	0

Source: CoStar (December 2022)

Notes: The study area or market is defined as the city limits of Federal Way and Kent.

(1) CoStar does not collect data for area of available properties (“Total Square Feet”) for religious facilities. Similarly, vacancy data is calculated using rentable building area which is not applicable to religious facilities.

(2) Includes properties listed as "for sale" in CoStar for apartment, office, industrial, and retail properties in Federal Way and Kent and religious facilities in Federal Way.

(3) Estimates the number of units available for rent on the market using the vacancy rate and total number of units.

Table 3.3-4 Residential Property Available for Relocation in the Study Area

Type of Property	Occupied Units	Available Units	Vacancy Rate
Owner-Occupied	44,931	428	0.94%
Renter-Occupied	35,087	1,564	4.27%

Source: 2017-2021 ACS 5-year Estimates (U.S. Census Bureau 2022)

Note: The study area or market is defined as the city limits of Federal Way and Kent.

3.3.3.1 Commercial and Industrial

Adequate commercial and industrial spaces are available in the market to relocate building owners and tenants displaced as part of the project. Industrial users requiring specific lot sizes and utilities may be more difficult to relocate, including properties such as GarageTown and Ellenos Yogurt that have specific needs, like storage facilities or specialized machinery.

3.3.3.2 Residential

There is a sufficient supply of comparable homes available to accommodate the residents displaced by the project. While comparable homes are available in the general area, displaced residents may have to choose a location in a different neighborhood. For all relocations, Sound Transit would work with those affected to try to keep them in the same general area. This includes identifying replacement housing that considers such factors as proximity to commercial and community facilities, schools (if applicable), an individual’s place of employment, and accessibility to transit if the residents are transit dependent. Although property uses may change before construction of OMF South, research indicates that there would be available locations for displaced residents to be relocated within the same general area.

There are several different types of relocation options potentially available for displaced Belmor residents:

- Relocate within Belmor.
- Relocate to another 55-plus park, renting or purchasing a mobile home within that park, or potentially moving their current mobile home.
- Relocate to a family park, renting or purchasing a mobile home within that park, or moving their existing mobile home.

- Rent or purchase a vacant lot and relocate the existing mobile home to the site.
- Relocate to a purchased or rented single-family residence, condominium, or apartment.
- Consider other options, such as senior living or retirement community housing.

Relocation of mobile home residents could be challenging because there is little availability in mobile home communities within Pierce and King counties.

3.3.3.3 Religious Facilities

Generally, there is adequate space available in the study area to relocate religious facilities that would be displaced by the OMF South build alternatives. Most of the religious facilities that would be displaced are currently located in commercial or industrial buildings and could be relocated to comparable properties. The exception is the Christian Faith Center, which is a large-capacity church on S 336th Street between SR 99 and I-5. There are four parcels associated with the Christian Faith Center, which total approximately 25 acres, including over 200,000 square feet of building space and numerous parking lots. This church would be uniquely difficult to relocate because of its size.

3.3.4 Sound Transit Acquisition and Relocation Policy Summary

Sound Transit would compensate affected property owners according to the provisions specified in Sound Transit’s Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines (Sound Transit 2017); the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the “Uniform Act”); and the State of Washington’s relocation and property acquisition laws and regulations, including Revised Code of Washington (RCW) 8.26 and Washington Administrative Code (WAC) 468-100. Compensation and entitlements would vary by property, depending on the project effects, the economy, number of available relocation opportunities, and factors outlined in the policies, laws, and regulations. Relocation resources would be available to all qualified individuals in compliance with Sound Transit’s Language Assistance Plan (Sound Transit 2022).

As a public agency, Sound Transit must pay “just compensation” to property owners for land and improvements acquired for public purposes. Determination of just compensation is based on an independent appraisal and appraisal review and must not be less than the fair market value of the property acquired. This value includes any measurable loss in value to the remaining property as a result of a partial acquisition. For TCEs, the affected property owner would be compensated for the temporary use of the property, and the property would be restored as close as possible to its previous condition.

Sound Transit would pay normal expenses of sale, including escrow fees, title insurance, prepayment penalties, mortgage release fees, recording fees, and typical costs incurred as part of conveying title. In addition to compensating owners for property rights, occupants of properties are eligible for relocation benefits. Forms of compensation for displaced persons may include moving expenses, replacement housing payments, nonresidential reestablishment, and other eligible expenses. Sound Transit also provides advisory services that consider the unique needs of those being displaced in order to minimize the inconvenience and hardship of displacement. Sound Transit’s property acquisition and relocation handbooks for residential and nonresidential properties detail the agency’s compensation and acquisition procedures and are described in more detail in Appendix E, Environmental Justice (Sound Transit 2014a, 2014b).

Sound Transit has notified property owners whose property would be directly affected by any of the alternatives. In most cases property acquisitions would begin after the Sound Transit Board selects the project to be built and FTA issues a ROD. However, in select cases property acquisitions may advance sooner, in which case an independent NEPA evaluation and decision would occur.

With FTA's approval, Sound Transit is acquiring the four parcels associated with the Christian Faith Center as a hardship acquisition and a portion of the parcel associated with Belmor as a protective acquisition prior to the OMF South ROD. The purpose of a hardship acquisition is to alleviate a particular hardship to the owner when the property owner can document on the basis of health, safety, or financial reasons that remaining in the property poses an undue hardship compared to others. The purpose of a protective acquisition is to prevent imminent development of a parcel that may be needed for a proposed transportation corridor or site.

Hardship and protective acquisitions do not limit the evaluation of alternatives required under the NEPA process. No development on these parcels would occur until after FTA issues a ROD, and only if the Sound Transit Board selects to build the Preferred or South 344th Street alternatives. The hardship acquisition would allow Christian Faith Center to begin early coordination on potential future sites. No Belmor residents would be displaced until the OMF South environmental review process is complete.

Sound Transit staff will be available to answer questions and provide additional information regarding just compensation, advisory services, and relocation payments and expenses, as well as the timing of the processes. Sound Transit would also provide information on the current availability, purchase price, or rental rates of comparable replacement properties. Sound Transit uses interpreters to help those with limited English proficiency understand their choices and options.

Affected residents and businesses owners would make the final decision on their relocation sites. Generally, owners would not have to relocate until they have been paid the agreed-upon purchase price or an amount equal to Sound Transit's estimate of just compensation has been deposited with the court. Displaced persons would not be required to move or relocate without receiving at least 90 days' notice via written communication.

3.3.5 Mitigation Measures

Sound Transit's policies and procedures comply with federal, state, and local property acquisition and relocation policies and, in some cases, provide advisory services above the minimum requirements of federal and state law. No additional mitigation is anticipated.

For the Preferred and South 344th Street alternatives, Sound Transit would mitigate the conversion of RCAs by providing replacement property, as described in Section 3.7, Visual and Aesthetic Resources.

3.4 Land Use

This section assesses the land use impacts of the proposed OMF South project alternatives by discussing the surrounding zoning compatibility, consistency with regional and local jurisdictional plans and policies, and conversions of land use to a public transportation use that would occur from property acquisition for the proposed project.

The study area includes the properties and local jurisdictions within 0.5 mile of the potential construction limits of each OMF South alternative. This includes portions of Federal Way and unincorporated King County for the Preferred and South 344th Street alternatives and portions of Kent, Des Moines, and unincorporated King County for the Midway Landfill Alternative. The portions of unincorporated King County within the study area have been identified by Federal Way and Kent as part of the cities' Potential Annexation Areas. The most common land uses in the vicinity of the alternatives include commercial, institutional, and single- and multi-family residential.

The methods, resources, and regulations guiding this analysis are described in Appendix H2, Land Use Technical Appendix, along with a complete list of all the zones within the study area by jurisdiction.

3.4.1 Affected Environment

3.4.1.1 Preferred Alternative

Existing Land Uses

Existing land uses within the Preferred Alternative study area include vacant land, public/institutional, and single- and multi-family residential land uses. The public/institutional land uses primarily include parcels associated with the Christian Faith Center and the Pacific Christian Academy.

The mainline tracks parallel I-5 from a large retail store that is just south of S 320th Street to just north of S 344th Street. The existing land uses underlying and abutting the mainline tracks and mainline tail tracks include mostly multi-family residential land uses to the west, vacant land to the south, and commercial land uses to the north, southwest, and southeast. Underlying multi-family residential uses are mostly associated with Belmor, a 63-acre mobile home park for adults 55 and older that contains over 300 mobile homes and a nine-hole golf course that extends west from the mainline tracks.

Land uses that are adjacent to or abut the OMF site boundaries (excluding the mainline tracks) consist primarily of commercial land use and vacant land mostly located to the south and west of the alternative boundaries, with some to the north and northwest. Single- and multi-family residential existing uses are located primarily across S 336th Street. Prominent uses within the study area include churches, cafes, restaurants, a park, school facilities, and single- and multi-family residential buildings to the north; a church, an automobile repair shop, and a bank to the west; and I-5 to the east, with the Pacific Bonsai Museum and the Woodbridge Corporate Park (the former Weyerhaeuser campus) beyond. Located to the south are additional churches; another automobile repair shop; a mini-storage facility, GarageTown, which offers custom storage condominiums; and Ellenos, a yogurt manufacturing facility.

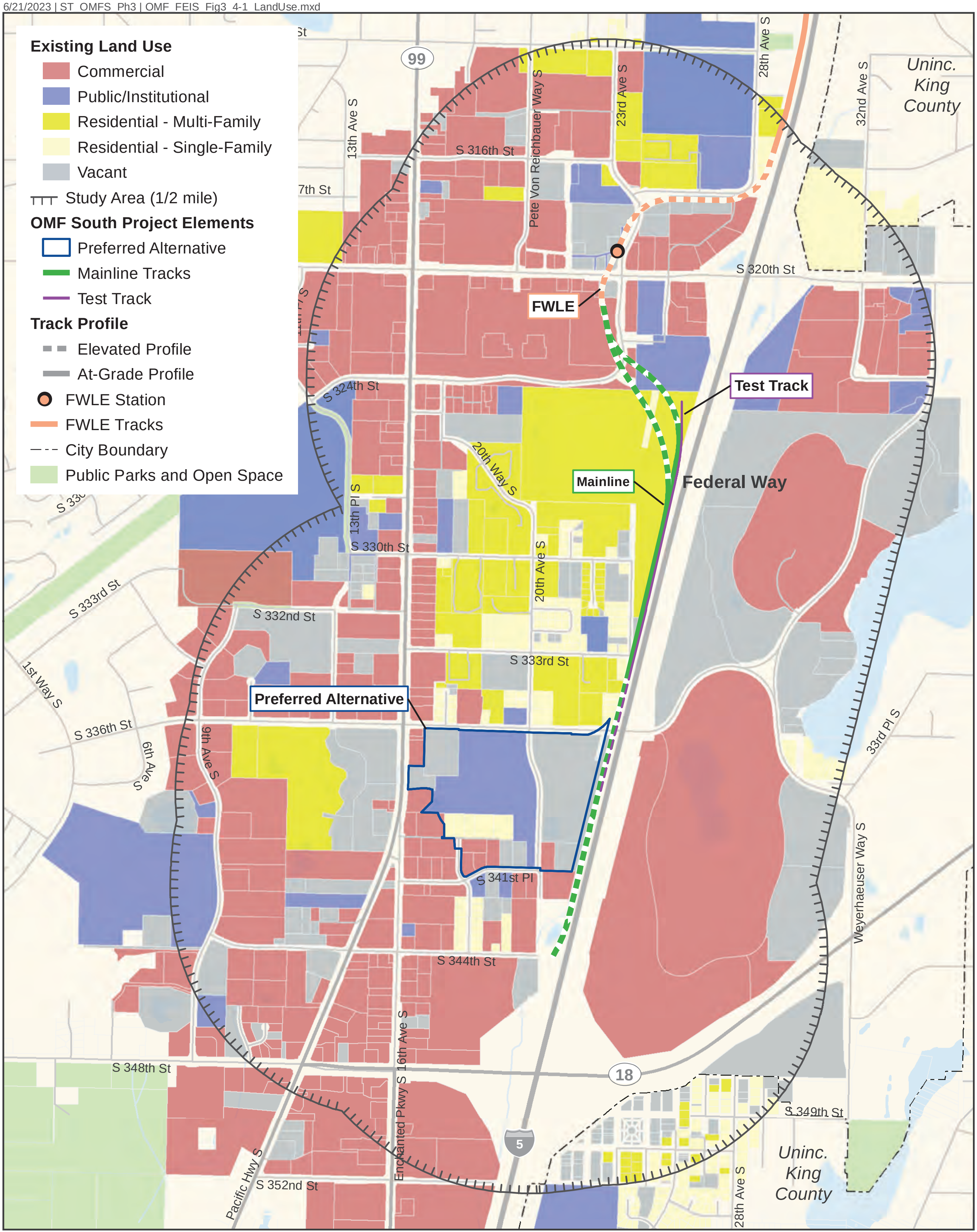
Figure 3.4-1 shows existing land use patterns within the Preferred Alternative study area, which consists primarily of commercial uses (nearly 47 percent of the area), and, to a lesser extent, vacant land (20 percent) scattered throughout the entire area, barring most of the land between the borders of S 324th Street, S 336th Street, SR 99, and I-5, where the public/institutional and residential land uses are primarily clustered. The public/institutional uses are mostly associated with religious facilities, and multi-family residential uses are mostly associated with Belmor.

Zoning

Figure 3.4-2 shows the general zoning patterns designated by Federal Way and King County within the Preferred Alternative study area. Commercial and office are the predominate zones, followed by multi-family residential and mixed-use zones in the northern section of the study area. In total, approximately 59 percent of the study area (excluding the project footprint) is commercial or office, 14 percent is multi-family residential, 17 percent is mixed-use, and 9 percent is single-family residential.

The Preferred Alternative is in the following Federal Way zones: City Center Core (CC-C), Community Business (BC), Commercial Enterprise (CE), and Multi-Family Residential (RM-2400 and RM-3600). The OMF site is primarily in the RM-3600 Multi-Family Residential zone, with the southeastern yard area mostly in the Commercial Enterprise zone and the gate/guard house area in the Community Business zone. The mainline tracks are in the City Center Core, Commercial Enterprise, and RM-3600 Multi-Family Residential zones.

The intent of the City Center Core zone is to create a higher density, mixed-use designation where office, retail, government, and residential uses are concentrated. The Community Business zone is designed to allow a broad mix of uses, encouraging mid-rise, high-quality developments containing a vibrant and compatible mix of well-integrated and designed pedestrian- and auto-oriented uses. The purpose of the Commercial Enterprise zone is to capture the demand for a diverse mix of industrial, office, and retail sales and services, arrayed in well-integrated, high-quality developments. Both multi-family residential zones are intended to provide opportunities for a range of housing types to accommodate anticipated residential growth. For additional details on the purpose of each zone for the Preferred Alternative, see Table H2-2 of Appendix H2, Land Use Technical Appendix.

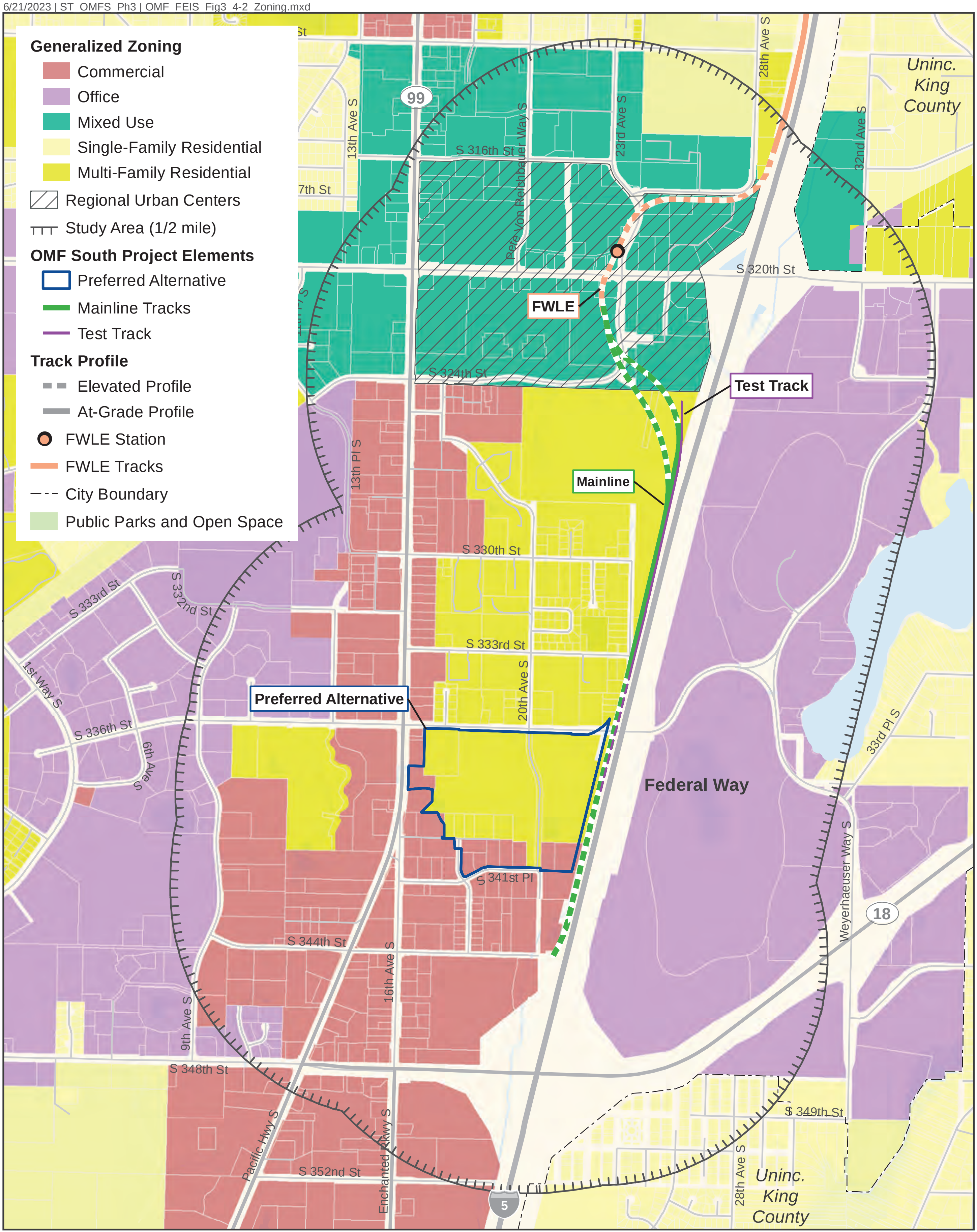

Existing Land Use
🟥 Commercial
🟦 Public/Institutional
🟨 Residential - Multi-Family
Residential - Single-Family
Vacant
Study Area (1/2 mile)
OMF South Project Elements
Preferred Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
● FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
99
FWLE
Test Track
Mainline
Federal Way
Preferred Alternative
Uninc. King County
Uninc. King County
18
5
S 316th St
S 320th St
S 324th St
S 330th St
S 332nd St
S 333rd St
S 336th St
S 341st Pl
S 344th St
S 348th St
S 349th St
S 352nd St
13th Ave S
13th Pl S
Pete Von Reichbauer Way S
23rd Ave S
28th Ave S
32nd Ave S
20th Way S
20th Ave S
9th Ave S
6th Ave S
1st Way S
Enchanted Pkwy S 16th Ave S
Pacific Hwy S
Weyerhaeuser Way S
33rd Pl S
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.4-1
Existing Land Uses
Preferred Alternative

OMF South

6/21/2023 | ST_OMFS_Ph3 | OMF_FEIS_Fig3_4-2_Zoning.mxd


Generalized Zoning
Commercial
Office
Mixed Use
Single-Family Residential
Multi-Family Residential
Regional Urban Centers
Study Area (1/2 mile)
OMF South Project Elements
Preferred Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
99
S 316th St
Pete von Reichbauer Way S
23rd Ave S
28th Ave S
13th Ave S
7th St
S 320th St
FWLE
S 324th St
Test Track
13th Pl S
Mainline
S 330th St
S 333rd St
S 332nd St
1st Way S
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
6th Ave S
Federal Way
S 341st Pl
18
Weyerhaeuser Way S
33rd Pl S
32nd Ave S
Uninc. King County
S 344th St
16th Ave S
9th Ave S
S 348th St
S 349th St
Pacific Hwy S
Enchanted Pkwy S
S 352nd St
28th Ave S
5
Uninc. King County
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.4-2
Generalized Zoning
Preferred Alternative

OMF South

3.4.1.2 South 344th Street Alternative

Existing Land Uses

The South 344th Street Alternative is in much of the same area as the Preferred Alternative. Existing land uses include vacant land and commercial, single-family residential, and public/institutional land uses. This alternative slightly differs from the Preferred Alternative in that existing uses include three smaller church properties and more commercial uses, such as the GarageTown and Ellenos Yogurt properties.

The South 344th Street Alternative would connect to the same mainline tracks as the Preferred Alternative, and the existing land uses underlying and adjacent to the mainline tracks are the same as those described above for the Preferred Alternative. However, the mainline tail tracks would extend farther south for the South 344th Street Alternative. The I-5 alignment would continue south in WSDOT right-of-way, while the Enchanted Parkway alignment would intersect with commercial land uses between S 344th Street and S 348th Street.

Land uses that are adjacent to or abut the OMF site boundaries (excluding the mainline tracks) consist mostly of commercial land uses surrounding the south and west of the alternative boundaries, with smaller areas of public/institutional existing uses to the west and single- and multi-family residential to the north of the site boundaries, across S 336th Street. Prominent uses within the study area include churches, cafes, restaurants, a park, school facilities, and single- and multi-family residential buildings to the north; a church, an automobile repair shop, a bank, and the Federal Way Public Academy to the west; and I-5 to the east, with the Pacific Bonsai Museum and the Woodbridge Corporate Park (the former Weyerhaeuser campus) beyond. The I-5/SR 18 interchange is south of the site, along with additional churches, department stores, an automobile repair shop, and a mini-storage facility.

Figure 3.4-3 shows existing land use patterns within the South 344th Street Alternative study area. Existing land uses are nearly the same as those in the Preferred Alternative study area, with the addition of more commercial land uses existing south of S 352nd Street.

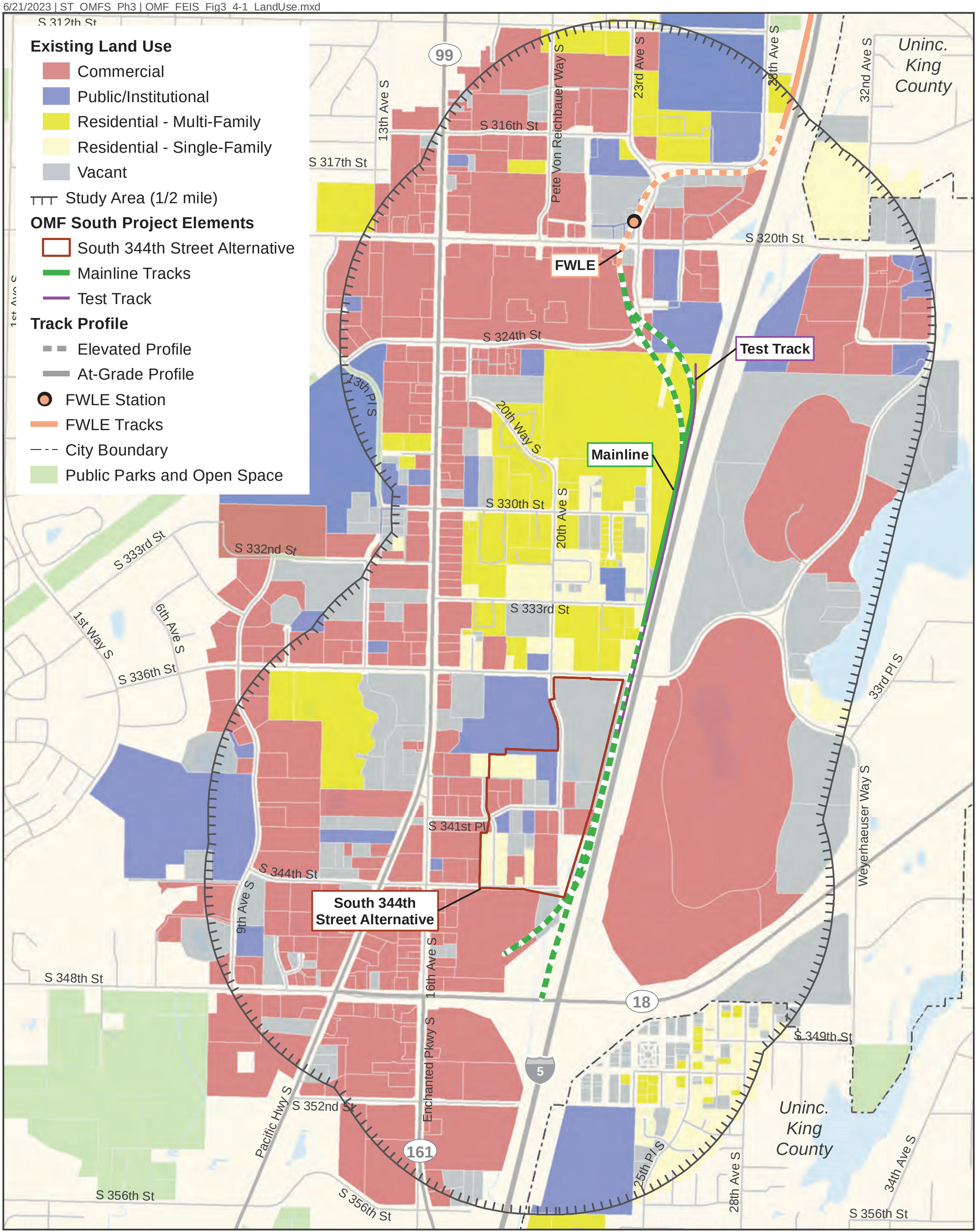
Zoning

Figure 3.4-4 shows the general zoning patterns in the South 344th Street Alternative study area. Like the Preferred Alternative, commercial and office zones are the largest, followed by mixed-use zones to the north and multi-family residential zones situated in the central and west sections of the 0.5-mile study area. In total, approximately 59 percent of the study area (excluding the project footprint) is commercial or office, 14 percent is multi-family residential, 17 percent is mixed-use, and 9 percent is single-family residential.

The South 344th Street Alternative is within the following Federal Way zones: Commercial Enterprise, City Center Core, and RM-3600 and RM-2400 Multi-Family Residential zones. The OMF site spreads across Commercial Enterprise and RM-3600 zones. The northeastern yard area is primarily within the RM 3600 zone, and the southern yard areas and gate/guard house areas are within the Commercial Enterprise zone.

The mainline tracks, including both tail track options, are primarily within the City Center Core, Commercial Enterprise, and RM-3600 Multi-Family Residential zones (very small portions of less than 0.5-acre are within the RM-2400 Multi-Family Residential zone). The purpose of each of these zones are described in the Zoning subsection for the Preferred Alternative, above, and in Table H2-2 of Appendix H2, Land Use Technical Appendix.

6/21/2023 | ST_OMFS_Ph3 | OMF_FEIS_Fig3_4-1_LandUse.mxd


Existing Land Use
🟥 Commercial
🟦 Public/Institutional
🟨 Residential - Multi-Family
Residential - Single-Family
⬜ Vacant
Study Area (1/2 mile)
OMF South Project Elements
South 344th Street Alternative
🟩 Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
● FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
FWLE
Test Track
Mainline
South 344th Street Alternative
Uninc. King County
Uninc. King County
99
18
5
161
S 312th St
S 316th St
S 317th St
S 320th St
S 324th St
S 330th St
S 332nd St
S 333rd St
S 333rd St
S 336th St
S 341st Pl
S 344th St
S 348th St
S 349th St
S 352nd St
S 356th St
S 356th St
S 356th St
13th Ave S
13th Pl S
20th Way S
20th Ave S
23rd Ave S
28th Ave S
28th Ave S
32nd Ave S
33rd Pl S
34th Ave S
25th Pl S
1st Ave S
1st Way S
6th Ave S
9th Ave S
16th Ave S
Pete Von Reichbauer Way S
Enchanted Pkwy S
Pacific Hwy S
Weyerhaeuser Way S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

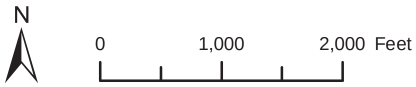
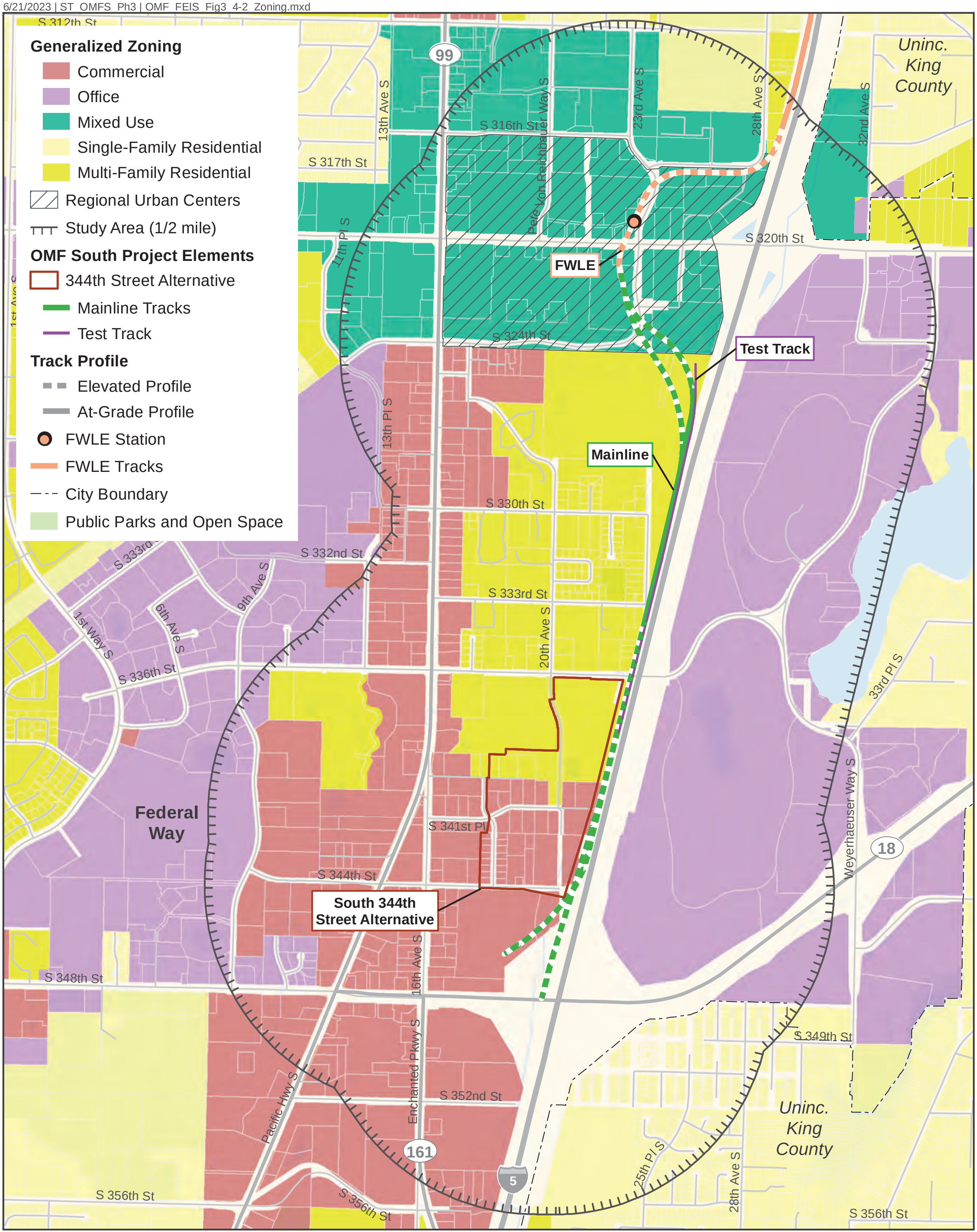

N
0
1,000
2,000 Feet

FIGURE 3.4-3
Existing Land Uses
South 344th Street Alternative

OMF South

6/21/2023 | ST_OMFS_Ph3 | OMF_FEIS_Fig3_4-2_Zoning.mxd


Generalized Zoning
Commercial
Office
Mixed Use
Single-Family Residential
Multi-Family Residential
Regional Urban Centers
Study Area (1/2 mile)
OMF South Project Elements
344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
S 312th St
99
13th Ave S
S 316th St
Pete von Reichbauer Way S
23rd Ave S
28th Ave S
32nd Ave S
Uninc. King County
S 317th St
11th Pl S
S 320th St
FWLE
1st Ave S
S 324th St
Test Track
13th Pl S
Mainline
S 330th St
S 332nd St
S 333rd
9th Ave S
S 333rd St
1st Way S
6th Ave S
20th Ave S
S 336th St
33rd Pl S
Federal Way
S 341st Pl
Weyerhaeuser Way S
18
S 344th St
South 344th Street Alternative
S 348th St
16th Ave S
S 349th St
Enchanted Pkwy S
Pacific Hwy S
S 352nd St
Uninc. King County
161
5
25th Pl S
28th Ave S
S 356th St
S 356th St
S 356th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
1,000
2,000 Feet

FIGURE 3.4-4
Generalized Zoning
South 344th Street Alternative

OMF South

3.4.1.3 Midway Landfill Alternative

Existing Land Uses

The Midway Landfill is a former gravel quarry and municipal solid waste landfill that accepted demolition materials, wood, and industrial wastes from approximately 1966 to 1983. The landfill is designated as an EPA Superfund site and is currently capped; an EPA Superfund Record of Decision (EPA 2000) as well as a Midway Landfill Consent Decree (King County Superior Court 1990) have allowed for ongoing operation and maintenance of a landfill gas extraction system and groundwater monitoring. The site includes public/institutional land uses, such as landfill facilities; commercial land uses, such as retail stores and auto repair shops; and vacant land.

Land uses that are adjacent to or abut the Midway Landfill Alternative site boundaries consist of vacant land (located to the north and west), residential (located north and south across S 252nd Street), and commercial (located to the west). OMF South would abut FWLE and the I-5 corridor to the east. Prominent uses within the study area include an elementary school to the west, military facilities and an elementary school beyond I-5 to the east, and automobile retail shops and a shopping center anchored by a large grocery store to the south. To the north of the site are a mobile home park (abutting the site), a community health center, and a college.

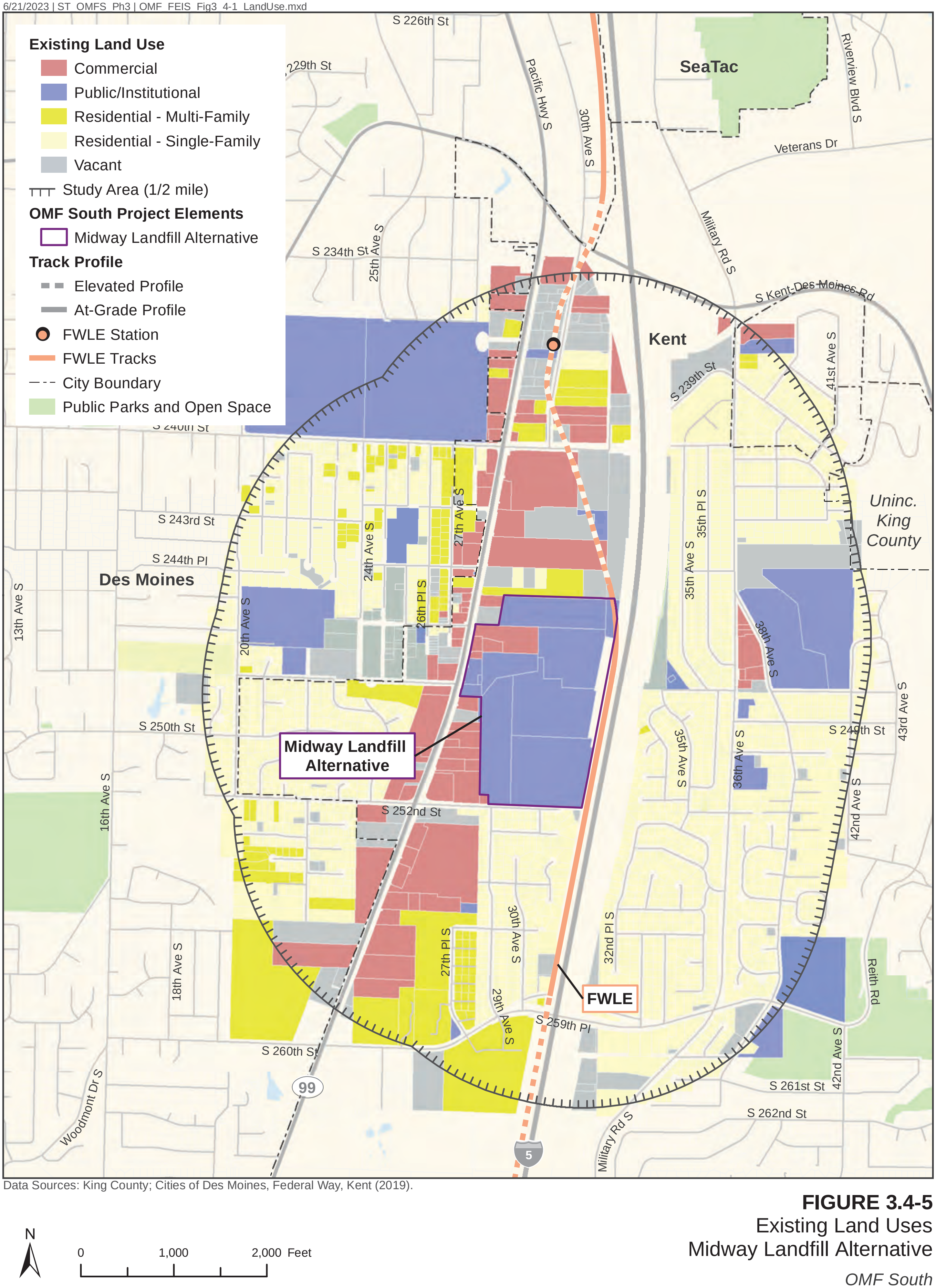
Zoning

Figure 3.4-6 shows the general zoning patterns in the Midway Landfill Alternative study area, designated by Kent, Des Moines, and King County. The zones within the Midway Landfill Alternative study area include primarily commercial, mixed uses, and multi-family residential in the central areas near SR 99 and I-5 and single-family residential zones beyond. In total, approximately 57 percent of the 0.5-mile study area (excluding the project footprint) is single-family residential, 17 percent is commercial/office, 10 percent is mixed-use, and 7 percent is multi-family residential.

The Midway Landfill Alternative OMF site is primarily within Kent's Commercial Manufacturing (CM) zone that runs north and south along SR 99 between S 260th Street and S 244th Street. The purpose of the Commercial Manufacturing zone is to provide locations for developments that combine characteristics of retail establishments, small-scale light industrial operations, heavy commercial and wholesale uses, and specialty manufacturing.

The lead tracks of the Midway Landfill Alternative are located in a small portion of the Midway Commercial Residential (MCR) zone. The purpose of this zone is to encourage the location of dense and varied retail, office, or residential activities in support of light rail and mass transit options; enhance a pedestrian-oriented character; and implement the goals and policies of the Midway Subarea Plan.

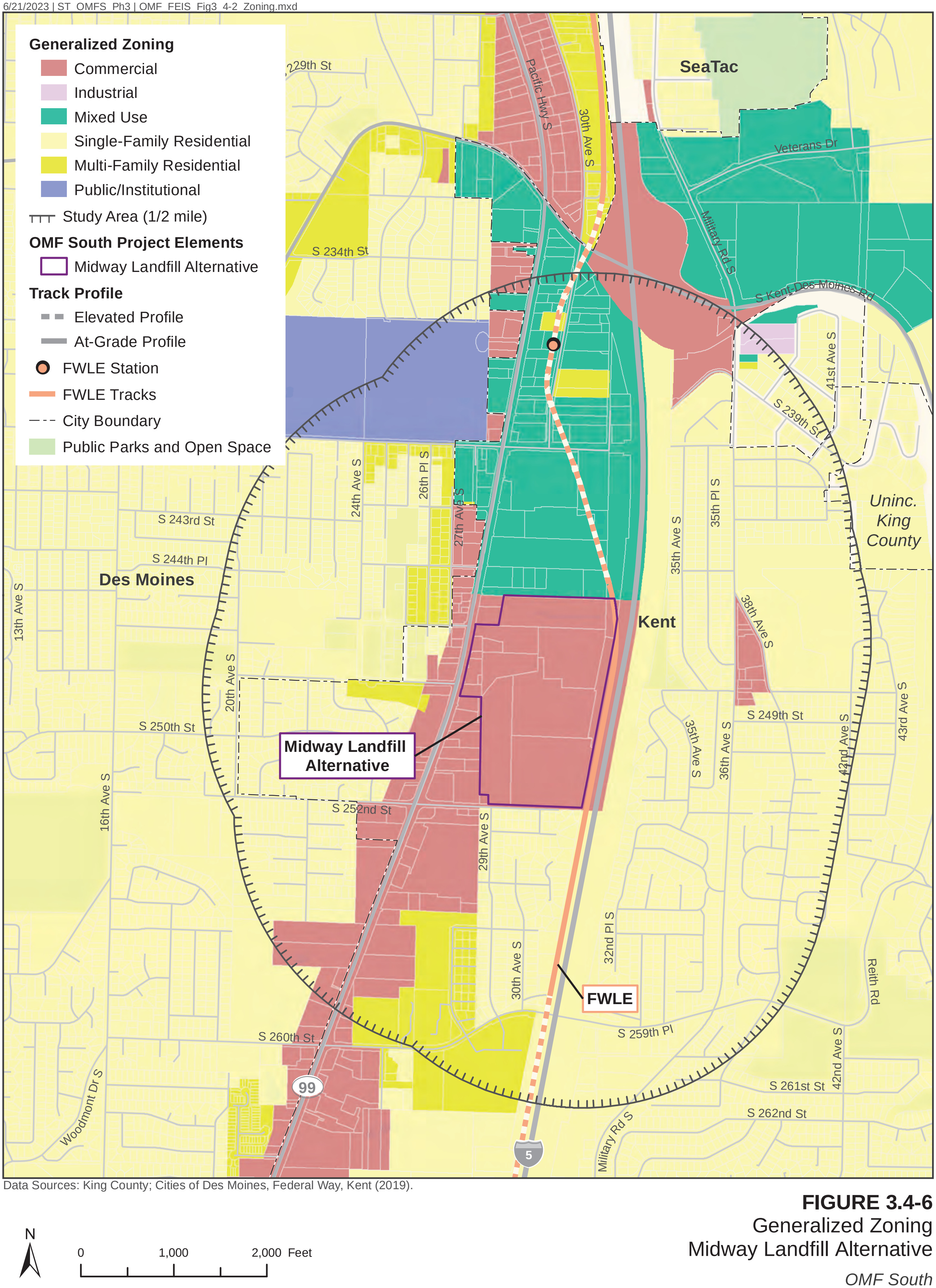
For additional details on the purpose of each zone for the Midway Landfill Alternative, see Table H2-1 of Appendix H2, Land Use Technical Appendix.


Existing Land Use
🟥 Commercial
🟦 Public/Institutional
🟨 Residential - Multi-Family
Residential - Single-Family
Vacant
Study Area (1/2 mile)
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
● FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
SeaTac
Kent
Des Moines
Uninc. King County
Midway Landfill Alternative
FWLE
S 226th St
S 229th St
Pacific Hwy S
30th Ave S
Riverview Blvd S
Veterans Dr
Military Rd S
S 234th St
25th Ave S
S Kent-Des Moines Rd
S 239th St
41st Ave S
S 240th St
S 243rd St
S 244th Pl
27th Ave S
24th Ave S
35th Pl S
35th Ave S
26th Pl S
20th Ave S
38th Ave S
13th Ave S
S 250th St
S 249th St
43rd Ave S
16th Ave S
35th Ave S
36th Ave S
42nd Ave S
S 252nd St
30th Ave S
32nd Pl S
27th Pl S
18th Ave S
29th Ave S
Reith Rd
S 259th Pl
S 260th St
99
S 261st St
42nd Ave S
Woodmont Dr S
S 262nd St
Military Rd S
5
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.4-5
Existing Land Uses
Midway Landfill Alternative

OMF South


Generalized Zoning
Commercial
Industrial
Mixed Use
Single-Family Residential
Multi-Family Residential
Public/Institutional
Study Area (1/2 mile)
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
SeaTac
S 229th St
Pacific Hwy S
30th Ave S
Veterans Dr
Military Rd S
S 234th St
S Kent-Des Moines Rd
41st Ave S
S 239th St
24th Ave S
26th Pl S
27th Ave S
S 243rd St
S 244th Pl
Des Moines
35th Ave S
35th Pl S
Uninc. King County
13th Ave S
Kent
38th Ave S
20th Ave S
S 249th St
43rd Ave S
S 250th St
35th Ave S
36th Ave S
42nd Ave S
Midway Landfill Alternative
S 252nd St
16th Ave S
29th Ave S
32nd Pl S
30th Ave S
Reith Rd
FWLE
S 260th St
S 259th Pl
S 261st St
42nd Ave S
99
S 262nd St
Woodmont Dr S
Military Rd S
5
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.4-6
Generalized Zoning
Midway Landfill Alternative

OMF South

3.4.2 Consistency with Regional and Local Comprehensive Plans and Zoning

This subsection evaluates the proposed project's general consistency with applicable comprehensive plan goals and policies and land use regulations, and it specifies potential planning considerations for each build alternative.

The regional and local land use plans for the study areas all encourage increased transit options, reduced vehicle transportation dependency, and expansion of regional growth centers. Regional plans and comprehensive plans for Federal Way and Kent identify the need to use transit to connect urban activity centers to facilitate efficient development patterns, as transit and other multimodal system improvements offer a sustainable approach to growing transportation demand. The Puget Sound Regional Council (PSRC) Vision 2050 (PSRC 2020c) includes several goals within its Growing Transit Communities Strategy that would be served by developing an OMF to support the expansion of the light rail system and service.

OMF South is necessary to enable the delivery of mobility improvements associated with the expansion of the Sound Transit regional light rail system, which will serve Federal Way and Kent. The project would ensure that there is enough storage capacity for, and a location from which to efficiently deploy, the number of vehicles needed to meet Sound Transit's service goals. As a maintenance system for high-capacity transit serving Federal Way and Kent, OMF South could help advance each city's comprehensive plan and land use goals and policies meant to improve high-capacity transit infrastructure and service.

Tables H2-5 and H2-6 in Appendix H2, Land Use Technical Appendix, provide a detailed outline of Federal Way and Kent's comprehensive plan land use goals and policies and OMF South's project consistency. While the tables show various specific goals and policies, policies that are not applicable or relevant to OMF South are not listed.

The Washington State Growth Management Act requires that zoning be consistent with comprehensive plans. It also prohibits local governments from precluding the siting of essential public facilities through their comprehensive plans or zoning. OMF South is a "regional transit authority facility" and is, therefore, explicitly recognized as an essential public facility in the Growth Management Act (RCW 36.70A.200). Once an OMF South alternative is selected, jurisdictions have a "duty to accommodate" the project in their land use plans and development regulations. Recognizing the duty to accommodate essential public facilities, the sections below discuss whether OMF South is a permitted use in the underlying zoning and compare OMF South to similar uses, general dimensional development standards, and the purpose and intent of the zones.

3.4.2.1 Preferred and South 344th Street Alternatives

Table H2-1 in Appendix H2, Land Use Technical Appendix, describes the consistency of the OMF site and mainline tracks in relation to the purpose and intent of relevant zones in Federal Way. The Preferred and South 344th Street alternatives would be located within Federal Way's City Center Core, Commercial Enterprise, Community Business, and Multifamily Residential zones.

As a light rail transit facility, the OMF site and the mainline tracks would be permitted within the Federal Way City Center Core and Commercial Enterprise zones, which specifically permit light rail or commuter rail transit facilities, including support facilities.

For both City Center Core and Commercial Enterprise zones, development standards require no minimum lot size, except for yards along Single-Family Residential zones. The height standard is 75 feet for the City Center Core zone and 50 feet for the Commercial Enterprise zone. Unless located within 100 feet of a Single-Family Residential zone, the structure height may exceed those limitations for both zones if the increased height is necessary to accommodate the structural, equipment, or operational needs of the use.

The greatest height proposed for the OMF lead tracks — which would be in the Multi-Family Residential zones, City Center Core zone, and Commercial Enterprise zone — is estimated at 36 feet, which is within the height standard of 75 feet for the City Center Core and Commercial Enterprise zones.

Light rail transit facility uses are not specifically contemplated in the Community Business and Multifamily Residential zones, but OMF South would be allowed within these zones as an essential public facility. There are no specific development standards for essential public facilities, however, and consequently the bulk, scale, and nature of the light rail transit facility use may not be consistent with the typical uses allowed in the Community Business and Multifamily Residential zones.

To ensure consistency with the Federal Way Comprehensive Plan, OMF South would be required to obtain a city of Federal Way Process IV land use approval from the hearing examiner for any zone in which the project is located, whether it would be a permitted use (as within the Commercial Enterprise zone) or allowed as an essential public facility (as in the Multi-Family Residential zone). Alternatively, an approved Development Agreement with the Federal Way City Council would serve as the project land use approval.

It is acknowledged that Multi-Family Residential zones are intended to provide a range of housing types to accommodate anticipated residential growth. In addition to the potential impacts and minimization measures related to the conversion of lands to a light rail transit facility use analyzed here, Section 3.7, Visual and Aesthetic Resources, and Section 3.9, Noise and Vibration, describe how Sound Transit would minimize aesthetic and noise impacts related to the bulk, scale, and nature of OMF South that could otherwise affect adjacent residents. Further discussion of the project’s potential effects to adjacent residential areas is included in Section 3.2, Transportation; Section 3.5, Economics; Section 3.8, Air Quality and Greenhouse Gas Emissions; and Section 3.17, Parks and Recreational Resources.

Federal Way Revised Code Section 19.135.251, Block Perimeters, requires block perimeters to be no greater than 2,640 feet. While the Preferred Alternative would remove 20th Avenue South, it would extend 18th Place South between S 340th Street and S 336th Street, which would replace the functionality of 20th Avenue S for vehicles, pedestrians, and bicycles. The extended 18th Place S would reduce one block to 4,100 feet and expand one block to 8,700 feet. Both of these blocks are currently nonconforming and are greater than the standard. The South 344th Street Alternative would also not meet the city’s block perimeter requirements because it would not replace 20th Avenue S. Sound Transit would work with Federal Way through the street vacation process to address the standards.

3.4.2.2 Midway Landfill Alternative

Table H2-2 in Appendix H2, Land Use Technical Appendix, describes the consistency of the OMF site in relation to the purpose and intent of relevant zones in Kent. In addition, specific dimensional development standards for all facility uses that fit within commercial and industrial zones, such as Midway Commercial Residential and Commercial Manufacturing, are listed in Table H2-2, as well as dimensional development standards for Single-Family Residential zoning.

Within the Commercial Manufacturing zone, there is a height limitation of two stories, or 35 feet, and maximum site coverage of 50 percent. The economic and community development director may grant one additional story in height if, during development plan review, it is found that the additional story would not detract from the continuity of the area. More than one additional story may be granted by the land use planning board. The highest proposed building height is the OMF office building, at an estimated 36 feet. This proposed building height could require a variance from the code standard due to the 35 foot-height limitation for the Commercial Manufacturing zone. In addition, the proposed development could result in approximately 11 percent of the site being covered with buildings and structures in the Commercial Manufacturing zone, which is below the 50 percent maximum site coverage standard for this zone.

The Midway Commercial Residential zone has an 80 percent maximum site coverage standard. The proposed development would be consistent with the 80 percent maximum site coverage standard because the design would result in less than 3 percent of the site being covered by buildings and structures in this zone.

The design of the tracks would be subject to high-capacity transit design requirements under Chapter 15.15 of Kent City Code. The design requirements are intended to ensure, in part, that high-capacity transit facilities are well designed, support transportation system connections, and adequately buffer different land uses.

Once built, OMF South would be similar in bulk and scale to a light commercial or office development, covering an area similar in size to a shopping center or suburban office complex. The OMF South site use, on the other hand, might be more similar to light industrial use, light rail transit facility, or government facility and public utility use.

Transit operations and maintenance facilities are listed as a conditional use within the Commercial Manufacturing zone. Those portions of the facility planned for the Commercial Manufacturing zone would be subject to a Conditional Use Permit, unless a Development Agreement is pursued because land use approval would be included as a part of the Development Agreement requirements.

The northern lead tracks for the Midway Landfill Alternative would be in the Midway Commercial Residential zone. The Midway Commercial Residential zone lists transportation and transit facilities, including high-capacity transit, as conditional uses. While not listed as a permitted or conditional use, lead tracks are a part of a transportation facility that supports high-capacity transit. The lead tracks are consistent with the intent of the zone and are consistent with the scale and intensity of the mainline tracks associated with transportation and transit facilities. Mainline tracks are a conditional use within the Midway Commercial Residential zone.

A small portion of the Midway Landfill Alternative would be located within the Single-Family Residential-6 zone at the southern edge of the potential construction limits. However, this area would not include elements of the facility itself; rather, it would be used primarily for landscaping and possibly for lead track and roadway improvements. Thus, it is not expected that the OMF site would conflict with the purpose of the Single-Family Residential-6 zone, which is to stabilize and preserve single-family residential neighborhoods. Impacts from the OMF South project could be minimized through building setbacks and landscaped buffers.

For further discussion of the potential effects to adjacent residential land uses see Section 3.2, Transportation; Section 3.5, Economics; Section 3.7, Visual and Aesthetic Resources; Section 3.8, Air Quality and Greenhouse Gas Emissions; Section 3.9, Noise and Vibration; and Section 3.17, Parks and Recreational Resources.

3.4.3 Environmental Impacts

3.4.3.1 No-Build Alternative

Under the No-Build Alternative, land use impacts from construction or operation of OMF South would not occur. However, other planned projects could convert existing land uses, since many of the areas are within commercial, multi-family residential, and mixed-use zones planned for development to accommodate future growth. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

Future population and employment growth are projected to increase by the respective cities' comprehensive plans. Both the Midway Subarea and Federal Way City Center plans have developed goals and strategies meant to support the development of high-capacity transit in their areas. Without the proposed OMF South project, the resulting level of service across the entire light rail system would potentially be lower than planned under Sound Transit 3. This could limit one of the driving factors behind land use conversion from existing lower-density, auto-oriented uses to transit-oriented development or higher-density uses near future stations.

3.4.3.2 Long-Term Impacts

Impacts Common to All Build Alternatives

All the build alternatives would have direct land use impacts through the acquisition of property for OMF facilities, tracks, and associated structures. The discussion below describes the approximate share of each jurisdiction's zoning that would be acquired by each alternative as well as the acreage of land subject to possible land use conversions. The potentially affected properties are detailed in Section 3.3, Acquisitions, Relocations, and Displacements, and in Appendix H1, Potentially Affected Parcels.

For each build alternative, the existing land uses of acquired properties would be converted to a transportation-related use, making them unavailable for potential future uses. Section 3.4.2, Consistency with Regional and Local Comprehensive Plans and Zoning, demonstrates that the OMF South project alternatives are largely consistent with relevant plans and policies, meaning surrounding properties generally would not face direct changes in their land use.

While surrounding properties may experience visual impacts from operation of OMF South, it is not expected that those impacts would be severe enough to result in alteration of existing or potential future land uses. A study by an Urban Land Institute Advisory Services Panel addressed common concerns related to the effects of light rail transit maintenance facilities on air quality, pollutants, nighttime activity, noise, light, and aesthetics. The study conclusion noted that these concerns are likely unfounded for modern light rail maintenance facilities (ULI 2014).

As shown in Table 3.4-1, all build alternatives would acquire a share of their associated city's commercial, mixed-use, and residential zones. If not replaced, conversions of land within commercial and mixed-use zones can result in decreased commercially zoned property, which could possibly spur reductions in sales tax revenue. Land use conversions that reduce residentially zoned areas could decrease the amount of land available for housing growth. Specific acreage of zoning acquired by each alternative is referenced in Table H2-10 of Appendix H2, Land Use Technical Appendix.

Table 3.4-1 Estimated Share of Total Commercial, Mixed-Use, and Residential Zoned Land to Be Acquired

Alternative	Commercial	Mixed Use	Residential
Preferred Alternative			
Mainline[1,2]	0.3%	6.4%	0.7%
OMF Site	1.1%	0.0%	0.6%
Total	**1.4%**	**6.4%**	**1.3%**
South 344th Street Alternative			
Mainline[1,2]	1.3%	6.4%	0.7%
OMF Site	1.8%	0.0%	0.5%
Total	**3.1%**	**6.4%**	**1.2%**
Midway Landfill Alternative			
OMF Site	4.1%	2.8%	< 0.02%

Sources: KCC Title 15; FWRC Title 19

Notes: This table shows the share of the project acreage within each city's commercial, mixed-use, and residential zones. See Table H2-10 in Appendix H2, Land Use Technical Appendix, for zoning acreages used to calculate percentages. These areas are approximate and were calculated using GIS tools based on conceptual designs and generalized zoning categories.

(1) For the Preferred and South 344th Street alternatives, the number of acquired parcels would be the same for the mainline track and tail track design options.

(2) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Table 3.4-2 summarizes the existing land uses and the approximate acreage of affected properties for each alternative that would be converted to a transportation use. The Preferred Alternative would convert the most land (just over 102 acres), the South 344th Street Alternative would convert less land (almost 97 acres), and the Midway Landfill Alternative would convert the least amount of land (approximately 71 acres). Overall, these conversions would make small changes in the local land use development patterns within the affected jurisdictions, but they could alter land use patterns in smaller localized areas.

Table 3.4-2 Amount of Converted Land by Land Uses

Alternative	Commercial	Public/ Institutional	Multi-Family Residential	Single-Family Residential	Vacant Land	Total
Preferred Alternative						
Mainline[1]	8.9	8.1	15.3	1.3	2.3	35.9
OMF Site	6.5	24.5	0.5	6.6	28.5	66.7
Total	**15.4**	**32.6**	**15.8**	**7.9**	**30.9**	**102.6**
South 344th Street Alternative						
Mainline[1]	11.7	8.1	15.3	1.3	3.6	40
OMF Site	15.8	5.6	0.0	9.1	26.3	56.8
Total	**27.5**	**13.7**	**15.3**	**10.4**	**29.9**	**96.8**
Midway Landfill Alternative						
OMF Site	6.5	60.6	0.6	0.2	3.3	71.2

Source: King County Assessor (2022)

Notes: All areas in acres. The estimated total includes the areas within the project's potential construction limits. The acreage is approximate, calculated using graphic information system (GIS) tools; totals may not be exact due to rounding. These are estimates based on conceptual designs. The Preferred and South 344th Street alternatives mainline track and tail track design options include similar existing land uses.

(1) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Preferred Alternative

As shown in Table 3.4-1, the Preferred Alternative mainline would require the conversion of 0.3 percent of the city's commercially zoned land, 6.4 percent of mixed-use zoned land, and 0.7 percent of residentially zoned land. As shown in Table 3.4-2, the mainline would primarily convert residential land uses (approximately 17 acres), including portions of Belmor, and about 19 acres of commercial land use, public/institutional land use, and vacant land.

The Preferred Alternative OMF site would require conversion of 1.1 percent of the city's commercial zoned land, 0.6 percent residential zoned land, and no conversion of mixed-use land (Table 3.4-1). It would primarily convert existing vacant land (approximately 29 acres) and public/institutional land uses (approximately 25 acres), including the Christian Faith Center (Table 3.4-2).

The OMF site would convert approximately 56 acres of the city's multi-family residentially zoned property, an area intended to be used to accommodate housing growth (Tables H2-2 and H2-10, Appendix H2, Land Use Technical Appendix). Additional detail is provided in Section 3.3, Acquisitions, Displacements, and Relocations.

The Preferred Alternative would include removal of 20th Avenue S between S 336th Street and S 341st Place, to be replaced by 18th Street S, which would be extended from S 340th Street to S 336th Street. Because 20th Avenue S is public right-of-way, Sound Transit would need to petition the Federal Way City Council to vacate 20th Avenue S under Federal Way Revised Code Chapter 4.20, Vacation of Streets, which specifies the requirements, process, and mitigation for removing public rights-of-way. Alternatively, the City Council may initiate procedures by resolution.

South 344th Street Alternative

As shown in Table 3.4-1, the South 344th Street Alternative mainline (including either tail track option) would require the conversion of 6.4 percent of Federal Way's mixed-use zoned land, 1.3 percent of commercial zoned land, and 0.7 percent of residential zoned land. Table 3.4-2 shows that the mainline would mostly convert existing residential, commercial, and public, institutional uses, as well as 3.6 acres of vacant land. The South 344th Street Alternative would have the same impacts through Belmor as described for the Preferred Alternative.

The South 344th Street Alternative OMF site would not require any conversion of mixed-use zoned land but would require conversion of almost 1.8 percent of the city's commercial zoned land (or approximately 36 acres of commercial enterprise zoning). The OMF site would primarily convert existing vacant (26 acres), commercial (approximately 16 acres), and public/institutional land uses (almost 6 acres). Major existing commercial uses include GarageTown and Ellenos Yogurt. Three small church properties are located within areas designated as public/institutional.

The multi-family residential-zoned area affected by the South 344th Street Alternative (0.5 percent) is similar to that of the Preferred Alternative (0.6 percent). Approximately 9 acres of residential land uses would be converted as a result of the OMF site. Additional detail is provided in Section 3.3, Acquisitions, Displacements, and Relocations.

The South 344th Street Alternative would include removal of 20th Avenue S from 300 feet south of S 336th Street and S 341st Place. Because 20th Avenue S is public right-of-way, Sound Transit would need to petition the Federal Way City Council to vacate 20th Avenue S as described for the Preferred Alternative.

Midway Landfill Alternative

As shown in Table 3.4-1, the OMF site would convert about 4.1 percent of Kent's commercial zoning and around 2.8 percent of the mixed-use zoning to a transportation use. While the Midway Landfill Alternative would convert the largest share of a city's commercially zoned land compared to other build alternatives, the existing land use in these areas is mostly public/institutional (primarily the capped landfill) and vacant land. In contrast to all the other alternatives, the Midway Landfill Alternative would not convert any discernible amount of residentially zoned areas. Table 3.4-2 shows the existing land uses that would be converted to transportation uses for the Midway Landfill Alternative. Most land use conversions would be public/institutional land uses (approximately 61 acres) with smaller areas of commercial (under 7 acres) and vacant land (approximately 3 acres).

The residential uses along the north and south boundaries of the site would be near the Midway Landfill Alternative's landscaped yards and stormwater detention pond, which would provide a buffer between the residences and the site.

3.4.3.3 Construction Impacts

Impacts Common to All Build Alternatives

For all build alternatives, there would be temporary noise and vibration impacts from construction activities. The Preferred and South 344th Street alternatives are expected to take approximately 3.5 years to construct, while the Midway Landfill Alternative could take over 8 years, depending on the subsurface construction design option chosen. Construction activities would be carried out in compliance with Sound Transit specifications and all applicable local jurisdiction noise regulations. In addition, the visual impact of construction is expected to be noticeable but temporary and no more impactful than other large construction projects. Changes in visual character are expected to be visible to surrounding viewers but would occur only within the project site boundaries. Sections 3.7, Visual and Aesthetic Resources, and 3.9, Noise and Vibration, discuss these construction impacts in more detail.

Because all construction activities, including staging, are expected to occur within the potential construction limits of the build alternatives and measures to minimize construction impacts and best management practices (BMPs) would be incorporated into the project, overall construction impacts on adjacent land uses are expected to be minimal. All build alternatives are anticipated to have minor impacts to property access and existing pedestrian and bicycle facilities. However, traffic volumes are estimated to increase throughout the study areas during peak hours. Increased traffic from construction could temporarily affect businesses in the project area but would not lead to long-term changes in land use because the construction haul routes would primarily use SR 99, I-5, and arterials that already experience large volumes of traffic. See Section 3.2, Transportation, for an analysis of construction impacts.

Given that most construction impacts are expected to be minimal and temporary, there would not be direct alteration of land use due to impairment or prevention of the primary function of such land.

3.4.3.4 Avoidance and Minimization of Impacts

The facility design process for OMF South would be developed according to Sound Transit's systemwide design goals and criteria as well as the design goals, criteria, and development patterns of the local municipality. The project would incorporate context-sensitive design considerations, which would likely vary based on local comprehensive plans, zones, and development standards related to building setbacks, landscaping, heights and massing, façade treatment, and urban design character. Site-specific design measures intended to increase compatibility with surrounding properties, such as landscaping for screening, would be developed during final design, in consultation with Federal Way or Kent, through the land use approval process.

Sound Transit would minimize construction and operation impacts that could otherwise affect adjacent land uses, as described in Sections 3.2, Transportation; 3.5, Economics; 3.7, Visual and Aesthetic Resources; 3.8, Air Quality and Greenhouse Gas Emissions; 3.9, Noise and Vibration; and 3.17, Parks and Recreational Resources.

The proposed project would result in direct long-term changes to existing land use. Any land use conversions would comply with local government planning and permitting procedures before the project is built. Section 3.3, Acquisitions, Displacements, and Relocations, includes more information on how Sound Transit would minimize property impacts and relocations.

3.4.3.5 Indirect Impacts

Indirect impacts are changes that may occur as a result of the proposed project in the future and in areas beyond the project's direct and short-term impacts. Indirect proximity impacts may include traffic, noise, visual impacts, and changes in adjacent land uses.

OMF South would provide Sound Transit with additional capacity to receive, test, commission, store, maintain, and deploy an expanded fleet of light rail vehicles, which would allow for more efficient operations of existing and future expansions of the light rail system than would occur without the facility. Improved light rail transportation service serving Federal Way and Kent could result in increased convenience and desirability of surrounding residential, commercial, and office properties. This may help advance parts of the cities' subarea and comprehensive plans, which include goals of increasing high-capacity transit and creating walkable, vibrant street life around transit facilities. Other benefits related to successful transit-oriented development include improved mobility, increased transit ridership in a more efficient urban form, and opportunities for urban redevelopment. As noise and visual impacts are likely to be minimal in the long term, no indirect impacts on land use are expected.

3.4.4 Mitigation Measures

In general, OMF South would be consistent with adopted comprehensive plans and land use policies, and no specific mitigation related to land use or zoning is anticipated.

3.5 Economics

This section describes the potential economic effects associated with the OMF South project alternatives. This economic analysis addresses the ways that land acquisition, construction, and operation of OMF South would impact economic conditions at and in the vicinity of the project sites and in the broader area. The alternatives were evaluated across several levels of geography. Site-specific effects were evaluated at each proposed OMF site and up to 0.5 mile from the potential construction limits of the build alternatives. Potential displacement of business activity and tax revenues were evaluated at the city level for Federal Way and Kent. Regional economic activity, such as jobs and labor income, were evaluated for the Puget Sound region, which includes King, Kitsap, Pierce, and Snohomish counties.

3.5.1 Affected Environment

3.5.1.1 Regional Demographic and Economic Trends

Employment in the Puget Sound region increased from 1.9 million in 2000 to 2.3 million jobs in 2018 (PSRC 2020a). During the same time period, median household income increased from approximately $45,000 to over $75,000 in Pierce County and from $55,000 to $95,000 in King County (PSRC 2020b).

Table 3.5-1 provides the population, household, and employment forecasts for the Puget Sound region and associated counties. The PSRC forecast for the region shows that the population will grow by over 1.6 million people between 2020 and 2050, reaching over 5.8 million by 2050. This amounts to an average 1.06 percent increase in population per year (PSRC 2022). PSRC data from 2022 shows that both King County and Pierce County will grow at a slower pace of 1.03 percent.

The number of households in the Puget Sound region is predicted to grow by approximately 765,102 between 2020 and 2050 — or by 1.27 percent per year — which would be faster than the overall population growth of 1.06 percent per year; this essentially reflects faster growth in smaller households. Travel demand typically tracks more closely to growth in the number of households than to population, suggesting a possible increase in travel demand.

Median household income in the Puget Sound region is higher than the state average. In 2018, King County had the highest median household income in the region, at about $95,000, while Pierce County ranked fourth at about $75,400 (PSRC 2019). From 2013 to 2018, incomes in King County grew by about 33 percent, while Pierce County incomes increased by about 31 percent. The U.S. Census Bureau reports that, in 2018, the median household income was $68,880 for Kent and $66,011 for Federal Way (PSRC 2020b).

Employment in the region is expected to grow at an approximate average rate of 1.18 percent through 2050. King County is expected to have faster job growth than Pierce County, at 1.87 percent per year versus Pierce County at 0.70 percent per year. These trends support the predictions of increased travel demand in the region and along the project corridor.

Table 3.5-1 Population, Household, and Employment Forecasts by Region and County

	2020 Actual	2050 Forecast	Average Annual Growth Rate, 2020 to 2050
Puget Sound			
Population	4,240,910	5,827,203	1.06%
Household	1,657,501	2,422,603	1.27%
Jobs	2,356,277	3,346,915	1.18%
King County			
Population	2,225,064	3,029,767	1.03%
Households	900,061	1,310,283	1.26%
Jobs	1,225,004	2,138,202	1.87%
Pierce County			
Population	891,862	1,213,634	1.03%
Households	330,999	487,287	1.30%
Jobs	422,410	521,106	0.70%

Source: 2020 Actual (U.S. Census Bureau, 2020 ACS 5-Year Estimates); 2050 Forecast (PSRC 2022).

3.5.1.2 Study Area Demographic and Economic Trends

Table 3.5-2 shows the growth of population, households, and jobs from 2020 to 2050 based on the PSRC Forecast Analysis Zone (FAZ) for the build alternatives. FAZs are geographic units used by PSRC to model and report its population, households, and employment forecasts. PSRC's Vision 2050 anticipates population and employment in the Puget Sound region will continue to grow over the next 30 years. PSRC acknowledges that the COVID-19 pandemic may have had effects on the economy that could alter long-range forecasts. For purposes of this Final EIS, the Vision 2050 forecasts were used for analysis.

Table 3.5-2 Population, Household, Employment Forecast by FAZ

	2020 Actual	2050 Forecast	Average Annual Growth Rate, 2020 to 2050
Central Federal Way (FAZ 3020)[1, 2]			
Population	26,950	54,507	2.38%
Households	10,371	22,255	2.58%
Jobs	13,035	37,555	3.59%
Des Moines (FAZ 3046)[3]			
Population	25,015	42,485	1.78%
Households	9,661	17,710	2.04%
Jobs	12,208	16,668	1.04%

Source: 2020 Actual (U.S. Census Bureau, 2020 ACS 5-Year Estimates); 2050 Forecast (PSRC 2022).

Notes:

(1) Preferred and South 344th Street alternatives.

(2) The U.S. Census Bureau does not provide actual population statistics for a single geographical boundary that directly matches the PSRC Central Federal Way FAZ 3020. Therefore, the 2020 Actual population numbers represent the sum the 2020 actual population for Census Tracts 300.05, 300.06, 302.03, 302.04, 303.13, and 303.14, all of which are encompassed within and align with the geographical boundaries of the PSRC Central Federal Way FAZ 3020.

(3) Midway Landfill Alternative.

The Preferred and South 344th Street alternatives are in the Central Federal Way FAZ 3020, which is bordered by I-5 and SR 99, shown in Figure 3.5-1. Between 2020 and 2050, household growth in FAZ 3020 is expected to continue at about 2.58 percent annually. Population and jobs are expected to grow as well, at 2.38 and 3.59 percent annually, respectively.

The Midway Landfill Alternative is in PSRC FAZ 3046, called the Des Moines area, although it includes a portion of Kent, shown in Figure 3.5-1. FAZ 3046 is forecast to experience a 1.78 percent growth rate in population, a 2.04 percent growth rate in households, and a job growth rate of 1.04 percent between 2020 and 2050.

Table 3.5-3 shows the forecasted number of jobs by sector from 2018 to 2050 for the build alternatives. Employment in census tract 303.13, which contains both the Preferred and South 344th Street alternatives, has a high concentration of finance, insurance, real estate, and services employment sector jobs, with over 50 percent falling into this category in 2018. By 2050, this share is expected to decrease slightly, to about 49 percent.

Employment in census tract 290.04, which surrounds the Midway Landfill Alternative, was primarily concentrated in the retail/food services and finance, insurance, real estate, and services employment sectors in 2018, each with substantial employment. Retail was the largest concentration in 2018, with approximately 48 percent of jobs. By 2050, the education employment sector, construction employment sector, and finance, insurance, real estate, and services employment sectors are expected to grow at a faster rate.

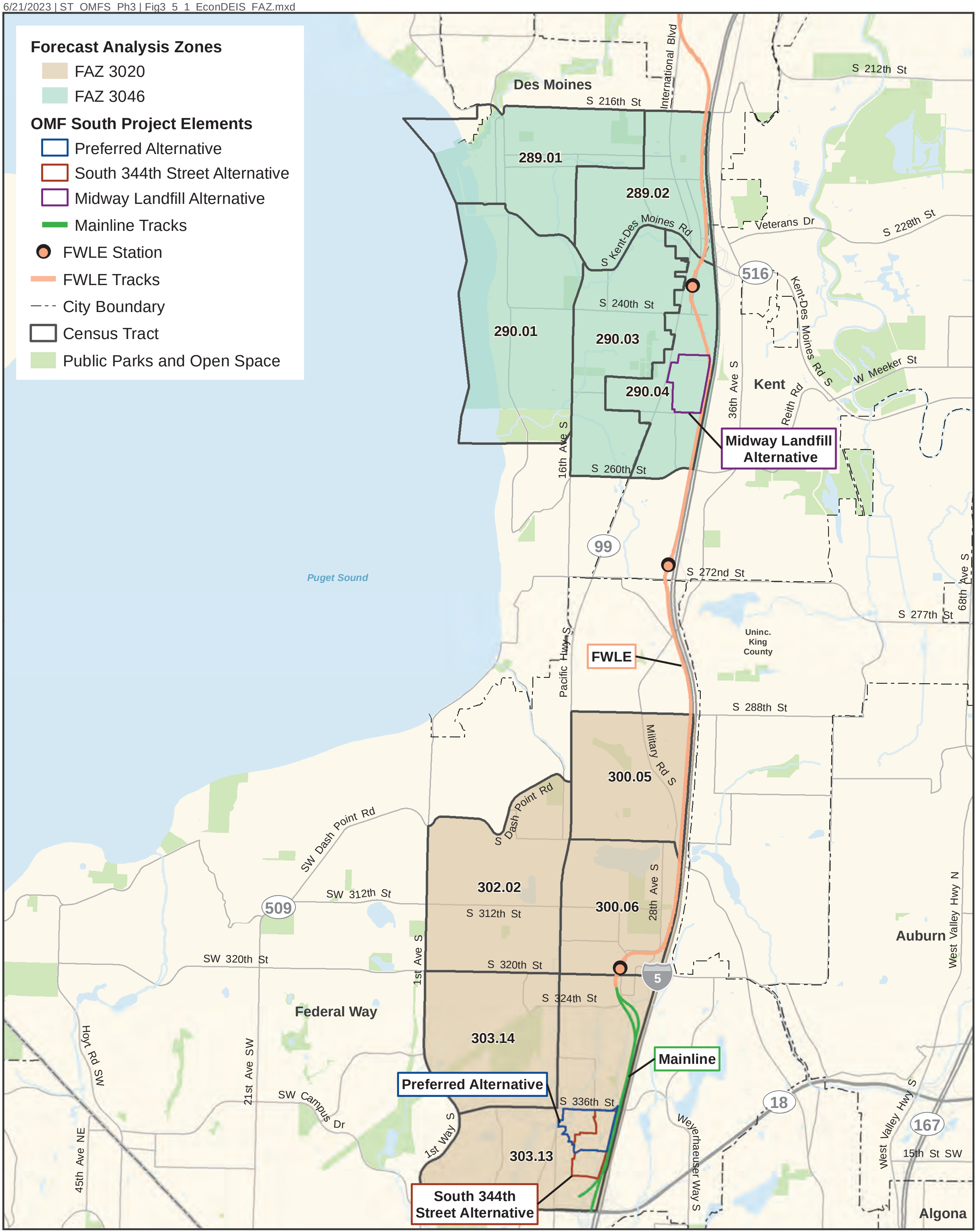
Table 3.5-3 Employment Forecasts by Census Tract

	2018 Estimated Jobs	2018 Share	2050 Forecast Jobs	2050 Share	Compound Annual Growth Rate, 2018 to 2050
Preferred and South 344th Street Alternative: Census Tract 303.13					
Construction/Resources	417	4.4%	499	3.6%	0.6%
Manufacturing/WTU[1]	979	10.3%	1,024	7.3%	0.1%
Retail/Food Services	2,324	24.5%	4,837	34.6%	2.3%
Finance, Insurance, Real Estate, and Services	5,057	53.3%	6,810	48.7%	0.9%
Government	544	5.7%	467	3.3%	-0.5%
Education	170	1.8%	346	2.5%	2.2%
Total	**9,491**	**100.0%**	**13,983**	**100.0%**	**1.2%**
Midway Landfill Alternative: Census Tract 290.04					
Construction/Resources	76	3.9%	426	5.9%	5.5%
Manufacturing/WTU[1]	203	10.5%	673	9.4%	3.8%
Retail/Food Services	929	48.3%	3,129	43.7%	3.9%
Finance, Insurance, Real Estate, and Services	665	34.5%	2,771	38.7%	4.6%
Government	49	2.5%	43	0.6.0%	-0.4%
Education	3	0.2%	119	1.7%	12.2%
Total	**1,925**	**100.0%**	**7,161**	**100.0%**	**4.2%**

Source: PSRC 2050 Land Use Vision (PSRC 2022).

Notes: (1) WTU = wholesale, transportation, and utilities.

6/21/2023 | ST_OMFS_Ph3 | Fig3_5_1_EconDEIS_FAZ.mxd


Forecast Analysis Zones
FAZ 3020
FAZ 3046
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Midway Landfill Alternative
Mainline Tracks
FWLE Station
FWLE Tracks
City Boundary
Census Tract
Public Parks and Open Space
Des Moines
S 216th St
International Blvd
S 212th St
289.01
289.02
Veterans Dr
S 228th St
S Kent-Des Moines Rd
516
Kent-Des Moines Rd S
S 240th St
290.01
290.03
290.04
36th Ave S
Kent
Reith Rd
W Meeker St
Midway Landfill Alternative
16th Ave S
S 260th St
99
S 272nd St
Puget Sound
68th Ave S
S 277th St
Uninc. King County
FWLE
Pacific Hwy S
S 288th St
Military Rd S
300.05
S Dash Point Rd
SW Dash Point Rd
302.02
28th Ave S
300.06
SW 312th St
509
S 312th St
Auburn
West Valley Hwy N
SW 320th St
1st Ave S
S 320th St
5
S 324th St
Federal Way
303.14
Hoyt Rd SW
21st Ave SW
Mainline
Preferred Alternative
SW Campus Dr
S 336th St
18
Weyerhaeuser Way S
West Valley Hwy S
167
1st Way S
303.13
45th Ave NE
15th St SW
South 344th Street Alternative
Algona
N
0
1
2 Miles

Data Sources: King County; Cities of Des Moines, Federal Way, Kent, PSRC (2019).

FIGURE 3.5-1
Forecast Analysis Zones
OMF South Alternatives

OMF South

3.5.1.3 Local Revenue Sources

Table 3.5-4 shows the revenue sources for both Federal Way and Kent. The revenue sources are listed both by total dollar amounts and by percentage of total budget, based on the 2021 to 2022 adopted budget for each city. It is unknown at this time what effect, if any, the COVID-19 pandemic may have on future revenues.

Table 3.5-4 General Fund Revenues for Federal Way and Kent

Revenue Source	Federal Way Total	Federal Way Share	Kent Total	Kent Share
Property Tax	$10,252,674	19.5%	$32,151,450	28.9%
Sales Tax	$18,977,116	36.0%	$19,943,030	17.9%
Utility Tax	--	--	$17,757,970	16.0%
Business and Occupation Tax	--	--	$19,100,000	17.2%
Other	$23,481,773	44.5%	$22,219,600	20.0%
Total	**$52,711,563**	**100%**	**$111,172,050**	**100%**

Sources: City of Federal Way 2021-2022 Adopted Budget (City of Federal Way 2020); City of Kent 2021-2022 Adopted Budget (City of Kent 2021)

Note: Utility and business and occupation taxes are not included in Federal Way's General Fund.

Federal Way primarily collects its general fund revenue from "other" taxes, which include licenses and permits, intergovernmental taxes, charges for services, fines and penalties, etc. Sales tax brings in more revenue than property taxes, generating 36 percent of the general fund at nearly $19 million. Federal Way's general fund supports 10 primary departments: city council, mayor's office, municipal court, law, finance, human resources, city clerk, community development, police department, and parks, recreation, and cultural services.

Property taxes are the largest revenue source for Kent. For the 2021 adopted budget, property taxes represented 28.9 percent of the general fund revenue at more than $30 million. Sales, utility, and business and occupation taxes are also important sources of revenue that collectively account for just over 50 percent of the city's general fund revenue. Kent's general fund finances the majority of the traditional services associated with local government.

3.5.1.4 Regional Transportation of Goods and Services

I-5 is the primary corridor for regional and interstate commerce in the study region, while SR 99 is a designated freight route through Federal Way and Kent. I-5 is heavily congested during peak periods, which results in longer travel times, decreased reliability, and increased operating costs. While some businesses may choose to shift deliveries to non-peak hours, other companies may choose alternate routes to maintain reliable pickup and delivery times. Heavy congestion can also constrain access to labor as workers seek to minimize commute times. As a result, businesses may respond by expanding to other areas in the metropolitan region or by relocating outside of the region. A more detailed discussion about the existing freight use and throughput along the I-5 corridor is described in Section 3.2, Transportation.

3.5.2 Environmental Impacts

3.5.2.1 No-Build Alternative

Under the No-Build Alternative, economic impacts from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. Once operational, FWLE would likely encourage private, transit-oriented development in the Midway Landfill Alternative study area, increasing property tax and sales tax revenues for local jurisdictions. Other planned projects may also have economic impacts, depending on the extent of business displacements and land use changes. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

Under the No-Build Alternative, future economic development at the proposed sites would continue on its current course for the foreseeable future and in accordance with current planning goals. Sound Transit would be constrained due to the lack of enough LRVs to meet the projected service needs of Sound Transit 3, which would result in increasing passenger loads as the population of transit users grows. These loads may continually meet or exceed capacity. Fleet constraints may also cause operational disruptions and inefficiencies, which could lead to economic effects resulting from reduced ridership and, as a result, could substantially affect each passenger's ability to travel throughout the Sound Transit service area. Increasing constraints on the transportation network could affect labor productivity as the costs (in time and expense) to commute to and from work increase.

3.5.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

For all build alternatives, the construction of OMF South may cause changes in the local area due to the acquisition of land that is currently used for other purposes, and impacts would primarily arise from displacement of employees and businesses on properties that are acquired and converted to public transit uses. Displacing those businesses would also initially change the amount of property tax burden and sales taxes collected in the local jurisdictions. If businesses are displaced outside of the region, business and occupation taxes and retail sales taxes could also be affected.

Once the project is constructed, approximately 610 staff would be employed to support the operation of OMF South, making it one of the larger employers in the area. These estimates are based on interviews, past experiences at other Sound Transit OMFs, and Sound Transit's projections on needed staff. This additional source of employment would help benefit the regional economy and reduce the impact from jobs displaced by the project alternatives (see Table 3.5-5).

Regional Transportation of Goods and Services

SR 99 is a designated freight route through Federal Way and Kent. The potential impacts associated with the OMF South build alternatives are not anticipated to negatively impact regional freight mobility in the study area. Freight traffic would experience similar travel times as the No-Build Alternative, and the cost of moving goods and services through the study region is not anticipated to increase as a result of the build alternatives. Similarly, it is not likely that the proposed alternatives for OMF South would result in increased congestion along the I-5 corridor. Section 3.2, Transportation, and Appendix G1, Transportation Technical Report, discuss potential transportation impacts in more detail.

Potential Business Displacement

Table 3.5-5 lists the number of businesses and employees that may be disrupted or displaced due to property acquisition. These estimates represent a likely upper bound of the potential direct displacement of employees across the proposed build alternatives. If businesses can relocate within the existing community or the broader affected area, the economic effect of displacement may be smaller.

Table 3.5-5 Property Acquisition Impacts on Businesses and Employees

Alternative	Total Affected Businesses[1]	Business Displacements[2]	Employee Displacements[3]
Preferred Alternative			
Mainline[4,5]	3	0	0
OMF Site	36	12	126
Total	**39**	**12**	**126**
South 344th Street Alternative			
Mainline[4,5,6]	4	0	0
OMF Site	70	21(7)	212
Total	**74**	**21**	**212**
Midway Landfill Alternative			
OMF Site	12	4	43

Source: King County Assessor (2024)

Notes:

(1) Total affected businesses include full and partial property acquisitions. Religious facilities (e.g., churches) are also included in affected business totals.

(2) Business displacements include both businesses and religious facilities for fully acquired parcels only.

(3) The number of displaced employees is based on the business building size (King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers and not on an actual survey of businesses. The analysis for estimating employees assumes that the businesses are not abandoned or vacant.

(4) With either the 40 mph Alignment or 55 mph Design Option.

(5) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could still be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(6) With either the Enchanted Parkway or I-5 mainline tail track options.

(7) Includes GarageTown, comprising 67 individual units.

The effects of potential business displacements are complex. Substantial displacement of local businesses can affect residents and businesses alike. Often the direct impacts for displaced businesses are financial, but there can be other consequences as well.

Businesses are affected differently based on their characteristics. Firm size and community importance may determine the level of impact on employment and to the community. For example, small and minority-owned businesses that rely on a localized customer base may have more difficulty finding suitable locations. Many of these businesses support local economic growth and innovation in the communities they serve. Businesses that use machinery or hazardous substances may require large parcels or have additional challenges that may make relocation difficult. Further, a business may have a suitable place to relocate, but the new location could limit access to its existing labor pool.

Relative to the employment base in the study region, the estimated number of employees displaced from the proposed build alternatives is small. Sound Transit would provide relocation assistance to businesses that are displaced, as described in Section 3.3, Acquisitions, Displacements, and Relocations. Depending on the extent to which displaced businesses are able to be relocated within the existing community or the broader affected area, these estimates do not necessarily reflect potential job losses in the study region.

This analysis cannot assess other characteristics of business vulnerability from displacement. Information about profitability or economic competitiveness of individual businesses is not publicly available. While these characteristics may be considered along with the broader social impacts of business disruption from the project alternatives, they are outside the scope of this Final EIS (WAC 197-11-448). Other anticipated socioeconomic impacts related to business and employee displacement are discussed in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods.

Impact of Displacement on Tax Base

All the build alternatives would acquire parcels that have existing commercial or industrial activity. Businesses located within these parcels pay a sales tax. Businesses in Kent also pay a business and occupation tax, as shown in Table 3.5-4. The acquisitions for OMF South could result in initial reductions of sales and business and occupation taxes by displacing those existing businesses. If some businesses were to relocate to another area within the city, they would resume paying sales and business and occupation taxes, reducing the effect on taxes. Retaining those displaced businesses could reduce the effect on local sales taxes. However, calculating the specific reductions for such taxes is not possible, given the inability to know exactly how many businesses would relocate and remain within each city.

Similarly, it is not possible to calculate specific property tax impacts due to complex property tax policies in the state of Washington. The acquisitions would initially reduce property taxes in Federal Way and Kent; however, the impact is expected to be small. The reduction of developable properties may affect the property tax base in the region by lowering the potential for new construction on acquired properties. This may require changes in local government budgets or an increase in rates to taxpayers to recover budgeted funds. Local governments would be constrained to the annual 1 percent levy rate increases to cover existing costs unless certain exemptions apply. However, some of the initial tax revenue displacement would be offset through sales taxes for construction-related purchases that occur within the local jurisdiction.

If the project were to promote future development and investment in the local vicinity, property tax assessments could increase. However, the project could also result in shifting demand across the region, so that while assessments adjacent to new development may increase, property tax assessments in other areas of the city might stagnate. Overall, the impact is expected to be small given the reduction in taxable assessed valuation of acquired properties in relation to the area’s overall tax base (see Table 3.5-6). For example, the total taxable assessed valuation of real property for full and partial acquisitions for the South 344th Street Alternative accounts for 0.72 percent of Federal Way’s overall assessed valuation in 2022; none of the alternatives exceed 1 percent.

Table 3.5-6 Total Taxable Assessed Valuation by Alternative

Alternative	Total Parcels	Total Taxable Value	Jurisdiction Total Taxable Value[1]	Acquired Jurisdiction Taxable Share
Preferred Alternative				
Mainline[2,3]	7	$31.4 M	$13.9 B	0.23%
OMF Site	30	$57.1 M	$13.9 B	0.41%
Total	**37**	**$88.5 M**	**$13.9 B**	**0.64%**
South 344th Street Alternative				
Mainline[2,3,4]	13	$41.4 M	$13.9 B	0.30%
OMF Site	51	$58.2 M	$13.9 B	0.42%
Total	**64**	**$99.7 M**	**$13.9 B**	**0.72%**
Midway Landfill Alternative				
OMF Site	47	$26.5 M	$25.1 B	0.11%

Source: King County Assessor (2022)

Notes:

(1) Jurisdiction is Kent for the Midway Landfill Alternative and Federal Way for the Preferred and South 344th Street alternatives.

(2) With either the 40 mph Alignment or 55 mph Design Option.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) With either the Enchanted Parkway or I-5 mainline tail track options.

Preferred Alternative

The Preferred Alternative OMF site would displace the Christian Faith Center, a religious facility with an associated private school, resulting in the disruption of approximately 92 jobs. Although neither entity is taxable, they represent the two largest sources of employment that would be disrupted. Other displaced businesses include warehouse and storage buildings and a garage service repair shop that would have much smaller employee displacements.

South 344th Street Alternative

The South 344th Street Alternative OMF site would disrupt some light manufacturing in the area. Ellenos Yogurt recently made investments to its facility and has stated that many of the improvements could not be moved. Additionally, GarageTown houses 67 individually rented or owned storage facilities. Both businesses would be difficult to relocate. For Ellenos Yogurt, it is unlikely that there is an existing facility with the same manufacturing equipment required for producing yogurt. GarageTown is less likely to have large, specialized capital requirements, but does have a large footprint; it may be difficult to find a site within the same area that also provides ease of access for its existing customer base. The South 344th Street Alternative would displace other warehouse and storage businesses, office buildings, and three churches, but these properties would result in a small number of employee displacements.

Based on the existing vacancy rates for retail and industrial sites in the region, there is potential capacity for the other displaced businesses to relocate. If any of the firms relocate outside of Federal Way, however, the city may lose some benefits from local consumption and contributions to the tax base. Although the total value added from the firms is unknown, the potential job displacement as a total share of employment in the region is small (see Table 3.5-5) and dependent on whether affected businesses relocate in the area or not. None of the identified businesses appear to be heavy industry or to use large amounts of toxic substances, which could otherwise make relocation difficult.

Midway Landfill Alternative

The Midway Landfill Alternative would have the smallest impact on employment displacements (see Table 3.5-5), and the identified businesses would likely be able to relocate to nearby properties. The affected businesses are an insurance business, an optometry clinic, and two warehouse businesses; the other affected parcels around the closed Midway Landfill are mostly vacant.

3.5.2.3 Construction Impacts

Construction supports economic activity through the purchase of goods and services and labor income in the study area. The economic contributions arising from construction projects are often temporary in nature and occur as construction spending unfolds. While the infusion of new money on capital projects can be beneficial to a region, residential and commercial sites that are adjacent to the proposed sites may experience some disruption and other adverse effects from construction. However, investments in capital projects that can reduce future congestion and pollution may have broader long-run benefits than what is typically measured in short-run economic impact analyses.

Construction activity may disrupt current economic activity by increasing traffic delays and may result in other negative externalities, such as increased noise adjacent to the construction site. However, those effects are anticipated to last only through the duration of the construction phase. The project is not expected to result in large changes in access to nearby businesses or lead to changes in existing transportation networks. Please see Sections 3.2, Transportation, and 3.9, Noise and Vibration, for more discussion on potential impacts during construction.

Table 3.5-7 displays the gross economic contributions from each build alternative. As shown, employment and spending would increase during construction for all the alternatives. The Preferred and South 344th Street alternatives have similar expenditure and employment estimates, while the Midway Landfill Alternative estimates are greater due to its longer construction period. Construction would bring revenue into the economy with the jobs that it produces, and the money spent by construction employees in the surrounding community. The extent of these impacts would depend on the source of project funding and the types of work crews performed.

These results do not differentiate between new economic activity in the region and activity that is repurposed as a result of this project, nor do they account for the opportunity cost of using those public dollars for an alternative use. The preferred approach for these analyses is to account only for new capital that would flow into the region for each alternative; however, that information was not available for this analysis. Instead, the values above represent the gross contributions, or “economic footprint,” associated with each alternative. As such, it represents an upper-bound estimate of economic activity associated with the project.

The direct expenditures and employment shown in Table 3.5-7 represent spending and jobs directly related to the project alternatives. Total economic output and total employment account for both the direct, supply chain, and consumption effects associated with each alternative, known collectively as secondary effects. These secondary effects are represented by economic multipliers, which trace how spending is distributed across other industries to support economic activities in a study region.

Table 3.5-7 Direct Expenditures and Direct Employment During Construction

Alternative	Direct Expenditures[1]	Total Economic Output[2]	Direct Employment (Job Years[3])	Total Employment (Job Years[3])
Preferred Alternative				
Mainline[4]	$.338 – .427 B[5]	$.661 – .835 B	1,157 – 1,462	2,550 – 3,221
OMF Site	$1.3 – 1.7 B	$2.5 – 3.3 B	4,450 – 5,820	9,806 -12,824
Total	**$1.6 – 2.1 B**	**$3.2 – 4.2 B**	**5,607 - 7282**	**12,356 – 16,045**
South 344th Street Alternative				
Mainline[4]	$.503 – .636 B	$.984 – 1.2 B	1,722 - 2,177	3,794 – 4,798
OMF Site	$1.3 – 1.7 B	$2.5 – 3.3 B	4,450 – 5,820	9,806 – 12,824
Total	**$1.8 – 2.3 B**	**$3.5 – 4.6 B**	**6172 – 7997**	**13,600 – 17,622**
Midway Landfill Alternative				
Platform	$2.8 – 3.5 B	$5.5 – 6.8 B	9,586 – 11,982	21,122 – 26,402
Hybrid	$2.2 – 2.8 B	$4.3 – 5.5 B	7,731 – 9,586	16,596 – 21,122
Full Excavation	$2.1 – 2.6 B	$4.1 – 5.1 B	7,189 – 8,901	15,841 – 19,613

Sources: Sound Transit and Washington Office of Financial Management Input-Output Model 2015.

Notes:

(1) Direct expenditures exclude construction contingency allowance and the purchase of land.

(2) The multipliers from the Washington Office of Financial Management Input-Output model are representative of the State of Washington and differ from economic multipliers created for the four-county PSRC region.

(3) A job year is defined as full-time employment for one person over the course of a year (assuming 2,080 hours of employment per year).

(4) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(5) Values expressed in a range consistent with Table 2.5-1 to reflect conceptual nature and preliminary level of design.

Construction spending (excluding land and equipment) tends to have a high multiplier, as many of the labor and capital inputs are supplied locally. Based on the multipliers in the 2012 Washington Office of Financial Management Input-Output model (revised in 2015), every $1 million spent on construction activity supports an additional $956,000 in economic output. As mentioned previously, expansionary projects can result in increased economic capacity but result in only a short-run increase in output and jobs. Often the impacts calculated from construction spending dissipates as project spending declines.

3.5.2.4 Avoidance and Minimization of Impacts

Construction might cause adverse temporary impacts on businesses due to reduced access or nuisances associated with general construction activity such as noise, vibration, or dust. Avoidance and minimization measures as described in the following sections would reduce these impacts: Section 3.2, Transportation; Section 3.3, Acquisitions, Displacements, and Relocations; Section 3.7, Visual and Aesthetic Resources; Section 3.8, Air Quality and Greenhouse Gas Emissions, and Section 3.9, Noise and Vibration.

During final design and permitting, construction plans would be developed to address the needs of businesses and could include, but are not limited to, the following elements:

- Provide a 24-hour construction telephone hotline.
- Establish effective communications with the public through measures such as meetings and construction updates, alerts, and published schedules.

- Provide an ombudsman consistent with Sound Transit policy. If complaints arise about construction impacts that cannot be resolved by community outreach staff or the relevant department director, the ombudsman policy provides a process for addressing those complaints in an impartial, fair, and timely manner that ensures effective stewardship of public resources and minimizes construction impacts.
- Provide detour, open-for-business, and other signage as appropriate.
- Maintain access as much as possible to each business and coordinate in advance with businesses during times of limited access.

3.5.2.5 Indirect Impacts

OMF South could have indirect economic impacts on properties adjacent to the construction site from temporary changes in traffic flow, noise levels, and visuals that could result in changes to business sales or property values. Impacts to local businesses are anticipated to be minor and last only through the duration of the construction phase. No substantial changes in existing transportation networks or access to nearby businesses are expected because of construction for any of the OMF South build alternatives.

For the Midway Landfill Alternative, residential properties adjacent to the project site may gain some marginal benefits from increased property values, depending on the extent of landfill remediation associated with the OMF South project. For example, the Full Excavation subsurface design option would completely remove the contaminated landfill material and would likely have the greatest positive effect on neighboring property values of the three options. Many economic analyses have found that clean-up of designated Superfund sites can have a positive effect on adjacent property values, but information about the timing and magnitude of that effect varies greatly across sites (Kiel and Williams 2007).

Other amenities that affect property values, such as proximity to green space, are not anticipated to be impacted by any of the build alternatives.

3.5.3 Mitigation Measures

No specific mitigation related to economic impacts is anticipated.

3.6 Environmental Justice, Social Resources, Community Facilities, and Neighborhoods

This section evaluates how the OMF South project alternatives could affect environmental justice, social resources, including community facilities, neighborhood character, community cohesion, and safety and security within the study area. For the purposes of this analysis, social resources include community amenities, government and Tribal entities, affordable and senior housing, medical facilities, recreation facilities, religious centers, schools, social service providers, and transportation facilities. Community cohesion refers to a community member's sense of belonging to a neighborhood and the degree to which community members interact with other community members and social resources in the neighborhood. The study area includes all social resources within 0.5 mile of the potential construction limits of each OMF South build alternative. Due to their close proximity, a single study area was identified for the Preferred and South 344th Street alternatives.

Consistent with FTA Title VI Circular and the FHWA Community Impact Assessment: A Quick Reference for Transportation, four key neighborhood and community issues were used to evaluate the project's potential impact on the study area (FTA 2012; FHWA 2018):

- Changes in neighborhood quality
- Barriers to social interaction
- Impacts on community resources
- Impacts on safety and security

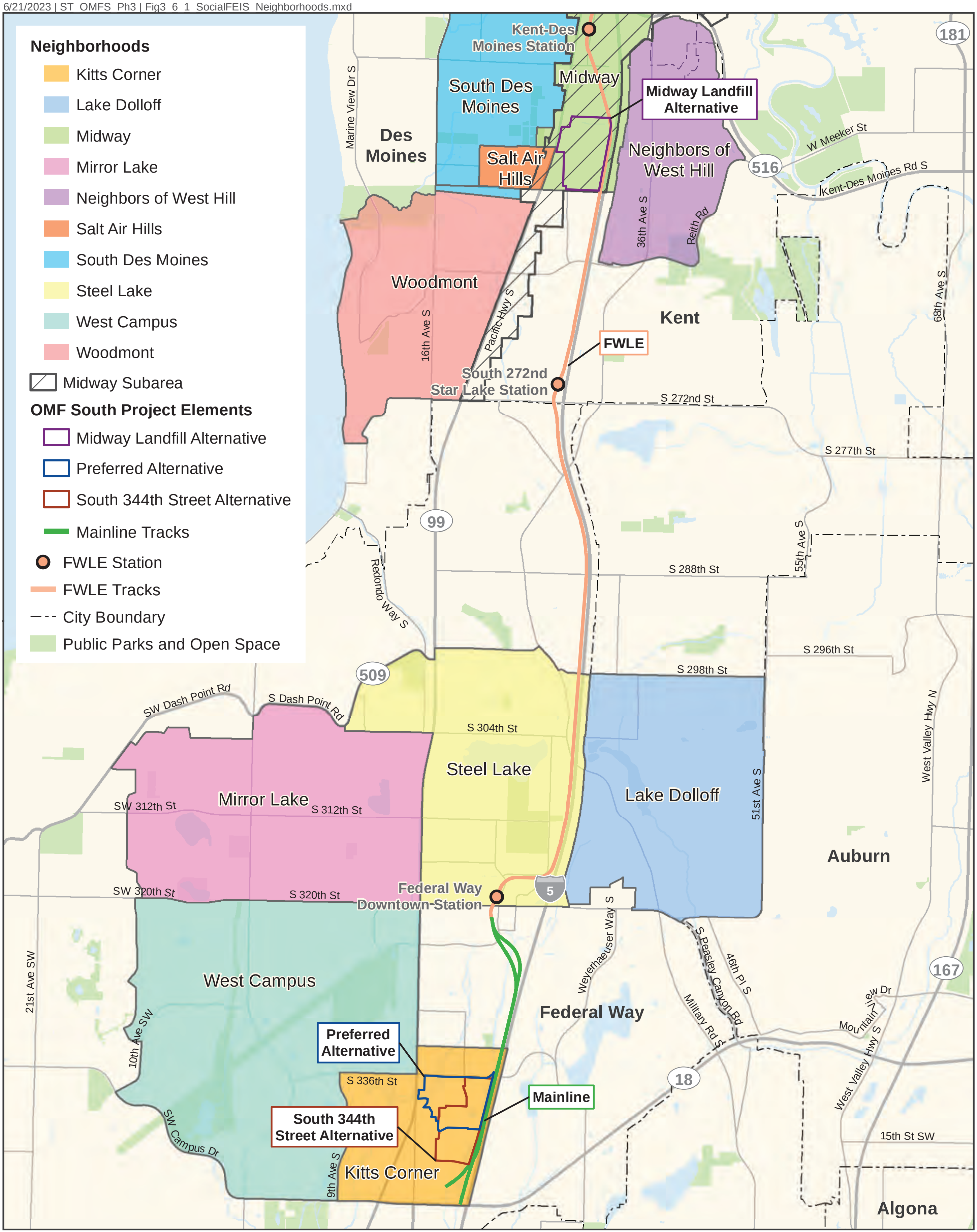
Potential impacts to environmental justice populations are summarized in Section 3.6.3, Environmental Justice Summary below and are discussed in more detail in Appendix E, Environmental Justice Assessment.

3.6.1 Affected Environment

Figure 3.6-1 shows the neighborhoods within the OMF South study areas, and Figure 3.6-2 and Figure 3.6-3 show all social resources within the study areas, including both subsidized (affordable) and nonsubsidized housing below market rate within the study area. Affordable housing was identified in the study area by reviewing information from the U.S. Department of Housing and Urban Development and King County Housing Authority to identify properties and housing developments that provide subsidized housing or housing assistance for low-income and cost-burdened families. Additional nonsubsidized below-market-rate housing within the study area is available through private developments, such as apartment complexes, manufactured or mobile home developments, and RV parks.

A low-income person is identified as a person whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines (FTA 2012). The 2022 poverty guideline is an annual income of $13,590 for a household of one and $27,750 for a household of four (HHS 2022). Sound Transit's low-income threshold is two times the federal poverty level, which the agency has determined is appropriate for use in determining eligibility for a reduced fare program and reflects the increasingly high cost of living in the region.

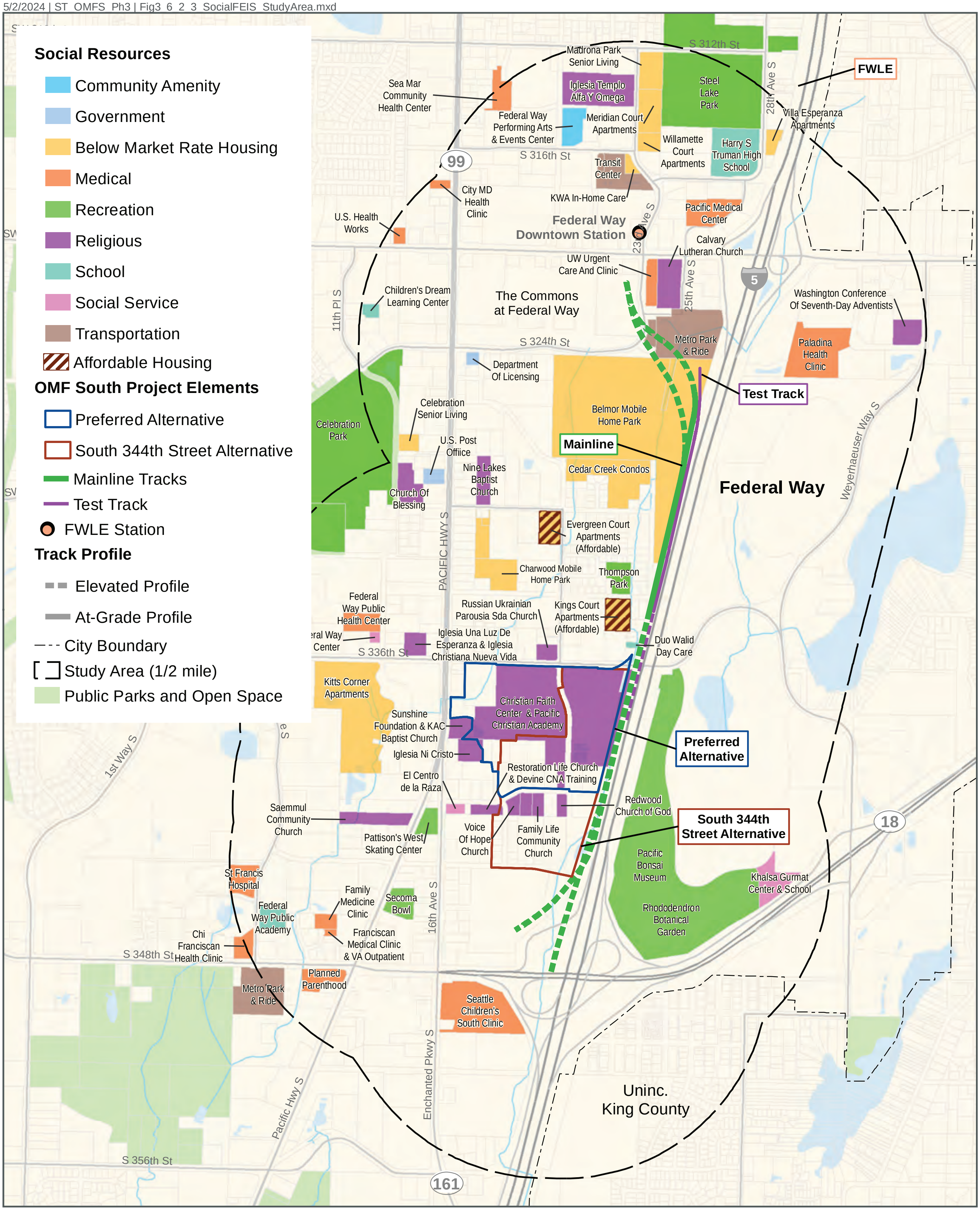
6/21/2023 | ST OMFS Ph3 | Fig3 6 1 SocialFEIS Neighborhoods.mxd


Neighborhoods
🟧 Kitts Corner
🟦 Lake Dolloff
🟩 Midway
🟪 Mirror Lake
🟪 Neighbors of West Hill
🟧 Salt Air Hills
🟦 South Des Moines
🟨 Steel Lake
🟩 West Campus
🟥 Woodmont
▨ Midway Subarea
OMF South Project Elements
☐ Midway Landfill Alternative
☐ Preferred Alternative
☐ South 344th Street Alternative
Mainline Tracks
● FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
Kent-Des Moines Station
South Des Moines
Midway
Midway Landfill Alternative
Des Moines
Salt Air Hills
Neighbors of West Hill
Woodmont
Kent
FWLE
South 272nd Star Lake Station
Steel Lake
Mirror Lake
Lake Dolloff
Auburn
Federal Way Downtown Station
West Campus
Federal Way
Preferred Alternative
Mainline
South 344th Street Alternative
Kitts Corner
Algona
181
516
99
509
5
167
18
Marine View Dr S
W Meeker St
Kent-Des Moines Rd S
36th Ave S
Reith Rd
16th Ave S
Pacific Hwy S
68th Ave S
S 272nd St
S 277th St
Redondo Way S
55th Ave S
S 288th St
S 296th St
S 298th St
West Valley Hwy N
SW Dash Point Rd
S Dash Point Rd
S 304th St
SW 312th St
S 312th St
51st Ave S
SW 320th St
S 320th St
Weyerhaeuser Way S
S Peasley Canyon Rd
46th Pl S
Military Rd S
21st Ave SW
10th Ave SW
SW Campus Dr
S 336th St
9th Ave S
Mountain View Dr
West Valley Hwy S
15th St SW
N
0
1
2 Miles

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.6-1
Neighborhoods
OMF South Alternatives

5/2/2024 | ST_OMFS_Ph3 | Fig3_6_2_3_SocialFEIS_StudyArea.mxd


Social Resources
Community Amenity
Government
Below Market Rate Housing
Medical
Recreation
Religious
School
Social Service
Transportation
Affordable Housing
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
FWLE Station
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
S 312th St
Madrona Park Senior Living
Iglesia Templo Alfa Y Omega
Steel Lake Park
28th Ave S
FWLE
Sea Mar Community Health Center
Federal Way Performing Arts & Events Center
Meridian Court Apartments
Willamette Court Apartments
Harry S Truman High School
Villa Esperanza Apartments
99
S 316th St
Transit Center
City MD Health Clinic
KWA In-Home Care
U.S. Health Works
Federal Way Downtown Station
23rd Ave S
Pacific Medical Center
Calvary Lutheran Church
UW Urgent Care And Clinic
25th Ave S
5
Children's Dream Learning Center
11th Pl S
The Commons at Federal Way
Washington Conference Of Seventh-Day Adventists
S 324th St
Metro Park & Ride
Paladina Health Clinic
Department Of Licensing
Test Track
Celebration Park
Celebration Senior Living
Belmor Mobile Home Park
Mainline
U.S. Post Office
Nine Lakes Baptist Church
Cedar Creek Condos
Federal Way
Weyerhaeuser Way S
Church Of Blessing
Evergreen Court Apartments (Affordable)
PACIFIC HWY S
Charwood Mobile Home Park
Thompson Park
Federal Way Public Health Center
Russian Ukrainian Parousia Sda Church
Kings Court Apartments (Affordable)
Federal Way Center
Iglesia Una Luz De Esperanza & Iglesia Christiana Nueva Vida
S 336th St
Duo Walid Day Care
Kitts Corner Apartments
Christian Faith Center & Pacific Christian Academy
Sunshine Foundation & KAC Baptist Church
Preferred Alternative
Iglesia Ni Cristo
1st Way S
Restoration Life Church & Devine CNA Training
El Centro de la Raza
Redwood Church of God
Saemmul Community Church
South 344th Street Alternative
18
Voice Of Hope Church
Family Life Community Church
Pattison's West Skating Center
Pacific Bonsai Museum
St Francis Hospital
Khalsa Gurmat Center & School
Family Medicine Clinic
Secoma Bowl
16th Ave S
Federal Way Public Academy
Rhododendron Botanical Garden
Chi Franciscan Health Clinic
Franciscan Medical Clinic & VA Outpatient
S 348th St
Planned Parenthood
Metro Park & Ride
Seattle Children's South Clinic
Enchanted Pkwy S
Pacific Hwy S
Uninc. King County
S 356th St
161

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

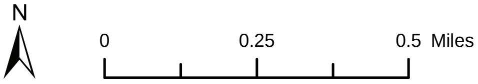
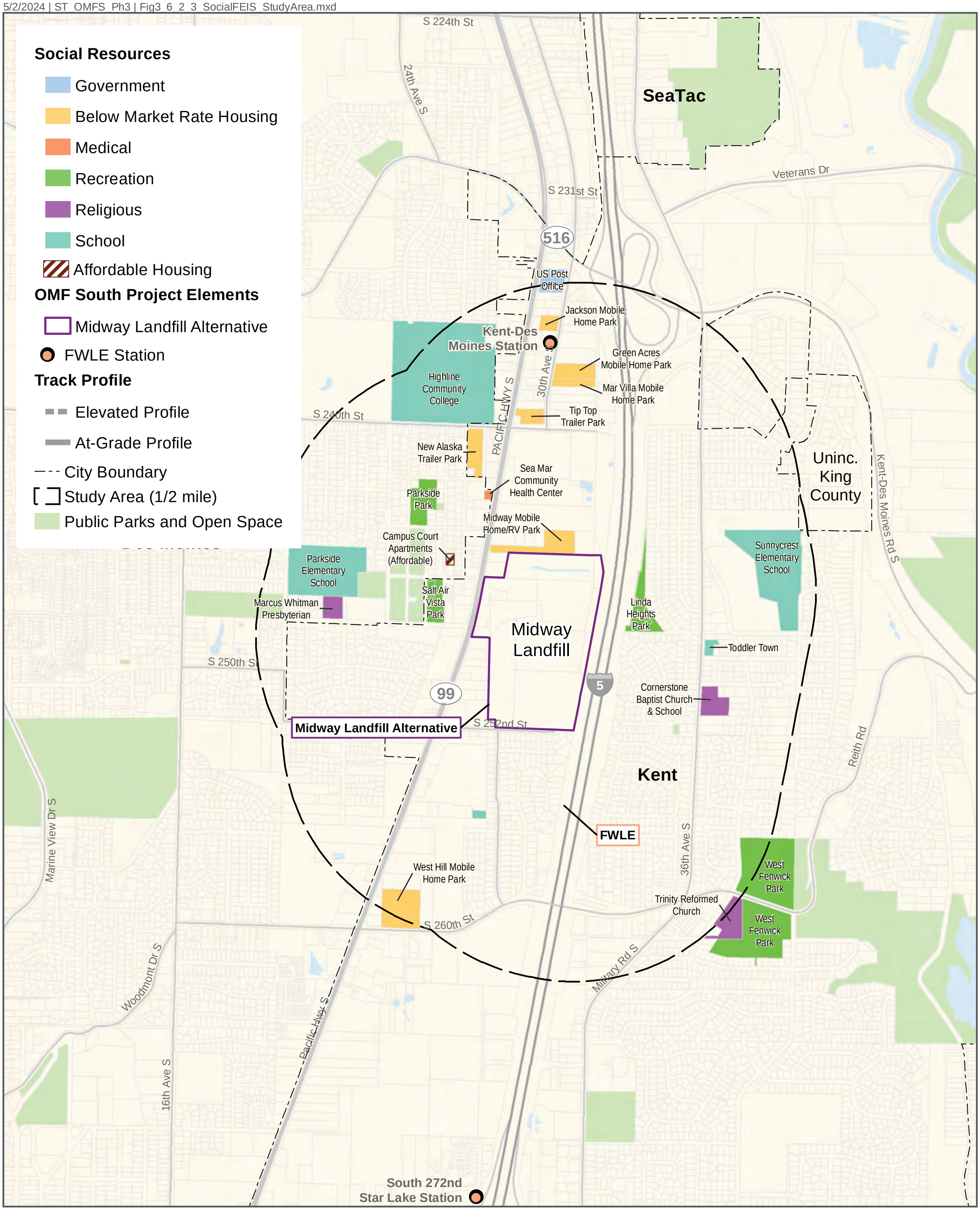

N
0
0.25
0.5 Miles

FIGURE 3.6-2
Social Resources Affected Environment
Preferred and South 344th Street Alternatives
OMF South

5/2/2024 | ST_OMFS_Ph3 | Fig3_6_2_3_SocialFEIS_StudyArea.mxd


Social Resources
Government
Below Market Rate Housing
Medical
Recreation
Religious
School
Affordable Housing
OMF South Project Elements
Midway Landfill Alternative
FWLE Station
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
S 224th St
24th Ave S
SeaTac
Veterans Dr
S 231st St
516
US Post Office
Jackson Mobile Home Park
Kent-Des Moines Station
Green Acres Mobile Home Park
Highline Community College
Mar Villa Mobile Home Park
30th Ave S
PACIFIC HWY S
S 240th St
Tip Top Trailer Park
New Alaska Trailer Park
Uninc. King County
Kent-Des Moines Rd S
Sea Mar Community Health Center
Parkside Park
Midway Mobile Home/RV Park
Campus Court Apartments (Affordable)
Sunnycrest Elementary School
Parkside Elementary School
Salt Air Vista Park
Marcus Whitman Presbyterian
Linda Heights Park
Midway Landfill
Toddler Town
S 250th St
5
99
Cornerstone Baptist Church & School
Midway Landfill Alternative
S 252nd St
Kent
Reith Rd
Marine View Dr S
FWLE
36th Ave S
West Hill Mobile Home Park
West Fenwick Park
Trinity Reformed Church
S 260th St
West Fenwick Park
Military Rd S
Woodmont Dr S
Pacific Hwy S
16th Ave S
South 272nd Star Lake Station

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 0.25 0.5 Miles

FIGURE 3.6-3
Social Resources Affected Environment
Midway Landfill Alternative

OMF South

3.6.1.1 Study Area Characteristics

Preferred and South 344th Street Alternatives

The combined study area for the Preferred and South 344th Street alternatives is primarily within Federal Way and includes portions of unincorporated King County, which are part of Federal Way's Potential Annexation Area. The mainline track for these alternatives begins at Federal Way Downtown Station, which is in the Federal Way City Center core.

The Preferred and South 344th Street alternatives are both in the Kitts Corner neighborhood, and the study area intersects the following neighborhoods: Mirror Lake, Steel Lake, Lake Dolloff, and Federal Way West Campus (Figure 3.6-1). The study area consists primarily of commercial land uses in addition to residential, institutional, and vacant parcels. Commercial uses are concentrated around The Commons at Federal Way shopping center and are also mixed with industrial uses along SR 99.

Residential uses within the study area are concentrated in the area along the mainline tracks between The Commons shopping center at S 324th Street and the northern boundary of the Preferred Alternative at S 336th Street. This primarily residential area includes numerous apartment and condominium complexes in addition to two mobile home parks: Charwood Mobile Home Park and Belmor Mobile Home Park. Charwood Mobile Home Park has space for 74 mobile home units. Belmor is a 63-acre mobile home park for adults 55 years and older that contains over 300 mobile home units and a nine-hole golf course. The property includes other amenities, including a pool, craft room, exercise room, and clubhouse. There are also several single-family homes along S 340th Street and 18th Place S. Community cohesion within apartment, condominium, and mobile home complexes is likely relatively high given the shared spaces and close proximity of housing units. However, most of the residential developments are separate and distinct, potentially discouraging interactions between neighborhoods and subdivisions.

Figure 3.6-2 depicts social resources in the study area for the Preferred and South 344th Street alternatives. Numerous religious facilities are in the study area, including the Christian Faith Center, Voice of Hope Church, Family Life Community Church, and the Redwood Church of God and Tabernacle Temple of Praise, which share a building. The Christian Faith Center has an affiliated school called the Pacific Christian Academy. There are also several healthcare centers and government services, including a post office, a Department of Licensing location, and the Greater Federal Way Chamber of Commerce. Additional social resources include parks, transit facilities, education facilities, and nonprofit organizations. Affordable housing in the study area is provided by King County Housing Authority at Kings Court Apartments and Evergreen Court Apartments. Properties offering nonsubsidized below-market-rate housing in the study area include Madrona Park Senior Living, Meridian Court Apartments, Villa Esperanza Apartments, Belmor, Charwood Mobile Home Park, Celebration Senior Living, and Kitts Corner Apartments.

Midway Landfill Alternative

The Midway Landfill Alternative study area is primarily in Kent and also includes parts of Des Moines and unincorporated King County, which are part of the city's Potential Annexation Area. The study area includes a substantial portion of the Midway Subarea, which was identified in the Midway Subarea Plan as an area with development potential associated with future light rail transit (City of Kent 2011). The Midway Subarea is along the western border of Kent between I-5 and SR 99 and between SR 516 (Kent-Des Moines Road) and S 272nd Street (Figure 3.6-1). It includes primarily commercial land uses along SR 99, including restaurants, retail shops, automotive services, and large "big box" stores, such as Lowe's and Fred Meyer.

There are also some vacant and industrial land uses and a limited number of residential parcels within the Midway Subarea.

Outside of the Midway Subarea, the Midway Landfill Alternative study area contains mostly residential areas east of I-5, west of SR 99, and south of S 252nd Street. Most residential parcels in the study area are single-family homes, in addition to some multi-family dwellings and mobile homes. The Midway RV and Mobile Home Park is directly north of the Midway Landfill and contains approximately 35 mobile home units.

The following neighborhoods intersect with the Midway Landfill Alternative study area: Pacific Ridge, Saltair Hills, Woodmont Beach, and West Hill (Figure 3.6-1). Community cohesion within dense, single-family neighborhoods is likely high; however, several barriers likely prevent interaction between neighborhoods. On the east side of the Midway Landfill Alternative, I-5 acts as a barrier between the West Hill neighborhood and the site; on the west side of the Midway Landfill Alternative, SR 99 acts as a barrier between the Saltair Hills and Woodmont Beach neighborhoods and the site.

Social resources in the Midway Landfill Alternative study area are depicted in Figure 3.6-3. The study area includes education facilities, such as Highline College and two Highline School District elementary schools. Highline College is a community college with over 17,000 total students and provides community resources for the surrounding area. There is a WorkSource Connection Site located at Highline College, which provides employment and training services to the community. The study area also includes community facilities, such as parks and religious facilities. Affordable housing in the study area is provided by King County Housing Authority at Campus Court Apartments. Properties offering nonsubsidized below-market-rate housing in the study area include Green Acres Mobile Home Park, Jackson Mobile Home Park, Mar Villa Mobile Home Park, Tip Top Trailer Park, New Alaska Trailer Park, Midway RV and Mobile Home Park, and West Hill Mobile Home Park.

3.6.1.2 Population Characteristics

Table 3.6-1 provides a summary of demographics in the study areas and compares the population characteristics to those of the three cities within the study areas (Federal Way, Kent, and Des Moines), the Sound Transit district, and King County as a whole. The Sound Transit district is composed of 53 cities in King, Pierce, and Snohomish counties and includes a population of approximately 3.2 million people.

Federal Way, Kent, and Des Moines have higher proportions of both low-income and minority residents when compared to all of King County and the Sound Transit district, and both study areas have higher proportions of low-income and minority persons than the three cities. The Midway Landfill Alternative study area has the highest percentages of both low-income and minority persons, at 44 percent and 68 percent, respectively.

Table 3.6-1 Study Area Demographics

	Preferred and South 344th Street Alternatives Study Area	Midway Landfill Alternative Study Area	Federal Way	Kent	Des Moines	King County	Sound Transit District
Total population	9,531	10,712	96,812	130,038	31,983	2,225,064	3,189,953
Population under 5 years old	7%	10%	7%	7%	6%	6%	6%
Population over 64 years old	15%	7%	14%	11%	18%	13%	13%
Minority[1]	66%	68%	57%	58%	48%	42%	42%
Low-income[2]	39%	44%	28%	30%	33%	18%	21%

Source: U.S. Census Bureau, American Community Survey (ACS) 2016-2020 5-Year Estimates

Notes: Percentages represent estimates based on survey data. Survey data are not available at the census-block level; the data represents an estimate of minority and low-income persons in block groups within 0.5 mile of each build alternative.

(1) Minority is defined as all race/ethnicity groups except for “Non-Hispanic White Alone.”

(2) Low-income is defined the number or percent of a block group’s population in households where the household income is less than or equal to twice the federal poverty level.

3.6.2 Environmental Impacts

3.6.2.1 No-Build Alternative

Under the No-Build Alternative, there would be no property acquisitions or other related changes associated with the OMF South project. However, other planned projects in the area could have social impacts, depending on the extent of the associated disruption. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

As part of FWLE, Sound Transit is constructing the Kent/Des Moines Station, which would be in the OMF South study area for the Midway Landfill Alternative, and the Federal Way Downtown Station, which would be in the study area for the Preferred and South 344th Street alternatives. The neighborhoods surrounding these new light rail stations would likely experience changes from FWLE once it is operational, such as added transportation infrastructure, transit access, and associated development.

3.6.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Permanent impacts associated with all OMF South build alternatives include residential and commercial property acquisitions and land use conversions. Sound Transit would provide relocation assistance to displaced property owners and renters, according to the federal Uniform Relocation Act. More information about relocations and relocation assistance can be found in Section 3.3, Acquisitions, Displacements, and Relocations. Parcels acquired for OMF South would be converted from their existing land uses, such as commercial and residential, to transportation-related land use and would have to be rezoned accordingly. These land use changes are detailed in Section 3.4, Land Use.

There would also be long-term impacts to visual character for residents and businesses near the OMF South sites and mainline tracks. All the build alternatives would add new buildings, at-grade and elevated light rail track, overhead catenary wires, at-grade parking lots and access roads, as well as tree and shrub landscape plantings and fences around the perimeter with limited-access gates. Elevated sections of mainline tracks and other elements of the site would be prominent and impact visual quality in neighborhoods in proximity to OMF South. These impacts are detailed in Section 3.7, Visual and Aesthetic Resources.

None of the build alternatives are anticipated to have adverse impacts on safety and security. OMF South security measures would be like other Sound Transit OMFs, including on-site security personnel, perimeter fencing, electronically controlled gates, and security patrol in the evenings. Additionally, the roadway, intersection, and nonmotorized improvements for all build alternatives would improve safety for motor vehicle and nonmotorized users in the study areas. Except for site driveways, OMF South would not intersect with existing roadways, highways, sidewalks, bicycle lanes, or nonmotorized trails. All tracks would be elevated over these transportation facilities, and site driveways would be designed to meet or exceed all local and state safety standards. See Section 3.2, Transportation, for more detailed safety information.

Preferred Alternative

The mainline tracks for the Preferred Alternative would affect Belmor, a manufactured home community on a parcel zoned multi-family residential, displacing approximately 71 to 77 mobile home lots. The 55 mph Design Option would displace more individual mobile homes than the 40 mph Alignment. Displacement of these mobile homes would likely adversely affect community cohesion within Belmor but would be unlikely to affect social cohesion in the surrounding neighborhoods of Steel Lake and Kitts Corner. Section 3.7, Visual and Aesthetic Resources, describes potential visual impacts to Belmor and the neighborhood to the south. Noise impacts from the 55 mph Design Option mainline tracks are expected at four residential properties under this alternative, although those impacts can be mitigated. See Section 3.9, Noise and Vibration, for more details.

Both the 40 mph Alignment and the 55 mph Design Option would permanently impact the private Belmor golf course. The 40 mph Alignment would modify the northeast corner of the course by relocating one golf hole and shortening its associated fairway. The golf course path in that area would also be altered but would serve the same function. The 55 mph Design Option would permanently affect a second hole and its associated fairway and further alter the cart path. However, its function would be maintained. The clubhouse would be unaffected.

The Preferred Alternative OMF site would permanently impact several social resources, including one religious facility. It would displace the Christian Faith Center church and its day care center (CF Kidz), along with the Pacific Christian Academy, which is a tenant on their property. The Christian Faith Center is a large-capacity church; therefore, it could be challenging to relocate a religious facility of this size and displacing it would impact the members of the service population from within and beyond the 0.5-mile study area. See Section 3.3, Acquisitions, Displacements, and Relocations, for further discussion.

The OMF site would also displace 15 residences, composed of one four-unit multi-family residential property and 10 single-family residential properties, one of which has two separate houses. Nine of these residences are adjacent to the I-5 right-of-way, between S 333rd Street and S 336th Street, where the lead tracks would connect to the mainline tracks. Residential displacements associated with the OMF site would not affect neighborhood quality because the properties are located on private drives and are relatively isolated. Additionally, the OMF site would displace 11 businesses, including a childcare center and commercial and light industrial businesses, such as an auto-repair shop, an aviation repair shop, home and business cleaning services, a gate design and fabrication company, a chiropractic center, and an equipment rental business. These businesses could likely be relocated without causing long-term impacts to community cohesion. Additionally, several of these businesses serve a broader area than the relatively narrow study area; therefore, their potential relocation out of the study area may not substantially affect their customer base.

South 344th Street Alternative

The South 344th Street Alternative would impact the most social resources and would have the most business and residential displacements as compared with the other build alternatives.

The mainline tracks for the South 344th Street Alternative would have identical impacts with respect to community cohesion and neighborhoods, including the potential impacts to the private Belmor golf course, as the Preferred Alternative mainline tracks.

The South 344th Street Alternative OMF site would displace approximately 20 residences and 17 businesses, including GarageTown and Ellenos Yogurt, which serve local populations and contain specialized facilities. GarageTown houses 67 individually rented or owned storage facilities and provides a community resource for tenants; however, impacts to community cohesion in the larger study area would be limited. Due to the unique site characteristics and large footprint, GarageTown may be challenging to relocate within the same area to continue to provide ease of access for its existing customer base.

The OMF site would also displace four religious facilities: Family Life Community Church, Voice of Hope Church, Redwood Church of God, and Tabernacle Temple of Praise. It is anticipated that these religious facilities could be relocated within the study area, if they cannot, the displacement of these religious facilities could affect community cohesion.

Midway Landfill Alternative

There would be no long-term impacts to social resources or community facilities within the Midway Landfill Alternative study area. The Midway Landfill Alternative would have the fewest impacts to social resources and community cohesion compared to other build alternatives.

For the Midway Landfill Alternative, all affected parcels and displacements are associated with the OMF site. The Midway Landfill Alternative OMF site would require relatively few property acquisitions that would affect social resources because it is primarily located on an existing landfill owned by the city of Seattle and managed by SPU. The OMF site would displace four businesses that, due to their size and type of business, are anticipated to be able to relocate within the study area without having long-term impacts to community cohesion. There are no residential displacements associated with the Midway Landfill Alternative.

3.6.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Construction of a major project such as OMF South involves intensive activities that last several years. If the project is constructed near community resources and neighborhoods, community activities and cohesion could be affected. Construction associated with OMF South would include staging areas; reserves of building materials; temporary fencing; lighting; large vehicles such as cranes, dump trucks, bulldozers, and excavators; and temporary roads and/or detours of traffic lanes and sidewalks. Community resources and neighborhoods in proximity to these construction materials and activities would be impacted by temporary access and mobility restrictions and increased truck traffic; localized adverse impacts to air and visual quality; and increased noise and vibration. When construction is complete, properties and access would be restored as closely as possible to their previous conditions.

Preferred and South 344th Street Alternatives

In addition to those impacts described for all build alternatives, the Preferred and South 344th Street alternatives would have temporary construction impacts associated with the mainline tracks. Mainline track construction would temporarily affect the Belmor mobile home community and golf course. Increased traffic and proximity to construction activities would result in short-term effects on community cohesion within Belmor. In addition, a portion of the Federal Way/S 320th Street Park & Ride would serve as a construction staging area.

Midway Landfill Alternative

Construction of OMF South at the Midway Landfill Alternative would impact the Midway RV and Mobile Home Park, located along the landfill's northern boundary. While construction would not displace any mobile home units, it would require easement access through the mobile home park, resulting in increased traffic. This alternative would also have varying construction impacts associated with transportation, air quality, and noise, depending on which construction approach is considered.

The three subsurface construction design options — Platform, Hybrid, and Full Excavation — vary in the amount of excavation to prepare the site and the number of truck trips necessary to haul the material, as discussed in Section 3.2, Transportation. The daily truck trip volume for the Hybrid and Full Excavation subsurface construction design options would have greater impacts than the Platform subsurface construction design option on neighborhoods and social resources in proximity to the Midway Landfill Alternative from increased truck traffic, noise and vibration, and air quality impacts.

3.6.2.4 Avoidance and Minimization of Impacts

As part of the OMF South project, specific design features, BMPs, and mitigation measures would eliminate or minimize impacts to social resources, community facilities, and neighborhoods. These measures are described in detail in other sections of this Final EIS and are summarized below.

- Transportation (Section 3.2): There would be avoidance and minimization measures to address potential traffic congestion during construction, such as developing a traffic management plan and avoiding traffic disruptions during peak travel times.
- Acquisitions, Displacements, and Relocations (Section 3.3): Sound Transit's policies and procedures comply with federal, state, and local property acquisition and relocation policies and, in some cases, provide advisory services to property owners above the minimum requirements of federal and state law.
- Visual and Aesthetic Resources (Section 3.7): In areas adjacent to residents, where there is adequate space, Sound Transit would add on-site landscaping to help screen views of project components while ensuring safety and security. In areas adjacent to residences where not enough room exists for landscaping to screen views of retaining or noise walls, Sound Transit would treat the walls with visually interesting elements, such as design treatments that incorporate textures, patterns, color, or trellises with climbing vines.

- Noise and Vibration (Section 3.9): For the Preferred and South 344th Street alternatives, noise barriers are proposed for mitigation along the 55 mph Design Option elevated mainline tracks.

3.6.2.5 Indirect Impacts

Indirect impacts on social resources, community facilities, and neighborhood resources often relate to changes in land use or other changes that result in effects on the rate or pattern of development in an area. Because the proposed project would change land use by converting residential, vacant, and/or commercial/industrial land to a transportation use, there is the potential for indirect effects on neighborhood character from changes in development patterns.

3.6.3 Environmental Justice Summary

This Final EIS also includes an Environmental Justice Assessment (Appendix E), as required by Executive Orders 12898 and 14096, and Department of Transportation Order 5610.2C, the purpose of which is to seek to avoid disproportionate and adverse effects on minority and low-income populations, defined below:

- Minority populations include people who are Black, Hispanic, Asian American, American Indian or Alaskan Native, or Native Hawaiian and Other Pacific Islander (DOT Order 5610.2C, Appendix § 1(c)).
- Low-income populations include people whose median household income is less than or equal to two times the Federal Poverty Level — a local threshold that Sound Transit and other regional transit agencies have determined is appropriate for use in determining eligibility for reduced fare programs and reflects the increasingly high cost of living in the region.

Demographic information, including environmental populations, for the OMF South study area, surrounding jurisdictions, and Sound Transit district are included in Table 3.6-1 above.

The Environmental Justice Assessment follows guidance in FTA Circular C-4703.1 and addresses whether the OMF South alternatives would result in disproportionately adverse effects on minority and/or low-income populations and summarizes the public outreach to minority and low-income populations within the project area. The analysis also discusses the potential benefits of the project to minority and/or low-income populations, as well as the specific outreach efforts made during project development to involve these populations.

3.6.3.1 Project Impacts and Benefits

Project impacts with the most potential to affect environmental justice populations include displacement of residents, businesses, and community facilities, including religious facilities and childcare centers; visual impacts; and construction-related transportation impacts. These impacts are summarized below for each build alternative. Other long-term and construction-related project impacts would be avoided or would consist of minor impacts that could be mitigated. See Appendix E, Environmental Justice Assessment, for a more detailed discussion of impacts to environmental justice populations and proposed avoidance, minimization, and mitigation measures.

- Preferred Alternative: The Preferred Alternative would displace fewer residences, business, and social resources than the South 344th Street Alternative but more than the Midway Landfill Alternative. Most residential displacements would occur in Belmor, which is home to many retired and fixed-income residents, though they are not necessarily considered low-income. The Preferred Alternative would also displace the Christian Faith Center church and an associated daycare (CF Kidz) and the Pacific Christian Academy, each of which serves low-income and minority populations, and an in-home childcare center that offers programs in English and Somali and accepts subsidized payments. The mainline for the Preferred Alternative would cause adverse visual impacts for residents within Belmor and along 24th Avenue S.

- South 344th Street Alternative: The South 344th Street Alternative would displace the most residences, businesses, employees, and social resources. Similar to the Preferred Alternative, most residential displacements would occur in Belmor. The South 344th Street Alternative would also displace four religious facilities that offer services in multiple languages and serve minority populations. The mainline for the South 344th Street Alternative would cause adverse visual impacts for residents within Belmor and along 24th Avenue S.
- Midway Landfill Alternative: The Midway Landfill Alternative would have the fewest displacements, including no residential or social resource displacements. The extensive site preparation work required for the Midway Landfill Alternative would result in higher volumes of construction traffic for a longer duration, as compared with the other build alternatives, which would affect the adjacent residential community.

OMF South would support the system-wide expansion of Link light rail as called for in Sound Transit 3, including expansion into the south corridor from Federal Way to Tacoma. This would, in turn, improve regional connectivity and mobility and provide a reliable means of transportation for populations reliant on public transit, including low-income and minority populations. While all populations within the project's service area would realize these benefits to the same extent, they could accrue to a higher degree for minority and low-income residents as a primary and affordable means of transportation (American Public Transportation Association 2008; Center for Housing Policy 2006).

Other benefits include enhanced community connectivity for the Preferred Alternative through public space and a multi-use trail integrated into the site design, construction jobs with project labor agreements and a disadvantaged business enterprise program to support hiring minority populations, and the creation of new high-skilled, living-wage jobs to operate the facility. In addition, the increased purchase and sale of goods and services within the community to facilitate construction and the positive economic effects of construction workers' purchases in food and retail within the community could temporarily benefit businesses that are owned by environmental justice populations.

3.6.3.2 Community Engagement

As part of its public engagement efforts during the OMF South scoping period and 2021 SEPA Draft EIS process, Sound Transit conducted a preliminary demographic analysis to identify low-income, minority, and limited-English-proficiency populations. Based on this analysis, Sound Transit used specific strategies to reach those communities during public outreach. As the project moves forward, Sound Transit will continue to engage community leaders, jurisdictions, and social service providers to seek input, assess outreach methods, and identify additional ways to reach low-income, minority, and limited-English-proficiency populations.

3.6.3.3 Environmental Justice Determination

After consideration of the totality of the circumstances, including mitigation, offsetting direct and indirect benefits, and impacts, the net results of the project would not have disproportionate and adverse effects on minority and low-income populations as described under EO 12898, EO 14096, and DOT Order 5610.2C.

3.6.4 Mitigation Measures

In addition to the discipline-specific avoidance and minimization measures described above, no mitigation measures are anticipated.

3.7 Visual and Aesthetic Resources

This section documents the visual environment surrounding the OMF South project alternatives and assesses the extent to which the viewer experience of visual and aesthetic resources may be affected by the project. The analysis assesses the existing visual quality and character of the landscape and then considers how typical viewers may respond to what they see around them. Assessment methods include defining viewsheds from where a build alternative can potentially be seen, characterizing the visual quality in landscape units within the viewshed, and selecting key observation points of the affected areas.

Visual and aesthetic impacts are defined by the extent to which the proposed project would change the environment in terms of visual quality and viewer sensitivity. Sound Transit adapted FHWA and WSDOT guidelines for visual quality analysis, which refers to the evaluation of the visual experience of the public described in terms of vividness (distinctive and memorable views), intactness (consistent or contrasting elements within view), and unity (overall compositional harmony) and is ranked as high, medium, or low. Viewer sensitivity refers to how viewers perceive the environment and what they find important, and is also rated as high, medium, or low.

Landscape units are geographic units in which visual quality impacts to viewers are assessed, are defined both by viewshed area and landscape type, and are generally visually homogenous (i.e., one viewshed and one landscape type). Key observation points were selected within each landscape unit to illustrate views that are typical of the build alternatives, locations from where project features are particularly prominent, or views from sensitive viewpoints that would have views of the operating build alternative. At each key observation point, views of existing conditions are compared with simulated views of the build alternatives.

Please see Appendix H3, Visual and Aesthetic Resources Technical Appendix, for more detail about the methodology and terms used in this analysis.

3.7.1 Affected Environment

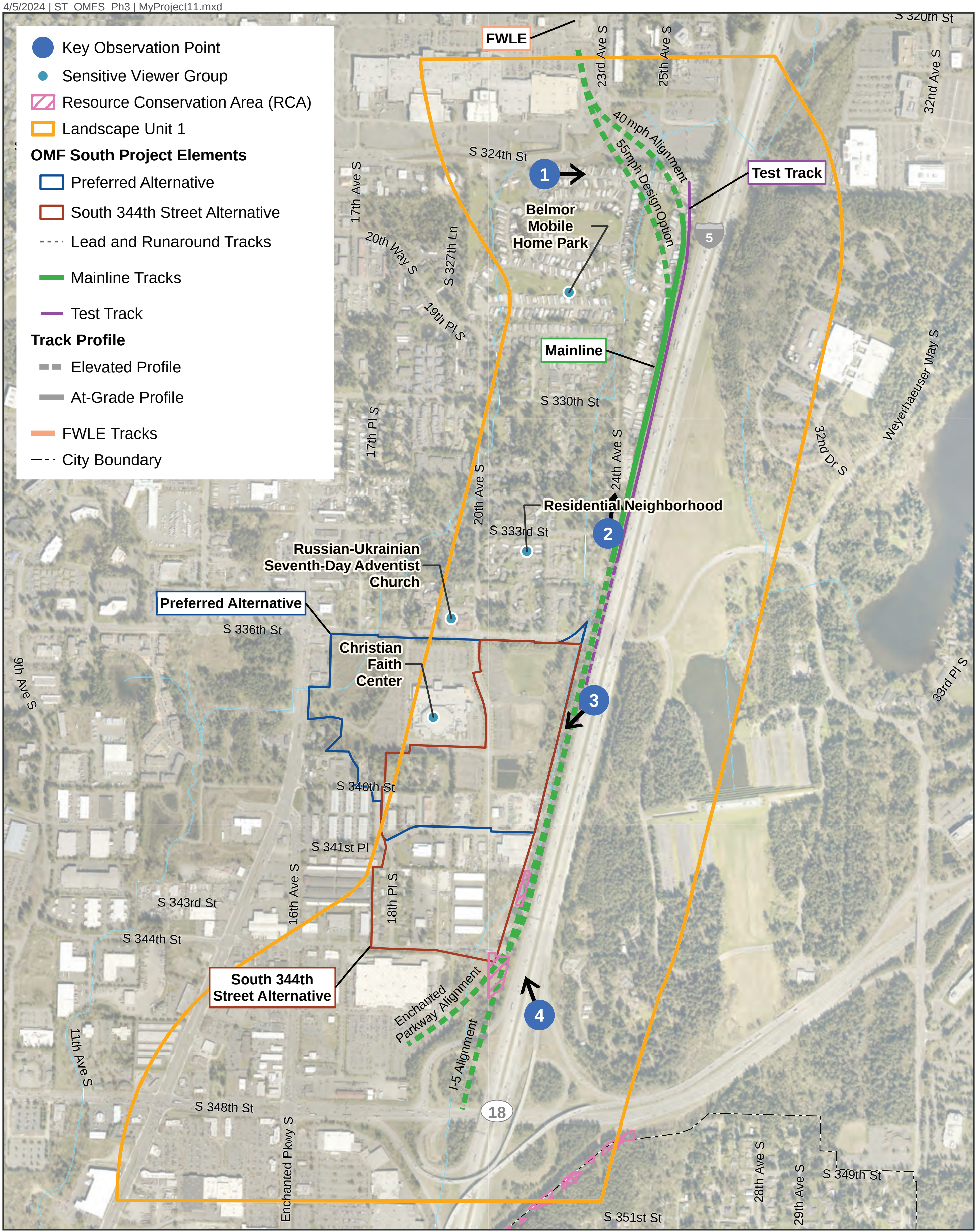
This section describes the affected environment for visual and aesthetic resources by landscape unit and by build alternative. There are three landscape units. The first landscape unit is the section of the I-5 corridor and adjacent areas where the mainline and test tracks serving the Preferred and South 344th Street alternatives would be built. The second landscape unit encompasses the OMF sites of the Preferred and South 344th Street alternatives. The third landscape unit encompasses the Midway Landfill Alternative. Table 3.7-1 below lists the landscape units and describes the visual quality rating and viewer groups for each.

Most views of the build alternatives are foreground views from vantages immediately adjacent to the sites and are typically within 400 to 500 feet. Views of the sites from beyond 500 feet and background vantages are mostly blocked by either vegetation, terrain, buildings, or infrastructure. Figures 3.7-1 through 3.7-4 show each build alternative, the associated landscape unit, and the location of the key observation points.

Table 3.7-1 Existing Visual Quality for the OMF South Alternatives

Alternative	Landscape Unit	Vividness	Intactness	Unity	Existing Visual Quality	Predominant Viewer Groups (Sensitivity)
Preferred	Mainline: Landscape Unit 1	Medium	Low to Medium	Medium	Medium	Residential (High) Woodbridge Corporate Park visitors (Medium-high) I-5 Commuting Drivers (Low) I-5 Sightseeing Drivers (High)
Preferred	Site: Landscape Unit 2	Low to Medium	Medium	Medium	Medium	Residential (High) I-5 and SR 99 Commuting Drivers (Low) I-5 and SR 99 Sightseeing Drivers (High) Business Patrons and Workers (Medium) Pedestrians and Cyclists (Medium)
South 344th Street	Mainline: Landscape Unit 1	Medium	Low to Medium	Medium	Medium	Residential (High) Woodbridge Corporate Park visitors (Medium-high) I-5 Drivers (Low) Sightseeing Drivers (High)
South 344th Street	Site: Landscape Unit 2	Low to Medium	Low to Medium	Low to Medium	Low to Medium	Residential (High) I-5 and SR 99 Commuting Drivers (Low) I-5 and SR 99 Sightseeing Drivers (High) Business Patrons and Workers (Medium) Pedestrians and Cyclists (Medium)
Midway Landfill	Site: Landscape Unit 3	Medium	Low to Medium	Low to Medium	Medium	Residential (High) I-5 and SR 99 Commuting Drivers (Low) I-5 and SR 99 Sightseeing Drivers (High) Business Patrons and Workers (Low to Medium) Pedestrians and Cyclists (Medium)

4/5/2024 | ST_OMFS_Ph3 | MyProject11.mxd



● Key Observation Point
● Sensitive Viewer Group
▨ Resource Conservation Area (RCA)
☐ Landscape Unit 1
OMF South Project Elements
☐ Preferred Alternative
☐ South 344th Street Alternative
- - - - Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
▪▪ Elevated Profile
At-Grade Profile
FWLE Tracks
— - - City Boundary
S 320th St
FWLE
23rd Ave S
25th Ave S
32nd Ave S
40 mph Alignment
55mph Design Option
S 324th St
1
Test Track
17th Ave S
Belmor
Mobile
Home Park
5
20th Way S
S 327th Ln
19th Pl S
Mainline
Weyerhaeuser Way S
S 330th St
17th Pl S
32nd Dr S
24th Ave S
20th Ave S
Residential Neighborhood
S 333rd St
2
Russian-Ukrainian
Seventh-Day Adventist
Church
Preferred Alternative
S 336th St
Christian
Faith
Center
9th Ave S
3
33rd Pl S
S 340th St
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
South 344th
Street Alternative
Enchanted
Parkway Alignment
4
I-5 Alignment
11th Ave S
18
S 348th St
Enchanted Pkwy S
28th Ave S
29th Ave S
S 349th St
S 351st St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

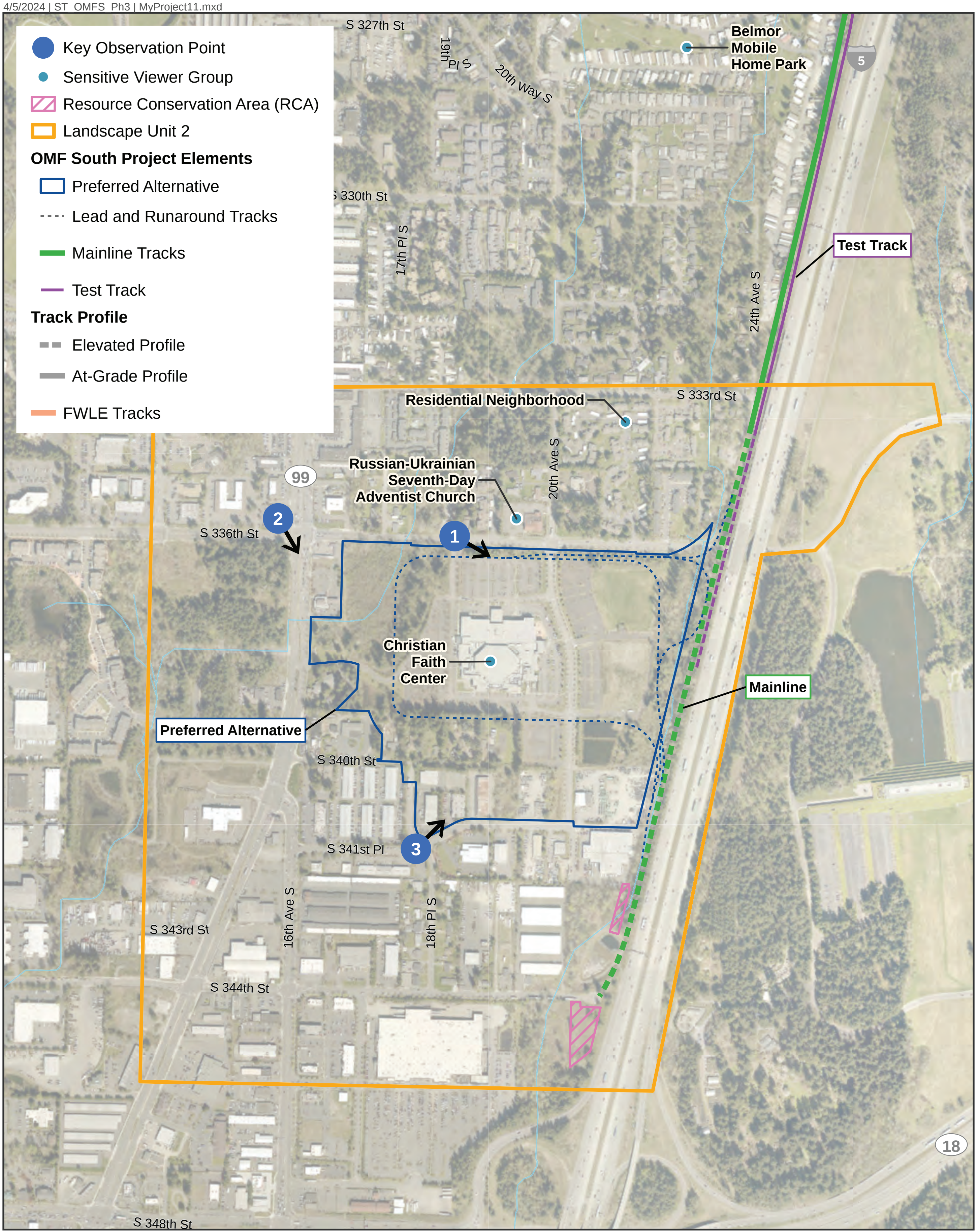
N
0
500
1,000 Feet

FIGURE 3.7-1

Visual Conditions and Key Observation Points
Mainline Track Options

OMF South

4/5/2024 | ST_OMFS_Ph3 | MyProject11.mxd


● Key Observation Point
● Sensitive Viewer Group
▨ Resource Conservation Area (RCA)
☐ Landscape Unit 2
OMF South Project Elements
☐ Preferred Alternative
---- Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
S 327th St
19th Pl S
20th Way S
Belmor Mobile Home Park
5
S 330th St
17th Pl S
Test Track
24th Ave S
Residential Neighborhood
S 333rd St
Russian-Ukrainian Seventh-Day Adventist Church
99
20th Ave S
2
S 336th St
1
Christian Faith Center
Mainline
Preferred Alternative
S 340th St
3
S 341st Pl
S 343rd St
16th Ave S
18th Pl S
S 344th St
18
S 348th St

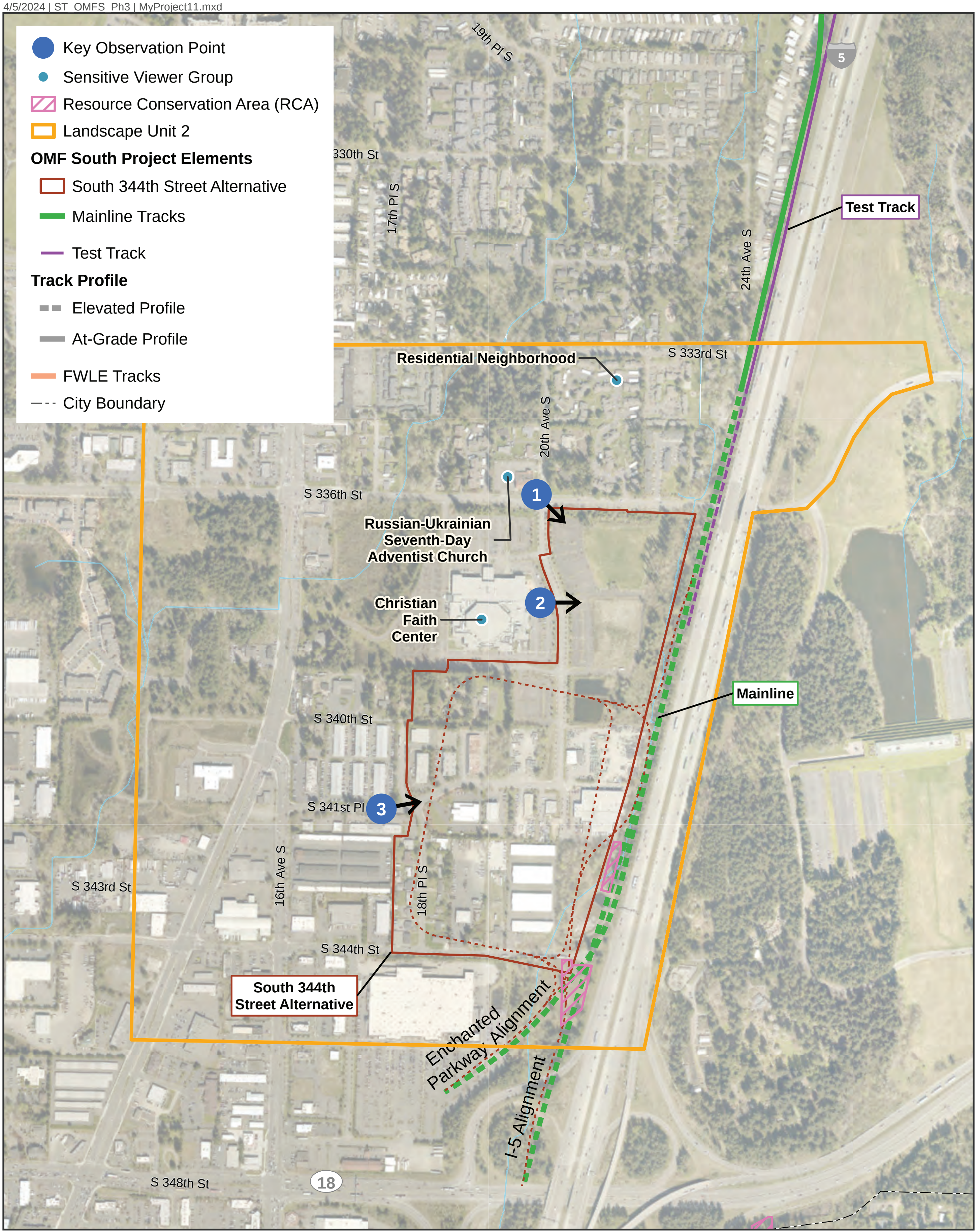
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.7-2
Visual Conditions and Key Observation Points
Preferred Alternative

OMF South

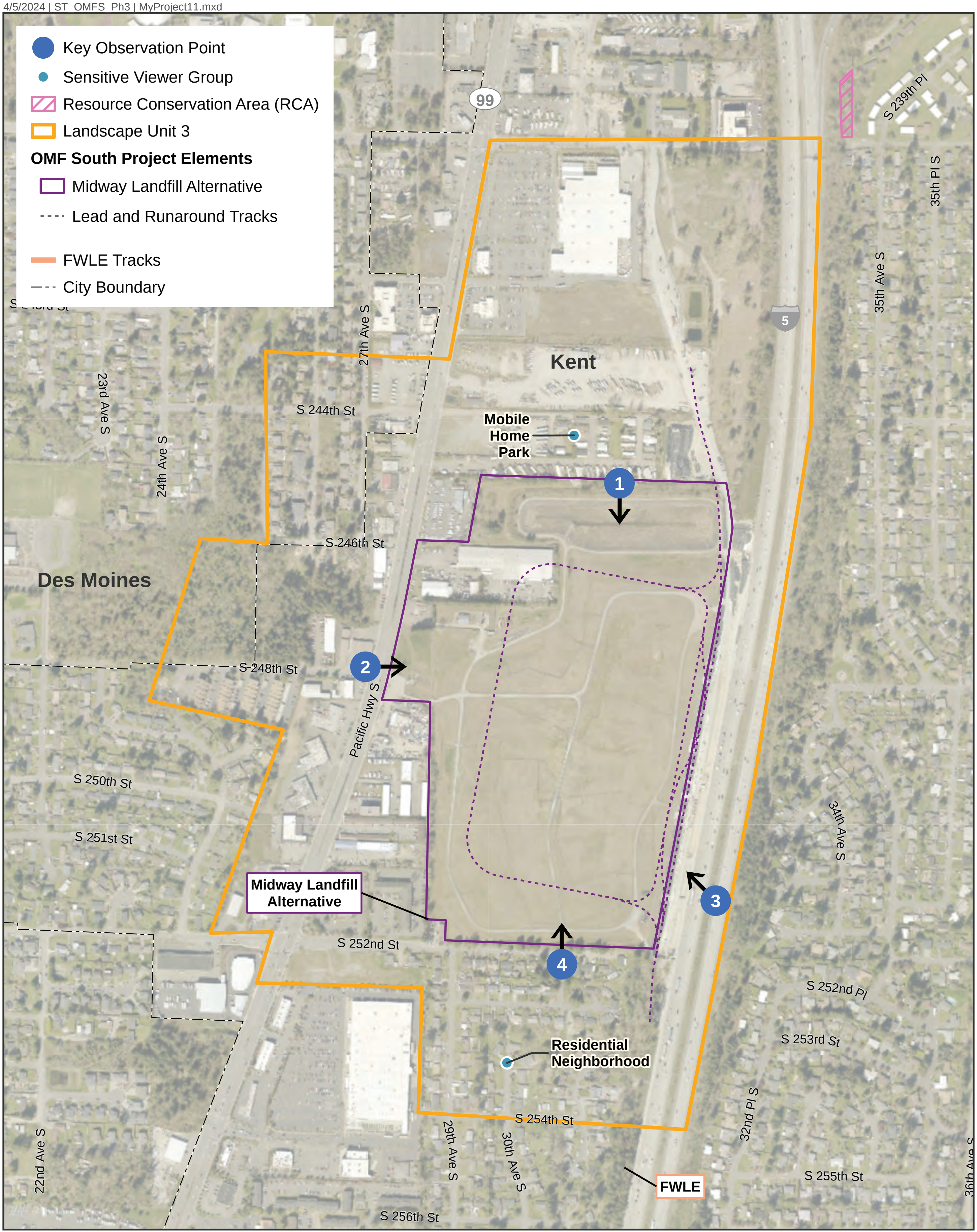

Key Observation Point
Sensitive Viewer Group
Resource Conservation Area (RCA)
Landscape Unit 2
OMF South Project Elements
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
19th Pl S
5
330th St
17th Pl S
Test Track
24th Ave S
Residential Neighborhood
S 333rd St
20th Ave S
S 336th St
1
Russian-Ukrainian Seventh-Day Adventist Church
Christian Faith Center
2
Mainline
S 340th St
S 341st Pl
3
16th Ave S
S 343rd St
18th Pl S
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
S 348th St
18
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.7-3
Visual Conditions and Key Observation Points
South 344th Street Alternative

OMF South

4/5/2024 | ST_OMFS_Ph3 | MyProject11.mxd


● Key Observation Point
● Sensitive Viewer Group
▨ Resource Conservation Area (RCA)
▭ Landscape Unit 3
OMF South Project Elements
▭ Midway Landfill Alternative
---- Lead and Runaround Tracks
▬ FWLE Tracks
—-- City Boundary
99
5
S 239th Pl
35th Pl S
35th Ave S
27th Ave S
23rd Ave S
24th Ave S
Kent
S 244th St
Mobile Home Park
1
S 246th St
Des Moines
2
S 248th St
Pacific Hwy S
S 250th St
S 251st St
34th Ave S
3
Midway Landfill Alternative
S 252nd St
4
S 252nd Pl
S 253rd St
Residential Neighborhood
32nd Pl S
S 254th St
29th Ave S
30th Ave S
22nd Ave S
FWLE
S 255th St
36th Ave S
S 256th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.7-4
Visual Conditions and Key Observation Points
Midway Landfill Alternative

OMF South

3.7.1.1 Mainline Tracks

Landscape Unit 1 encompasses the mainline alignments that would connect the Preferred and South 344th Street alternatives to the terminus of FWLE, including the tail tracks and test track (Figure 3.7-1). This area is well south of and separate from the Midway Landfill Alternative and shares adjacency with the Preferred and the South 344th Street alternatives. However, the visual character of the mainline study area is unique and distinct from that of the OMF sites.

The northern portion of Landscape Unit 1 is near the future Federal Way Downtown Station and includes the Federal Way downtown area, the Federal Way Performing Arts Center, The Commons at Federal Way shopping center, and the Federal Way/S 320th Street Park & Ride. The central portion includes residential areas, including Belmor, a 63-acre mobile home park for adults 55 years and older that contains over 300 mobile home units and a nine-hole golf course located south of S 324th Street, and the visually prominent BPA transmission line towers. The southern portion of this area extends south of S 348th Street and includes the I-5/SR 18 interchange and a shopping center with big-box and medium-scale retail shops.

Belmor residents are high-sensitivity viewers. Relatively unobstructed views of Mount Rainier can be seen from locations in Belmor. The residents between Belmor and S 336th Street would have high visual sensitivity as well, with views of mature trees within and surrounding the neighborhood. The vividness and unity ratings of Landscape Unit 1 are medium, and intactness is rated low to medium.

I-5 runs adjacent to the proposed mainline. The mature vegetation along the edge of I-5 serves as a backdrop for many adjacent neighborhoods that, along with noise walls in some locations, provides a visual barrier to the freeway and provides natural beauty along the highway for the traveling public. Where I-5 can be seen from adjacent areas, its presence influences the character of adjacent land uses and the visual quality of surrounding areas.

The southern tail track alignments extend to S 348th Street at the I-5/SR 18 interchange. This area includes two WSDOT-designated RCAs and is bordered by the I-5/SR 18 interchange on the east and south and a retail store parking lot on the west (Figure 3.7-4). The northernmost of the two RCAs is approximately 0.3 acre and is covered in mature native trees. The second area, 500 feet to the south, is approximately 1 acre and is primarily covered in Himalayan blackberry, with just a few trees. Both are seen as a green background for travelers on I-5 and for visitors to the stores to the west.

Lighting within the landscape unit varies from the higher levels of commercial and streetscape lighting in the Federal Way Downtown area to more the subdued neighborhood lighting in Belmor to the I-5 corridor, which is continuously illuminated from high-mast overhead lighting.

3.7.1.2 Preferred Alternative

The Preferred Alternative is located within Landscape Unit 2, which encompasses the combined areas of the Preferred and South 344th Street alternative OMF sites and their surroundings. Landscape Unit 2 is defined by residential uses to the north, a commercial business district to the south, retail businesses and residential and light industrial land uses to the west, and I-5 to the east (Figure 3.7-2). The OMF site itself is bounded on the north by S 336th Street, with residential areas beyond, and to the east by the I-5 corridor, which is lined with mature conifer trees. The site is bounded on the west by SR 99 and commercial properties. To the south, the site borders S 340th Street and S 341st Place and a mix of warehouses, light industrial land uses, and residential properties.

The site is primarily occupied by the approximately 55-foot-tall building for the Christian Faith Center church, with surrounding surface-level parking west of 20th Avenue S, and overflow parking lots, a soccer field, and open areas east of 20th Avenue S. Given the mix of visual character elements of parking areas, landscaping, and more natural perimeter vegetation along with the building scale, the Christian Faith Center campus has medium visual intactness and unity. The southern portion of the site, with a mix of building forms, scales, and uses, has a lower level of unity and intactness. Overall views in the area lack vividness, and the overall visual quality is medium.

Lighting visible within the study area consists of exterior lighting for the Christian Faith Center parking areas; limited interior lighting and street lighting associated with residential areas to the north and commercial areas to the south of the site; and high-mast lighting on I-5 to the east of the site that is somewhat obscured by mature vegetation next to the interstate.

Viewers of the OMF site include nearby residents in surrounding neighborhoods; patrons and workers at nearby commercial and industrial establishments; motorists, pedestrians, and cyclists using nearby streets; and motorists driving on I-5.

3.7.1.3 South 344th Street Alternative

The South 344th Street Alternative partially overlaps with the Preferred Alternative within Landscape Unit 2 (Figure 3.7-3). A portion of the OMF site extends north to S 336th Street, with residential areas beyond, and to 20th Avenue S on the west, with the Christian Faith Center building and parking areas beyond. The entire site is bordered on the east by the I-5 corridor, which is lined on both sides with mature conifer trees, and the southern boundary of the site is defined by S 344th Street and commercial uses beyond. The majority of the proposed OMF site is south of the Christian Faith Center and includes two residential streets with approximately 20 residences. The remainder of the southern area is occupied with various office and warehouse light industrial buildings and associated surface-level parking, bounded on the west by warehouse and light industrial properties.

The northern portion of the site, which covers the Christian Faith Center campus property east of 20th Avenue S, is visually open and uncluttered and therefore has a medium level of intactness and unity. The main southern portion of the site contains a mix of building forms and uses and has a lower level of unity and intactness. Overall views in the area lack vividness, and the overall visual quality is medium to low.

As with the Preferred Alternative, lighting visible within the study area consists of exterior lighting for the Christian Faith Center parking areas and high-mast lighting on I-5 to the east. Due to its proximity to the commercial areas to the south, the South 344th Street Alternative is subject to higher lighting levels as compared to the Preferred Alternative.

Viewers of the OMF South alternative site include nearby residents in surrounding neighborhoods; patrons and workers at nearby commercial and industrial establishments; motorists, pedestrians, and cyclists using nearby streets; and motorists driving on I-5.

3.7.1.4 Midway Landfill Alternative

Within Landscape Unit 3, the Midway Landfill Alternative OMF site is bordered to the north by S 244th Street and the Midway RV and Mobile Home Park. I-5 borders the site on the east, with a continuous vegetative buffer east of the interstate screening views of the project site from residential neighborhoods to the east of I-5. To the south, the site is bordered by S 252nd Street, a residential neighborhood, and a large superstore to the southwest. SR 99 and automobile-dependent businesses with parking areas, including hotels, restaurants, auto mechanics, and other small commercial uses in strip mall developments, border the site to the west. Residential neighborhoods lie further west beyond the SR 99 commercial zone.

The site itself is a closed landfill and stands out as distinct from surrounding areas with an open, gently rolling landscape covered in tall grass. Gravel access roads and landfill gas collection piping crisscross the site, and a stormwater detention pond is located on the northern part of the property. Observed on its own, the site would be rated a higher visual quality, with uniform fields providing higher vividness, intactness, and unity and a different visual character from its surroundings, which are mainly developed. But as seen by most viewers, including the more sensitive residential viewers to the north and south, views include a mix of on-site and off-site built and natural elements that give the broader landscape unit medium vividness and low to medium visual intactness and unity.

Lighting within the study area consists of limited exterior lighting for the landfill operations area in the northwest corner of the site, lighting for businesses adjacent to and roadway lighting on SR 99, interior and exterior lighting and street lighting associated with residential areas to the north and south of the site, and high-mast lighting on I-5 to the east.

The view on both sides of I-5 within Landscape Unit 3 is of mature, mainly native mixed forest dominated by conifer trees with some open, tall grass areas, including the Midway Landfill. The view on the west side includes the FWLE mainline in places. For motorists and passengers traveling through the corridor, the vegetation and open grass areas provide for a pleasant backdrop with higher visual intactness and unity. The mature vegetation along the edge of I-5 serves as a backdrop for many adjacent neighborhoods that, along with noise walls in some locations, provides a visual barrier to the freeway. Where I-5 can be seen from adjacent areas, its presence influences the character of adjacent land uses and the visual quality of surrounding areas.

3.7.2 Environmental Impacts

3.7.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to visual and aesthetic resources from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. For example, the construction of the elevated mainline tracks associated with FWLE has affected visual resources in the Midway Landfill Alternative study area to the east of the landfill, next to I-5, and through removal of some mature vegetation that screens views of I-5 south of the landfill. In addition, the proposed build alignments for TDLE overlap with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.7.2.2 Long-Term Impacts

This section qualitatively assesses the level of visual change and visual quality for each landscape unit that could occur as a result of OMF South, based on simulations that were prepared for this assessment. The simulations use photographs of existing views from key locations from around each build alternative and show proposed conceptual designs. Building, wall, and landscaping details would be determined in the final design phase.

Visual impacts are defined as a change from a higher visual quality to a lower visual quality where sensitive viewers have exposure to the view. The following criteria are used to characterize the degree of visual quality change from existing conditions in terms of changes in the elements of vividness, intactness, and unity.

- **High change and impact to visual quality** would remove existing features and/or introduce visually prominent features that alter the visual character of the area for sensitive viewers with exposure to the change. High visual change could have high, medium, or low visual impact, depending on the level of sensitivity and exposure of viewers effected.
- **Medium change and impact to visual quality** would alter visual features but not in a way that would be perceived as intrusive or incompatible by most viewers, and it would not substantially change intactness and visual unity. Medium visual change would have medium or low visual impact, depending on the level of sensitivity and exposure of viewers effected.
- **Low change and impact to visual quality** generally includes relatively minor new features or relatively minor alteration of existing features, such as vegetation cover. Low visual change would generally have low visual impact, depending on affected viewers.

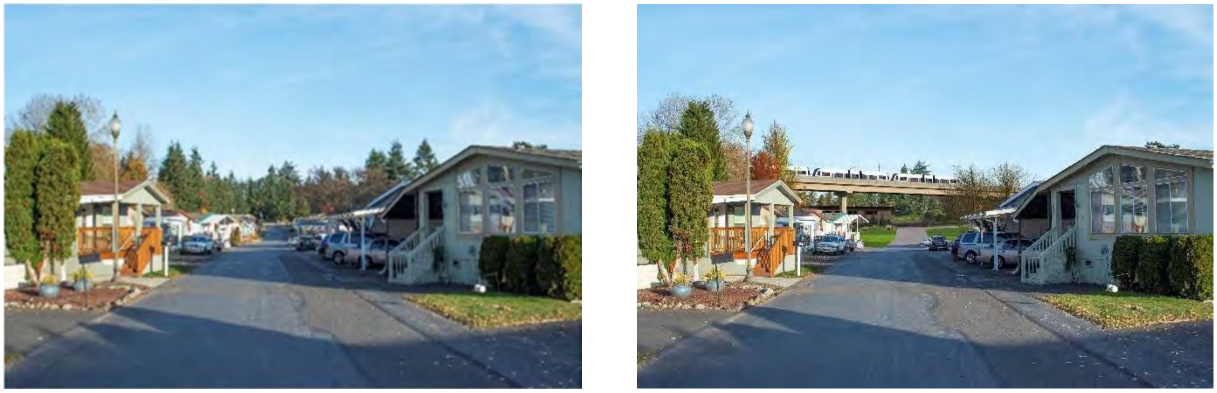
Impacts Common to All Build Alternatives

All the build alternatives would add new at-grade buildings, elevated light rail track, overhead catenary wires, at-grade parking lots and access roads, as well as tree and shrub landscape plantings and fences around the perimeter with limited-access gates. On-site lighting would be as prominent or more prominent than existing lighting at the alternative sites; however, light sources would be shielded to control glare and light escaping from the site.

Mainline Tracks

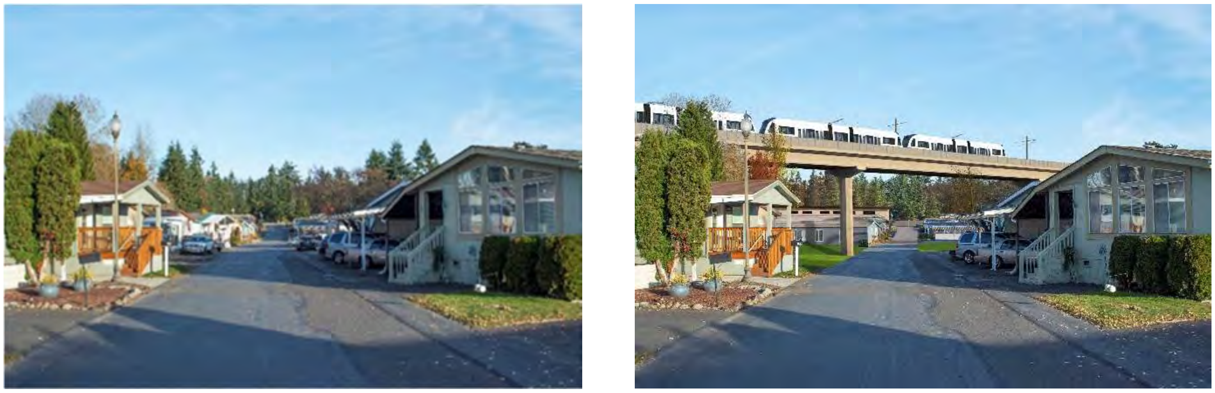
Viewers of the mainline and test tracks include residents at Belmor and residential neighborhoods to the south of Belmor (high-sensitivity viewers), sightseeing drivers on I-5 (high-sensitivity viewers), commuting drivers on I-5 (low-sensitivity viewers), and patrons and employees of businesses (low-sensitivity viewers). The test track would be at the same level as the mainline tracks and generally follow the same alignment. Figures 3.7-5 through 3.7-8 show visual simulations of the proposed facility from three key observation points along the mainline tracks.

Figure 3.7-5 represents the view Belmor residents would have of the 40 mph Alignment and 55 mph Design Option for the mainline tracks. The mainline and test tracks would connect to the Preferred and South 344th Street alternative OMF sites roughly 0.75 mile south of this location. The elevated mainline and test tracks would have a high impact on the visual intactness, unity, and vividness of this view for the high-sensitivity viewers at Belmor. Residents would have views of the elevated mainline and test tracks due to their height, with views of the test track facility east of the track. Plantings to screen views of the mainline would not be possible due to the clear zones required around the tracks.



Existing Condition

Simulation of Mainline with 40 mph Alignment

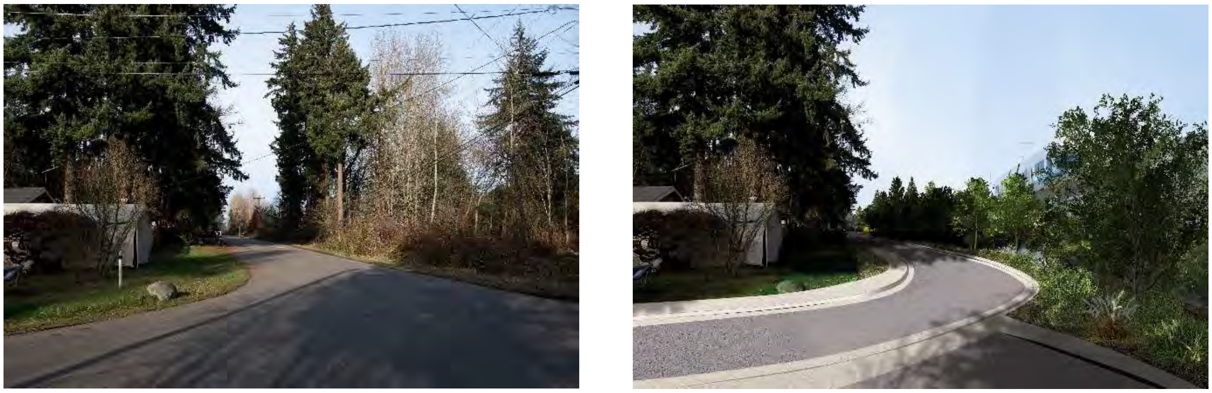


Existing Condition

Simulation of Mainline with 55 mph Design Option

Figure 3.7-5 Mainline Tracks Key Observation Point 1

Figure 3.7-6 shows the retaining wall supporting the mainline tracks looking north from the intersection of S 333rd Street and 24th Ave S. The existing mix of mature conifer and deciduous trees provide a naturalistic visual screen combined with an existing noise wall to block views of I-5. The clearing of vegetation and construction of walls for the elevated mainline and test tracks would have a high impact on the visual intactness of this view for high-sensitivity viewers west of 24th Ave S. Vegetation would be added to provide visual screening of the mainline in this area but would not fully obscure the mainline.

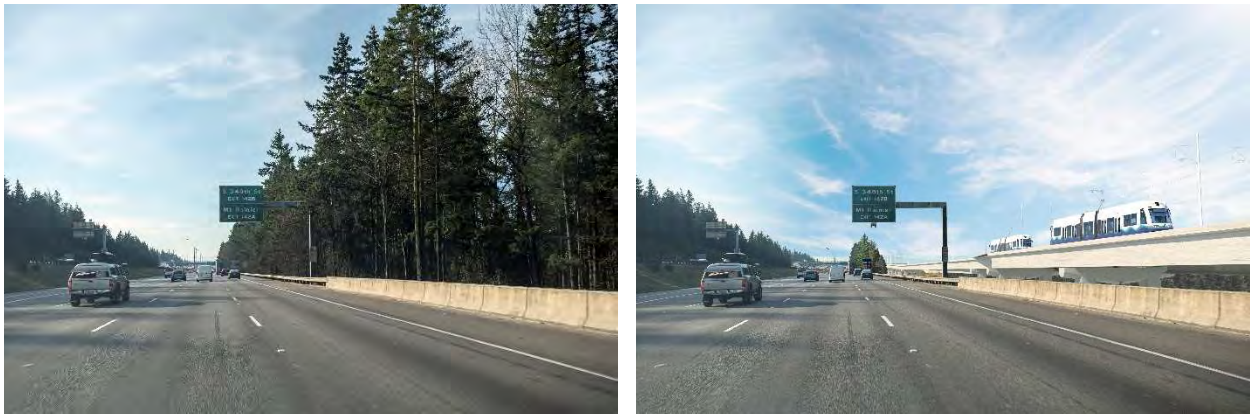


Existing Condition

Simulation of Proposed Conditions approximately 10 years after planting

Figure 3.7-6 Mainline Tracks Key Observation Point 2

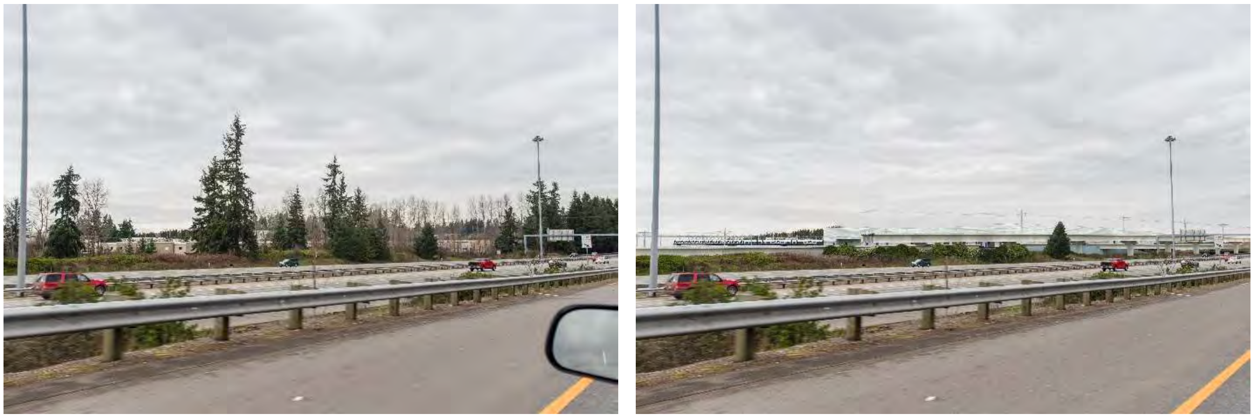
Figure 3.7-7 presents the driver viewpoint looking southwest on southbound I-5. The Preferred and South 344th Street Alternative OMF sites would be just out of sight to the right of this view, where the grade drops down west of the interstate. The mainline tracks would have a high impact on the visual intactness, unity, and vividness of this view for lower-sensitivity commuting viewers and high-sensitivity sightseeing viewers traveling I-5. The potential exists to retain vegetation west of the elevated mainline tracks in this view and to plant new trees along portions of the alignment; however, retained and new vegetation would not be very visible in this view because it would be on the opposite side and downslope from the mainline tracks.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-7 Mainline Tracks Key Observation Point 3

Figure 3.7-8 captures the driver viewpoint looking northwest at the rendering of the mainline tracks and facility from the entrance ramp where westbound SR 18 merges onto northbound I-5. The South 344th Street Alternative OMF site is behind the trees on the other side of I-5. Building detail will be determined during the final design phase. This view looks directly toward two RCAs, some trees visible in this view would be impacted by the project. The project would have a low to medium impact on the visual intactness, unity, and vividness of this view for low-sensitivity commuting viewers and high-sensitivity viewers traveling I-5.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-8 Mainline Tracks Key Observation Point 4

Summary of Mainline Track Impacts

Overall the mainline would result in a high impact to visual quality. Construction of the mainline would displace a number of mobile homes along the eastern portion of Belmor and require the removal of trees and vegetation within the clear zone of the tracks. The elevated mainline and test tracks would have a high impact for the high-sensitivity viewers at Belmor from their homes and when using the private golf course. Depending on final design clearing requirements, the mainline would also have a high impact for the high-sensitivity residential viewers living on the west side of 24th Avenue S and the residential communities between Belmor and the existing Christian Faith Center.

The removal of vegetation along I-5 for the mainline would have a lesser impact to high-sensitivity sightseeing travelers and lower-sensitivity commuters along I-5.

Preferred Alternative

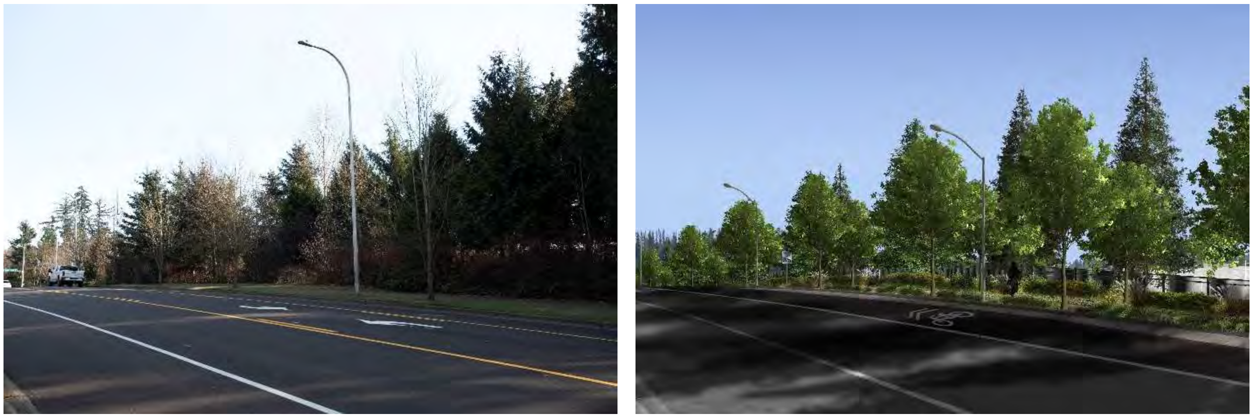
Viewers of the Preferred Alternative site include residents to the north of the site (high-sensitivity viewers), visitors to and employees of the Russian-Ukrainian Seventh-Day Adventist Church (medium-sensitivity viewers), sightseeing drivers on I-5 (high-sensitivity viewers), commuters on I-5 (low-sensitivity viewers), and patrons and employees of nearby businesses to the south and southwest of the site (low-sensitivity viewers).

The project would remove the landscaping in the parking areas for the Christian Faith Center and street trees and all landscaping along 20th Avenue S, as well as mature trees and much of the vegetation around the perimeter of the site. The north side of the site would have two existing driveways removed and replaced with a pathway and landscaped vegetation, trees, and other improvements along the roadway frontage. The current drive entry on SR 99 would be removed and replaced with landscaping. Mature trees and vegetation would be cleared in order to extend 18th Place S northward to connect to S 336th Street and extend 21st Avenue S southward to connect to S 344th Street. Residences, mature trees, and landscaping on the properties south of the Christian Faith Center would be removed to support future site improvements. Open space and fields east of 20th Avenue S would also be removed.

Lead tracks would be contained within the Preferred Alternative OMF site boundary, except for a small segment of track that would pass over S 336th Street to connect with mainline tracks near I-5. Lead tracks on the southern end of the site would also be mostly contained within the site boundary, with a small segment passing over vacant and industrial parcels. These changes would not lead to additional visual impacts beyond those listed above under Impacts Common to All Build Alternatives and Mainline Tracks. Additionally, one RCA in the study area would be impacted by the alignments for the mainline tail tracks in the area northwest of the I-5/SR 18 interchange (see Figure 3.7-1). The tail tracks would be built adjacent to the eastern boundary of the RCA, which could impact some vegetation.

Figures 3.7-9 through 3.7-11 show visual simulations of the proposed facility from three key observation points around the site. In general, visual impacts would be highest immediately following construction and, in areas where there is landscaping, would lessen over time as vegetation grows.

Figure 3.7-9 captures the view of the facility along S 336th Street, looking southeast from across the street. This represents the site as it would be seen by viewers in residences north of the site who would have a high sensitivity to change to this view. While existing trees and shrubs would be removed, new street trees and frontage improvements along the perimeter of the site and vegetation planted within the proposed site would grow over time and reduce impacts. Views of the storage tracks on the north end of the site would be screened by landscaping and frontage improvements along S 336th Street and the differing grades of roadway and site. OMF buildings would be in the center of the site and would not be prominent in views from S 336th Street. The result would be a medium impact to visual intactness and unity for views from this location.

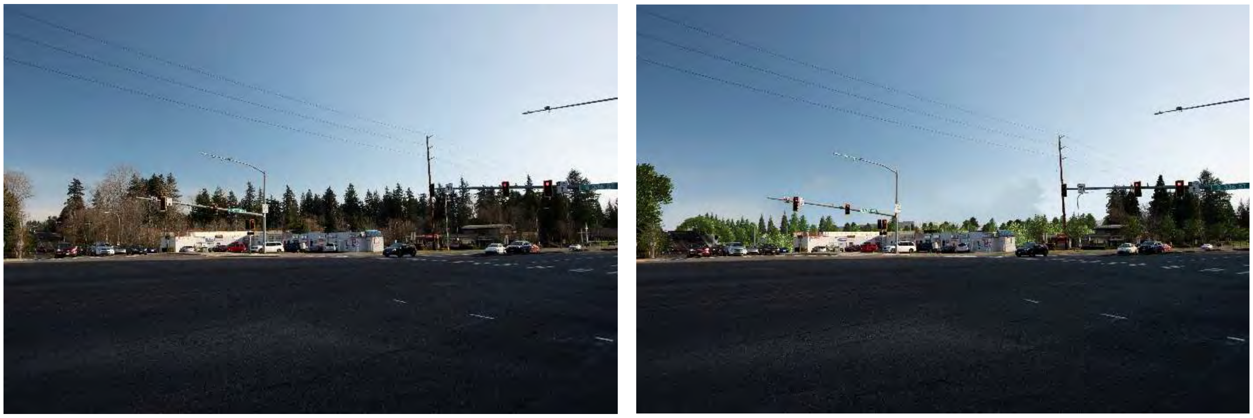


Existing Condition

Simulation of Proposed Conditions approximately 10 years after planting

Figure 3.7-9 Preferred Alternative Key Observation Point 1

Figure 3.7-10 shows a shared pedestrian and driver viewpoint looking southwest toward the site from the corner of SR 99 and S 336th Street. The removal of tall conifer trees will be apparent from this location; however, site development features, including the extension of 18th Place S, retaining walls, and buildings, will be partially obscured by existing vegetation. New street trees and site landscaping as seen from this view would, over time, grow and further screen views of the site development resulting in a low to medium visual change from this location for low to medium sensitivity viewers, who are mainly drivers and nonmotorized users along SR 99.

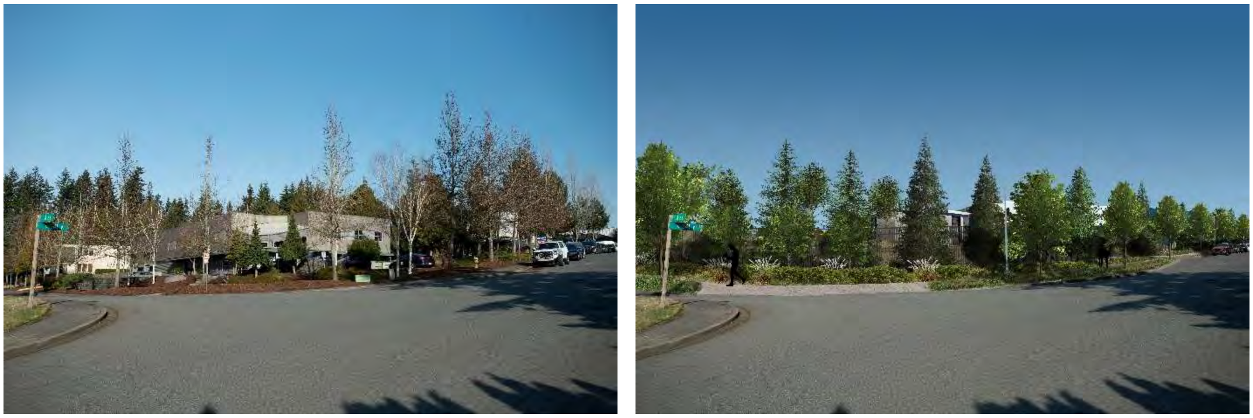


Existing Condition

Simulation of Proposed Conditions approximately 10 years after planting

Figure 3.7-10 Preferred Alternative Key Observation Point 2

Figure 3.7-11 represents the driver and pedestrian viewpoint looking northeast toward the entrance of the site from S 341st Street near the intersection with 18th Place S. Buildings and site development visible in this view would be similar in scale and character to existing commercial buildings. Streetscape and site landscaping would, over time, grow and screen site development to a similar degree as the existing trees and landscaping. Visual change would be minimal from this observation point for medium and higher sensitivity viewers.



Existing Condition

Simulation of Proposed Conditions approximately 10 years after planting

Figure 3.7-11 Preferred Alternative Key Observation Point 3

Summary of Preferred Alternative Impacts

Overall, the Preferred Alternative would result in a medium impact to visual quality. Visual features would be altered in a way that could be perceived as intrusive or incompatible for a medium change to visual quality and impact for higher-sensitivity residential viewers to the north. However, alterations to visual features to the south and west would not substantially change intactness and visual unity with surroundings and would largely maintain consistency with existing conditions.

The Preferred Alternative would also result in visual impacts associated with the mainline, as described above.

South 344th Street Alternative

Viewers of the South 344th Street Alternative include residents to the north (high-sensitivity viewers), visitors and employees of the Christian Faith Center and the Russian-Ukrainian Seventh-Day Adventist Church (medium-sensitivity viewers), sightseeing drivers on I-5 (high-sensitivity viewers), and commuters on I-5 (low-sensitivity viewers). Other viewers include residents of two properties directly west of the site (high-sensitivity viewers) and patrons and employees of businesses to the south and west of the proposed alternative site (low-sensitivity viewers).

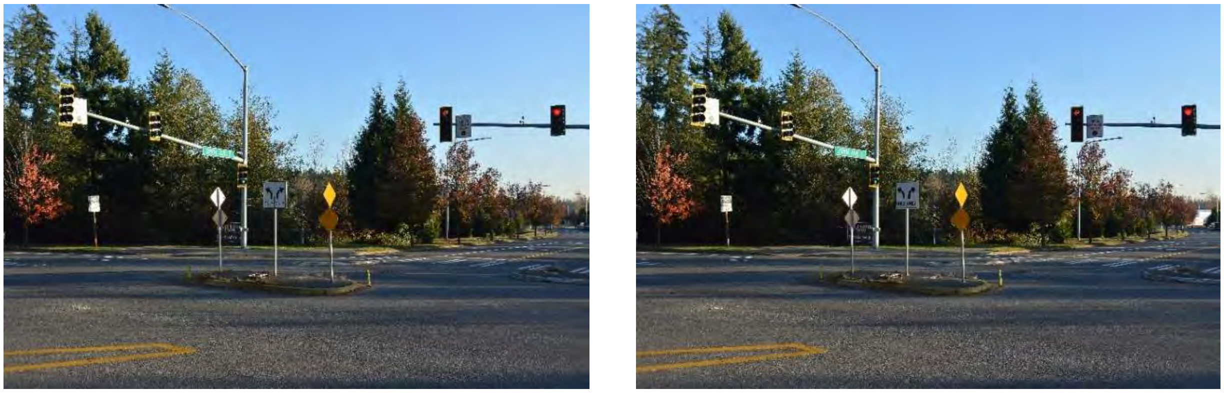
The visual impacts from the mainline and test tracks would be the same as those of the Preferred Alternative at the north end of the site. Additionally, the two RCAs in the study area would be impacted by either of the alignments for the mainline tail tracks in the area northwest of the I-5/SR 18 interchange (see Figure 3.7-1). The tail tracks would be built adjacent to the eastern boundary of the northernmost RCA, which could impact some vegetation, and pass directly through and partially impact the southernmost RCA.

Site development would result in a low degree of visual quality change compared with the existing commercial area, which has built elements and buildings of similar scale to those that surround the site to the south and southwest. Site development in the northern portion of the site would replace parking and open areas with new structures in proximity to residential viewers north of S 336th Street and to visitors and employees of the Christian Faith Center and the Russian-Ukrainian Seventh-Day Adventist Church. The increased scale of development in this area would result in a medium degree of change.

Lead tracks would be contained within the South 344th Street Alternative OMF site and would require clearing of some mature vegetation along I-5. Therefore, the OMF site would have visual impacts for low-sensitivity viewers from I-5 beyond those listed above under Impacts Common to All Build Alternatives.

Figures 3.7-12 through 3.7-15 show visual simulations of the proposed facility from three key observation points around the OMF site.

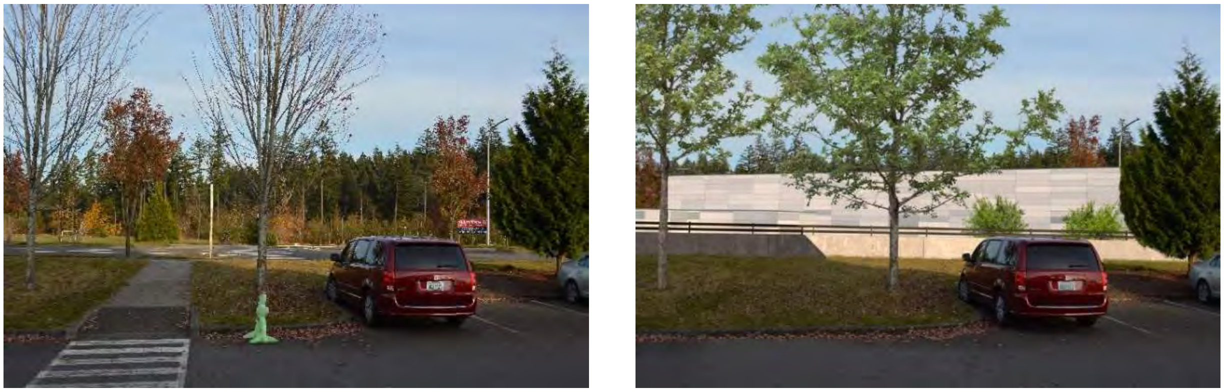
Figure 3.7-12 represents the driver viewpoint looking southeast from S 336th Street and 20th Avenue S from the opposite side of the street from the facility. This view represents the site as it would be seen by viewers in residences north of the site who would have a high sensitivity to change to this view. Architectural design and façade treatments on the buildings would reduce visual massing of those structures, and retention of existing or new vegetation planted around the site perimeter and nearer to the proposed on-site structures would screen and mitigate impacts to these views. Together this would result in a low impact to visual intactness and unity for views from this location.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-12 South 344th Street Alternative Key Observation Point 1

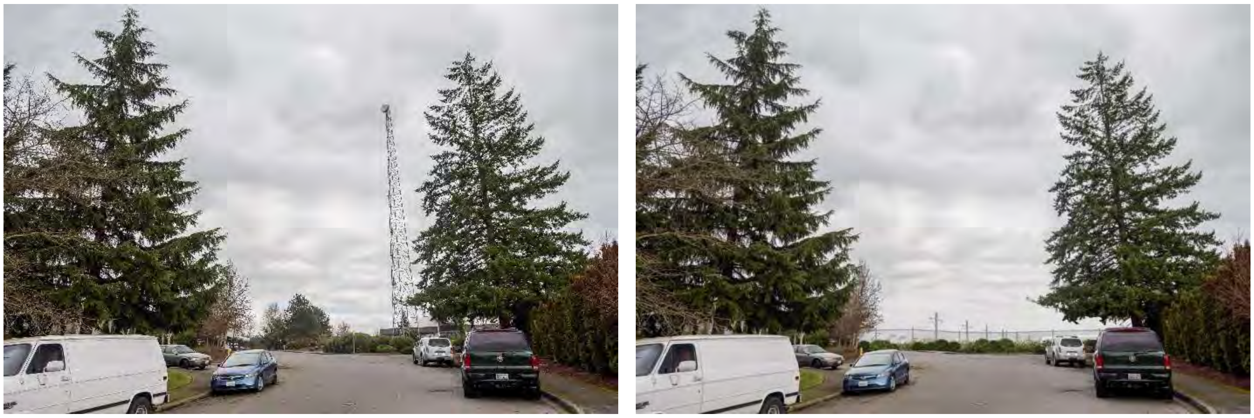
Figure 3.7-13 shows the pedestrian viewpoint of OMF South looking east from the east entrance to the Christian Faith Center. Views for congregants and employees of the Christian Faith Center would include new buildings and fencing. The presence of the proposed OMF buildings and fencing would result in a high degree of change in visual intactness, vividness, and unity for this view. However, new vegetation planted around the site perimeter and nearer to the proposed on-site structures would over time grow to screen and reduce impacts resulting in a medium to high visual impact for the medium sensitivity viewers at this location.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-13 South 344th Street Alternative Key Observation Point 2

Figure 3.7-14 presents a rendering of OMF South looking east on S 341st Place from the driver viewpoint. Changes to the site entrance would result in low visual changes as seen by low- to medium-sensitivity viewers, who are mainly drivers and nonmotorized users along on S 341st Place.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-14 South 344th Street Alternative Key Observation Point 3

Summary of South 344th Street Alternative Impacts

Overall, the South 344th Street Alternative would result in a medium impact to visual quality because of the increased scale of constructed features. The customers and employees (medium-sensitivity viewers) and residents (high-sensitivity viewers) next to the southern portion of the site would experience a low degree of change. The residents and church visitors to the north of the site would have views similar to what they have now, given that existing vegetation would be retained, and new trees and shrubs would be planted to provide a vegetative screen along S 336th Street. Views from the Christian Faith Center would include new buildings and fencing. Impacts to these views would be reduced over time with vegetative screening, such as the planting of trees and shrubs. Like the Preferred Alternative, views from I-5 under the South 344th Street Alternative would be affected by vegetation removal.

The South 344th Street Alternative would also result in visual impacts associated with the mainline, as described above.

Midway Landfill Alternative

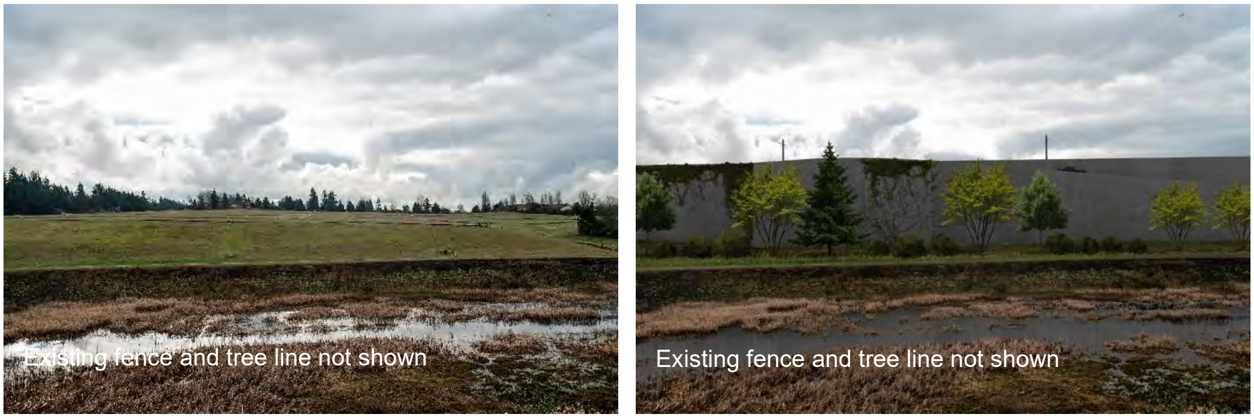
The primary viewers of the Midway Landfill Alternative OMF site include the residents in the neighborhood south of the site and residents of the Midway RV and Mobile Home Park north of the site (high-sensitivity viewers), sightseeing drivers (high-sensitivity viewers), and commuting drivers on I-5 and SR 99 (lower-sensitivity viewers). Other viewers include patrons and employees of businesses along SR 99, pedestrians, and cyclists — all of whom are considered to have medium or low viewer sensitivity.

The proposed facility would introduce prominent buildings and retaining wall structures. Retaining walls are needed to create the level areas required for operations on this sloping site. This would constitute a high degree of change when compared with existing conditions; however, the resulting development would not be drastically out of character with the visual character of the broader landscape unit east and west of the site.

Lead tracks would be seen by residential neighbors in the mobile home park to the north as well as by nearby residents in the neighborhood to the south. The lead tracks would appear somewhat closer to viewers than the mainline tracks. However, they would be at essentially the same elevations and, therefore, should not appear distinct or prominent separate from the mainline tracks.

Figures 3.7-15 through 3.7-18 show visual simulations of the proposed facility from four key observation points around the site.

Figure 3.7-15 provides an approximation of the residential view looking south from the Midway RV and Mobile Home Park across the stormwater detention pond to the OMF site. The photographer was unable to access the mobile home park, so this picture was taken from the northern edge of the landfill property. An existing fence and tree line that separate the landfill and the mobile home park are not visible because they are located directly behind the photographer in this view.


Existing fence and tree line not shown
Existing fence and tree line not shown

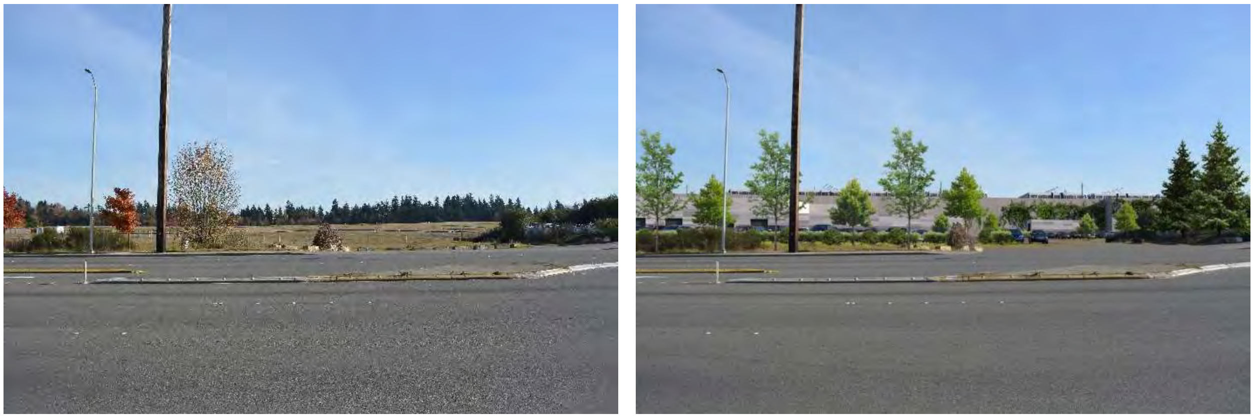
Existing Condition

Simulation of Proposed Conditions

Figure 3.7-15 Midway Landfill Alternative Key Observation Point 1

The residential viewers to the north of the site would have a high sensitivity to changes, and the proposed retaining walls for the site development would result in a medium to high degree of change to visual intactness, vividness, and unity in this view. However, the retention of the existing fence and vegetation along the property boundary would provide foreground visual screening. New landscaping around the site perimeter and near the proposed on-site structures would further screen and mitigate impacts to these views. Viewers would be over 300 feet from the wall, which would lower the wall's visual prominence. Together this would result in a low to medium visual impact for views from this location.

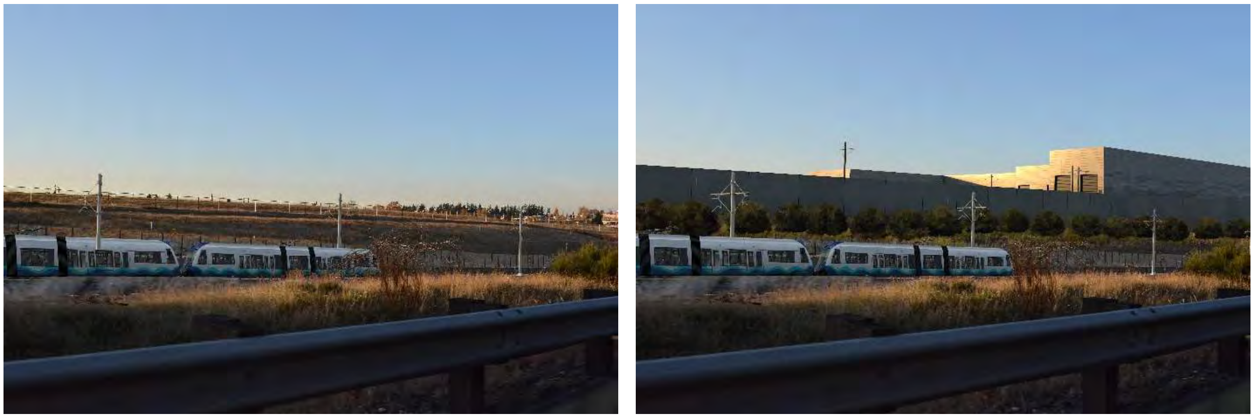
Figure 3.7-16 presents the pedestrian and driver views of the facility and wall from the corner of S 248th Street and SR 99, looking east. Views of the site from SR 99 by low- to medium-sensitivity viewers are the most prominent due to the lack of vegetation. The proposed retaining walls and visible elements beyond would result in a medium to high degree of change to visual intactness and unity in this view. Views of the wall seen in the simulation would be enhanced with aesthetic treatments to the wall surface as well as with tree and shrub plantings to screen the view of the wall. This would result in a low to medium level of impact.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-16 Midway Landfill Alternative Key Observation Point 2

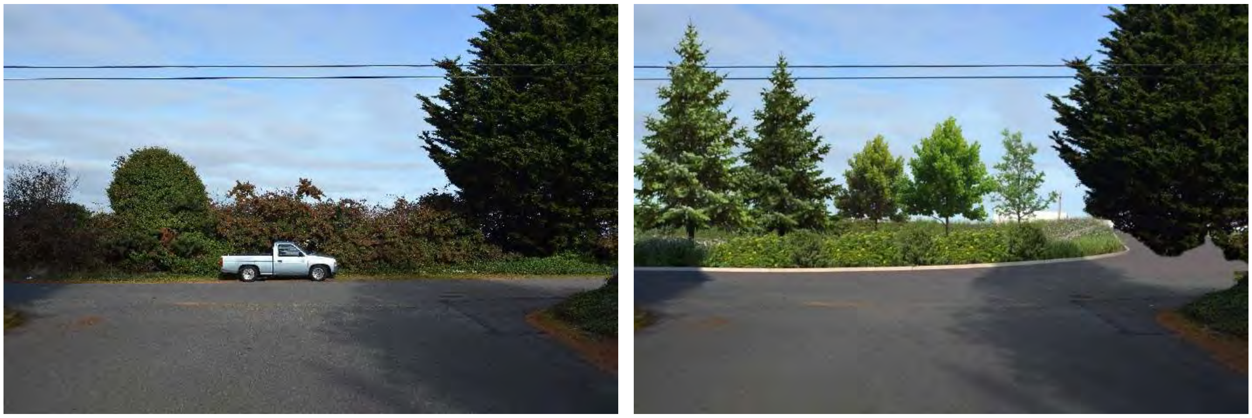
Figure 3.7-17 represents the facility building and wall that a driver would see looking northwest as they drive northbound on I-5. Travelers on I-5, which include both lower-sensitivity commuting viewers and high-sensitivity sightseeing viewers, would experience a medium to high degree of change to visual intactness and unity in this view. Visual change may be tempered somewhat by the presence of the FWLE mainline tracks in the foreground.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-17 Midway Landfill Alternative Key Observation Point 3

Figure 3.7-18 shows the view from the closest houses in the residential neighborhood just south of the Midway Landfill. This photo was taken in the middle of S 252nd Street, at the intersection of 30th Avenue S, looking north. Residential viewers to the south of the site would have a high sensitivity to changes. But retention of some existing screening vegetation and planting of new screening vegetation would mitigate visual impacts from changes to the site perimeter adjacent to the residents as well as from the OMF buildings that would be over 500 feet in the distance. This would result in a low to medium visual impact to visual intactness and unity for these areas. Shielding of light sources would be used to control glare and light escaping from the site.



Existing Condition *Simulation of Proposed Conditions*

Figure 3.7-18 Midway Landfill Alternative Key Observation Point 4

Summary of Midway Landfill Alternative Impacts

Overall, the Midway Landfill Alternative would result in a medium impact to visual quality. Visual features would be altered in a way that could be perceived as intrusive or incompatible by higher-sensitivity residential viewers to the north and south, but they would not substantially change intactness and visual unity with surroundings as seen by the lower-sensitivity viewers to the west along SR 99. The preservation of existing vegetative screening in combination with the planting of new trees and shrubs would cause the residents to the north and south of the site (as sensitive viewers) to have similar views of the Midway Landfill Alternative as before the project. The views from I-5 of the Midway Landfill Alternative would affect both lower-sensitivity commuting viewers and high-sensitivity sightseeing viewers but would be somewhat obscured by the FWLE mainline tracks in the foreground.

3.7.2.3 Construction Impacts

There would be temporary visual impacts due to construction for the viewer groups identified for each build alternative. Construction would last approximately 3.5 years for the Preferred and South 344th Street alternatives and up to approximately 8.5 years for the Midway Landfill Alternative. While visual impacts from construction of the Midway Landfill Alternative would potentially be longer in duration, the nature of the impacts would be the same as for the other sites. The existing visual character and form of the site would be altered due to the removal of existing structures; vegetation, including trees and shrubs; and roads.

The construction site would include staging areas; reserves of building materials; fencing; lighting; large vehicles or pieces of equipment, such as cranes, dump trucks, scaffolding, bulldozers, or excavators; and detours or temporary roads. Other large vehicles could move to and from the site. The visual impact of construction would be a temporary decrease in visual quality, typical for a large construction project. Where practical, Sound Transit would place construction screens or barriers to limit the visibility of work areas from sensitive viewers, such as nearby residents. If necessary, Sound Transit would reduce the glare during nighttime construction by shielding light sources.

3.7.2.4 Avoidance and Minimization of Impacts

When developing the OMF South build alternatives during conceptual design, Sound Transit worked to minimize the elevation or height of structures to avoid and minimize potential visual impacts, including incorporating at-grade track profiles where practicable. Early conceptual design also considered where mainline track alignments could avoid or reduce acquisitions and clearing of right-of-way where the project would be near or in existing arterial and highway rights-of-way or utility corridors.

Each alternative site's context varies with the surrounding community, with the influence of comprehensive plans and zoning, and with development standards that govern building setbacks, heights and massing, landscaping, facade treatment, and urban design character. The project designers would consider site context and adhere to the landscape guidelines in Sound Transit's Design Criteria Manual. Context-sensitive design measures would be developed and refined during final design with input from the affected communities and cities and could include the following items:

- Preservation of existing vegetation and addition of new vegetation and street frontage improvements, where possible.
- Adherence to required design standards, guidelines, and design review processes for Federal Way, Kent, and WSDOT, as applicable, to promote visual unity in treatments at the site and along corridors. Landscaping treatments would be used to enhance the visual character of the build alternative at the perimeter of the site. Streetscape elements, such as sidewalks, street trees, and other aesthetic features, would be added along adjacent frontage streets. These measures would help maintain the local character, improve aesthetics, and reduce the visual scale of the proposed project.
- Architectural treatment of buildings, including varying materials and articulation of the building façade to minimize visual massing, provide visual interest, and reduce scale, in accordance with the Federal Way Revised Code.
- Design treatment of retaining walls, such as texture, pattern, color, and screening vegetation, where practical.
- Preparation of a Roadside Master Plan in accordance with WSDOT guidelines for the portion of the route within I-5 right-of-way and RCAs.
- Design of exterior lighting at the OMF site to minimize height and use of source shielding to avoid direct visibility of luminaires (bulbs) from residential areas, streets, and highways. Shielding would also limit spillover light and glare in residential areas.
- Replacement of trees removed for the project in accordance with tree-replacement requirements for Federal Way, Kent, and WSDOT to meet minimum replacement ratios. Some of these requirements encourage native species for the ecosystem benefit and the planting of younger trees because of the higher likelihood for survival as compared with transplanting more mature, larger trees.

It is important to note that, even when using larger or faster-growing trees or plants, it can take 15 to 20 years for the plants to grow large enough to screen large facilities such as elevated structures, buildings, or retaining walls. As a result, some visual impacts may not be able to be immediately avoided or minimized.

3.7.2.5 Indirect Impacts

No indirect impacts related to visual and aesthetic resources would result from construction and operation of the proposed project.

3.7.3 Mitigation Measures

In addition to the avoidance and minimization measures considered during the development of the design and in place during construction, mitigation measures would be implemented in areas near residences and other areas with sensitive viewers, where appropriate, to reduce impacts. Where possible, Sound Transit would place construction screens and/or barriers to limit the visibility of work areas where they are adjacent to visually sensitive receivers.

Sound Transit would refine the mitigation measures as the project design is further developed and feedback from reviewing agencies and the public is received. Most of the potential mitigation measures for visual impacts are related to the use of landscaping, berms, and aesthetic treatments to help screen views of the mainline and test tracks, OMF site, or other project components. Mitigation measures would be compatible with Sound Transit's maintenance and operations requirements, which include long-term maintenance, safety, and security considerations.

Depending on the alternative selected, mitigation measures would include the following:

1. In areas adjacent to residents, where there is adequate space, add on-site landscaping adjacent to residential areas to help screen views of project components while ensuring safety and security.
2. In areas adjacent to residences where not enough room exists for landscaping to screen views of retaining or noise walls, or in addition to landscaping under Mitigation Measure 1, Sound Transit would treat the walls with visually interesting elements, such as design treatments that incorporate textures, patterns, color, or climbing vines.
3. Within the WSDOT right-of-way, Sound Transit would consult with WSDOT to develop appropriate site-specific measures for roadside vegetated areas and mitigate the conversion of these areas to right-of-way with replacement property or with other measures agreed to by WSDOT and FHWA, consistent with the WSDOT Roadside Policy Manual (WSDOT 2022). The manual describes the extent of mitigation required for lost vegetation, vegetation types, and tree replacement ratios, including irrigation requirements and plant establishment criteria. Replacement parcels would meet the intended function of the original RCA.

Table 3.7-2 shows the primary locations where impacts would be mitigated for higher sensitivity viewers, depending on the alternative selected:

Table 3.7-2 Mitigation for Impacts to Visual and Aesthetic Resources

Landscape Unit and Alternative	Location	Mitigation Measure(s)	Notes
Landscape Unit 1, Mainline, Preferred and South 344th Street Alternatives	West side of the mainline through Belmor	Mitigation Measure 1 Mitigation Measure 2	Mitigation Measure 1 would add, where possible, trees and vegetation adjacent to the mainline and between columns to help screen views of the tracks for sensitive viewers within the Belmor residential area. In addition to Mitigation Measure 1, Mitigation Measure 2 would incorporate architectural treatments to project components such as walls and fencing to help soften views and add visual interest. Landscaping and architectural treatment would be designed to add human scale elements.
Landscape Unit 1, Mainline, Preferred and South 344th Street Alternatives	West side of the mainline along 24th Avenue S	Mitigation Measure 1 Mitigation Measure 2	These measures would add new vegetation to provide screening, where possible, or architectural treatments to walls to soften views and add visual interest. Both measures address the loss of vegetation and the introduction of guideway retaining walls for sensitive viewers living along 24th Avenue S. Landscaping an architectural treatment would be designed to add human scale elements.
Landscape Unit 1, Mainline, Preferred and South 344th Street Alternatives	Within WSDOT right-of-way adjacent to I-5	Mitigation Measure 3	This measure would mitigate the loss of vegetation in WSDOT right-of-way.
Landscape Unit 1, Mainline, Preferred and South 344th Street Alternative	RCAs adjacent to I-5	Mitigation Measure 3	Sound Transit would consult with WSDOT staff to develop appropriate site-specific and off-site mitigation measures to address impacts to RCA areas.
Landscape Unit 2, Preferred Alternative	Along South 336th Street adjacent to OMF South site	Mitigation Measure 1	This measure would add trees and other vegetation to provide screening to address the loss of mature trees and the introduction of OMF site buildings and structures for sensitive residential viewers on the north side of S 336th Street.
Landscape Unit 2, South 344th Street Alternative	OMF site frontage west of Christian Faith Center	Mitigation Measure 1	This measure would add new trees and other vegetation to address vegetation loss and introduction of OMF site buildings and fencing for sensitive viewers at the church.
Landscape Unit 3, Midway Landfill Alternative	Within northern portion of the site, surrounding buildings	Mitigation Measure 1	This measure would enhance the screening of OMF buildings for sensitive residential viewers to the north of the site.
Landscape Unit 3, Midway Landfill Alternative	Along southern border of OMF site	Mitigation Measure 1	This measure would enhance screening of OMF buildings for sensitive residential viewers to the south of the site.

3.8 Air Quality and Greenhouse Gas Emissions

This section discusses the potential air quality and greenhouse gas (GHG)-related impacts associated with the construction and operation of the OMF South project alternatives.

Regional impacts on air quality would be caused by criteria air pollutants that would be emitted directly or indirectly as a result of the proposed project. “Criteria air pollutants” are six common air pollutants that can harm health and the environment, cause property damage, and are subject to certain federal air quality standards known as the National Ambient Air Quality Standards (NAAQS). Three agencies have jurisdiction over the ambient air quality in the OMF South study area: EPA, the Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency.

The impacts of the OMF South project’s air quality and GHG emissions are not limited to the build alternative sites. Therefore, the study area for this analysis is the Puget Sound Clean Air Agency’s jurisdiction, which includes King, Pierce, Snohomish, and Kitsap counties.

Please see Appendix H4, Air Quality and Greenhouse Gas Technical Appendix, for more information on the regulatory requirements for air quality, including the NAAQS and efforts by Washington State and Sound Transit to reduce GHG emissions.

3.8.1 Affected Environment

3.8.1.1 Climate Conditions and Local Air Quality

Washington is located on a windward coast in the mid-latitudes, producing a predominantly marine-type climate west of the Cascade Mountains. East of the Cascades, the climate possesses both continental and marine characteristics. The Puget Sound region’s climate is mild, with wet and cloudy winters and cool and comparatively dry summers. In the interior valleys, measurable rainfall is recorded on 150 days each year; in the mountains and along the coast, there is rain 190 days each year.

Prevailing winds are typically from the south or southwest during the winter and from the north or northeast during the summer. Wind speeds are generally sufficient to disperse air pollutants released into the atmosphere. Air pollution is most noticeable in the late fall and winter under conditions of clear skies and light winds.

Typical air pollution sources near the study area include vehicular traffic, commercial and retail businesses, light industry, and residential wood-burning devices. While many types of pollutant sources are present, the largest contributors of criteria pollutant emissions are on-road vehicles, which contribute the majority of the carbon monoxide and ozone precursors. Secondary sources of emissions are commercial and industrial land uses.

Based on monitoring information for criteria air pollutants collected over a period of years, Ecology and EPA designate regions as being attainment or nonattainment areas for the criteria pollutants. Once a nonattainment area achieves compliance with the NAAQS, the area is considered an air quality maintenance area. Although portions of the Puget Sound region are in maintenance areas for $PM_{2.5}$ and PM_{10}, none of the build alternatives are located within nonattainment or maintenance areas.

According to Puget Sound Clean Air Agency's annual Air Quality Data Summaries (PSCAA 2023), air quality in the study area is good, and there is no part of the study area that is currently under non-attainment or maintenance. The criteria air pollutants of carbon monoxide, sulfur dioxide, nitrous oxide, and lead are all below the NAAQS (EPA 2023a).

While also below the NAAQS, the two pollutants that pose the greatest issue in the study area are particulate matter ($PM_{2.5}$) and ozone (O_3). The standards set by EPA are 9 micrograms per cubic meter ($\mu g/m^3$) for the $PM_{2.5}$ annual concentration, 35 $\mu g/m^3$ for the $PM_{2.5}$ 24-hour concentration, and 0.070 parts per million (ppm) for the O_3 8-hour concentration.[3] The following tables list the readings from the closest monitoring stations to the site alternatives from 2019 to 2022 (2020 is not included because readings were not taken consistently through the year due to the COVID-19 pandemic). As demonstrated in Tables 3.8-1 and 3.8-2, the air quality values for $PM_{2.5}$ and O_3 are below the NAAQS.

Table 3.8-1 $PM_{2.5}$ Monitoring results at Beacon Hill, Kent, and Auburn Monitoring Stations (micrograms per cubic meter)

Station	Value	NAAQS Level ($\mu g/m^3$)	Results by Year ($\mu g/m^3$)		
			2019	2021	2022[1]
Beacon Hill	24-hour[2]	35	11.9	11.8	27.7
	Annual Mean	9	5.2	4.4	7.0
Kent	24-hour[2]	35	17.8	17.6	33.7
	Annual Mean	9	5.8	7.1	9.3
Auburn	24-hour[2]	35	16.9	NA[3]	29.8
	Annual Mean	9	5.6	NA[3]	8.9

Source: PSCAA Air Quality Data Summaries for 2019, 2021, and 2022. Available at: https://pscleanair.gov/615/Data-Summary.

Notes:

(1) The relatively high readings for 2022 are attributable to the number of wildfires that year.

(2) 98th percentile 24-hour value averaged over 3 years

(3) Annual averages are reported only if 75 percent or more of the data for each of the four quarters is available.

Table 3.8-2 Ozone Monitoring Results at Beacon Hill Monitoring Station (parts per million)

Years	NAAQS Level (ppm)	Ozone concentration (ppm)[1]
2017 – 2019	0.070	.046
2019 – 2021	0.070	.050
2020 – 2022	0.070	.050

Source: PSCAA Air Quality Data Summaries for 2019, 2021, and 2022. Available at: https://pscleanair.gov/615/Data-Summary.

Notes:

(1) 3-year average of the annual 4th Highest Daily Volume.

Diesel exhaust is a known source of particulate emissions. While there is currently no known direct monitoring method to track diesel emissions, they, along with wood smoke particulates, are known to present the greatest potential health risk in the Puget Sound area (PSCAA 2023). Diesel exhaust also contains volatile organic compounds and nitrogen oxides, which can undergo chemical reactions in the atmosphere and become ozone (smog). Typical construction equipment powered by diesel engines includes bulldozers, excavators, backhoes, and loaders.

---

[3] EPA revised the standard for $PM_{2.5}$ annual concentration, effective February 7, 2024; it was formerly 12 $\mu g/m^3$.

There are several sensitive receptors in the project study areas, including single-family and multi-family residences and religious facilities. The study area around the Preferred Alternative includes a residential community with a mix of single- and multi-family residences and the Russian-Ukrainian Seventh-Day Adventist Church to the north. To the south is a mix of commercial uses with residences along 18th Place S and four churches south of S 341st Street: the Voice of Hope Church, Family Life Community Church, the Redwood Church of God, and Tabernacle Temple of Praise. To the west are commercial uses on both sides of SR 99, along with the KAC Baptist Church. I-5 is to the east.

The study area around the South 344th Street Alternative includes a mix of commercial, institutional, and residential land uses. To the north of the OMF site is a residential community with a mix of single- and multi-family residences, the Christian Faith Center and associated school, the Russian-Ukrainian Seventh-Day Adventist Church, and the KAC Baptist Church. To the south are commercial uses. To the west are commercial uses on both sides of SR 99. I-5 is to the east.

The land use around the Midway Landfill Alternative includes primarily commercial land uses to the west on both sides of SR 99, along with three churches: the Great Commission Presbyterian Church, the New Jerusalem Haitian Baptist Church, and the Seattle Full Gospel Church. Sensitive uses also include a mobile home park to the north and hotels and a single-family residential community to the south.

EJScreen (EPA 2024a) is an environmental justice screening and mapping tool developed by EPA to provide a nationally consistent dataset and approach for combining environmental and socioeconomic indicators. The EJScreen analysis conducted for OMF South indicates environmental justice indexes above the 90th percentile for diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard at each of the build alternative study areas. For the Preferred Alternative study area, the index is above the 80th percentile for particulate matter. The Washington State Health Disparities map (DOH 2022) indicates a similar ranking with the census tracts that contain the build alternatives, both ranking a 9 (on a scale of 1 to 10 with 10 being the highest) for Environmental Exposures.

3.8.2 Environmental Impacts

3.8.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to air quality and GHGs from construction or operation of OMF South would not occur. Other planned projects in the area would have varying air quality and GHG impacts, depending on their nature. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

The No-Build Alternative includes both private and public projects for which quantifiable GHG emissions data is not yet available. As a result, Sound Transit conducted a qualitative analysis of regional GHG emissions proportionate to the anticipated emissions from construction and operation of OMF South. King, Kitsap, Pierce, and Snohomish counties, the four counties within PSRC jurisdiction, have been experiencing an increase in GHG emissions over the past several years along with population and economic growth. In 2019 the four counties generated an estimated 48 million $MTCO_2e$ (King County 2023). Consistent with the GHG emission reduction goals of PSCAA, PSRC has a target to reduce GHG emissions to 50 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050 (PSRC 2020). Although GHG emissions within the PSRC region are anticipated to decline to 25.6 million $MTCO_2e$ by 2042 due to a number of recently enacted federal, state, and local policies, the counties are not on track to meet their GHG emission reduction goals (King County 2023).

Sound Transit also considered the social cost of GHG emissions, which is an estimate of the monetary value of the net harm to society associated with emission of carbon dioxide, methane, nitrous oxide, or other GHGs in a given year that contribute to climate change (EPA 2023b). As described above, the No-Build Alternative would have no construction- or operations-related GHG emissions for OMF South. Other planned projects under the No-Build Alternative would affect GHG emissions differently and therefore result in varying social costs of those emissions.

3.8.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Because all the build alternatives would have the same programming and function, there are no discernable differences between them in terms of potential long-term air quality impacts. As such, the description of impacts below applies to all OMF South build alternatives.

Air Quality

Operational air quality emissions include emissions from mobile sources associated with the facility, natural gas usage, electricity usage, architectural coatings, consumer products, and landscaping equipment. Because electrical utilities in the project area primarily rely on hydropower and thus have very low emissions, the primary sources of long-term air quality emissions would be associated with employee commutes, material deliveries, and on-site vehicle maintenance, which includes the use of an enclosed paint booth. Spray painting would occur infrequently and be limited in quantity. Welding would also occur in a dedicated space with the proper ventilation systems. These functions would be placed in the interior of the site. The potential impacts from painting and welding would be minor and addressed by implementing standard minimization measures.

Because the build alternatives are located within attainment areas for the $PM_{2.5}$, PM_{10}, and carbon monoxide standards, carbon monoxide and PM hot-spot analyses are not required. A conformity determination under federal regulations is not needed.

Climate Change

The maintenance and operational GHG emissions for OMF South were calculated using FTA’s Transit Greenhouse Gas Emissions Estimator v3.0 (FTA 2022). Each phase of operation was considered separately and included both upstream and downstream sources of emissions. Upstream emissions are the emissions associated with the extraction, transportation, and production of the fuels and materials used in the operation of the facilities (e.g., natural gas for heating, paint and solvents, fuel for maintenance equipment, etc.). Downstream emissions are generated within the facility during daily operations (e.g., the burning of natural gas for heating, the use of paint and solvents, the burning of fuel for maintenance equipment, etc.).

In total, the OMF South facility would generate between 1,183 and 1,191 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year. Sound Transit and Puget Sound Energy (PSE) have entered into an agreement that all electricity accounts related to the operations of Link light rail be sourced solely from renewable wind power via PSE’s Green Direct program. Therefore, there would be no upstream emissions associated with the project's electricity use. Table 3.8-3 summarizes the project's annual GHG emissions from operation and maintenance. Maintenance activities include routine transit way, pavement, and vehicle maintenance. The annual operational emissions are far below the 10,000 $MTCO_2e$ per year mandatory reporting threshold for facilities in Washington State (Ecology 2020).

Table 3.8-3 Annual Operational Greenhouse Gas Emissions

Emission Source	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
Operations – Upstream	0[1]	0	0
Operations – Downstream	1,149	1,149	1,149
Maintenance	41	42	34
Total Annual GHG Emissions	**1,190**	**1,191**	**1,183**

Note:

(1) Emissions are reported in $MTCO_2e$.

3.8.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Because all the build alternatives would have a similar footprint and, as a result, similar on-site construction activities, the description of impacts below applies to all OMF South build alternatives. However, the large number of truck trips required for two of the Midway Landfill subsurface construction design options — Hybrid and Full Excavation — would result in additional off-site emissions. The emissions associated with those additional haul truck trips are reflected in Table 3.8-2 below.

Air Quality

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities. Emissions from construction equipment would include carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds, and directly emitted particulate matter ($PM_{2.5}$ and PM_{10}).

Site preparation and project construction would involve clearing, cut-and-fill activities, grading, and building activities. Table 2.3-1, Estimated OMF South Construction Durations, reports the estimated site preparation and facility construction durations for each build alternative. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soil to and from the site.

Sources of fugitive dust (primarily consisting of PM_{10}) could include disturbed soil at the construction sites and trucks carrying uncovered loads of soil. Unless properly controlled, vehicles leaving the site could deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. With the implementation of standard construction measures, such as frequent watering (e.g., two times per day at a minimum), fugitive dust emissions from construction activities would not result in adverse air quality impacts.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, carbon monoxide and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction sites.

Climate Change

The construction GHG emissions for OMF South were calculated using the FTA’s Transit Greenhouse Gas Emissions Estimator (FTA 2022). These emission estimates are based on the size of the proposed facilities and the number of truck trips required to complete the excavation of each alternative and design option. Each phase of construction was considered separately and included both upstream and downstream sources of emissions.

In the construction phase of a transit project, upstream emissions are the emissions associated with the extraction, transportation, and production of the materials used in the construction of the facilities (e.g., asphalt, concrete, base stone, and steel). Downstream construction emissions are tailpipe emissions resulting from the operation of construction vehicles and equipment. In total, construction of the project would generate up to 1,944 $MTCO_2e$ per year. This total reflects an amortization of construction emissions over a 50-year period, which corresponds to the minimum useful life span of facilities (FTA 2017).

As shown in Table 3.8-3, operation and maintenance of OMF South would generate up to 1,191 $MTCO_2e$ per year. Although construction emissions are not included in the Washington State Agency Greenhouse Gas Calculator, the amortized emissions from construction have been added to the operational emissions to determine the total annual impact of the OMF South build alternatives. Table 3.8-4 summarizes the annual GHG emissions from construction, operation, and maintenance for each of the build alternatives. The largest impact would be from the Midway Landfill Alternative using the Full Excavation subsurface construction design option, which would generate up to 3,127 $MTCO_2e$ per year. This amount is less than the 10,000 $MTCO_2e$ per year mandatory reporting threshold for facilities in Washington State (Ecology 2020). Therefore, no additional analysis is required.

Table 3.8-4 Total Annual Greenhouse Gas Emissions

Build Alternative	Mainline Track Construction[1]		OMF Site Construction		Haul Truck Emissions	Operation and Maintenance	Annual GHG Emissions
	Upstream	Downstream	Upstream	Downstream			
Preferred	108	4	1,165	23	60	1,190	2,550
South 344th Street	129	5	1,165	23	75	1,191	2,588
Midway Landfill – Platform	N/A	N/A	1,165	23	284	1,183	2,655
Midway Landfill – Hybrid	N/A	N/A	1,165	23	684	1,183	3,055
Midway Landfill – Full Excavation	N/A	N/A	1,165	23	756	1,183	3,127

Notes: Construction emissions, including truck haul trips, have been amortized over a 50-year period prior to being added to the annual operations and maintenance emissions. Emissions are reported in $MTCO_2e$.

(1) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

3.8.2.4 Social Cost of Greenhouse Gas Emissions

The analysis of the social cost of GHG emissions estimates the monetary value of the net harm to society associated with emission of carbon dioxide, methane, nitrous oxide, or other GHGs in a given year that contribute to climate change (EPA 2023b). Following guidance on analyzing GHGs under NEPA (CEQ 2023), the social cost is estimated based on the annual $MTCO_2e$ emissions from the construction and operation of the build alternatives (see Table 3.8-4) multiplied by the average cost per $MTCO_2e$ determined by EPA.

Table 3.8-5 lists the social costs and emission equivalencies for the Build Alternatives from EPA's Greenhouse Gas Equivalencies Calculator (EPA 2024b).

Table 3.8-5 Social Cost of GHG Emissions and Emission Equivalencies

Build Alternative	Social Cost of GHG Emissions for the Year 2040 (2020 dollars)[1]	Number of Gasoline Powered Passenger Vehicles Driven for 1 Year for which GHG Emissions are Equivalent
Preferred	$688,500	567
South 344th Street	$698,760	576
Midway Landfill (Platform)	$716,850	591
Midway Landfill (Hybrid)	$824,850	680
Midway Landfill (Full Excavation)	$844,290	696

Notes:

(1) The estimated 2040 average cost, in 2020 dollars, is $270 (using the projected 2.0 percent near-term discount rate) per $MTCO_2e$. EPA projects rates at 10-year increments; 2040 was chosen for this analysis because it is the closest year to the OMF South design year of 2042.

3.8.2.5 Avoidance and Minimization of Impacts

Sound Transit would implement construction BMPs to minimize the impact on existing residential and recreational uses from construction-related emissions and fugitive dust, including the development of a fugitive dust control plan. Such plans typically include the following:

- Identification of all fugitive dust sources
- A source-specific description of the proposed dust control method(s)
- A prescribed method to identify how often, how much or when the control method is to be used
- Monitoring and recordkeeping plans and requirements
- A backup plan in case the first control plan is not successful
- The contact information for the person responsible for making sure the plan is implemented and who can be contacted for dust complaints (Ecology 2016)

BMPs to reduce construction impacts would be incorporated into construction plans and specifications and could include the following:

- Complying with the BMPs required in WAC 173-400-040 (general standards for maximum emissions)
- Complying with applicable dust control policies and plans
- Spraying dry soil with water to reduce dust
- Using temporary ground covers
- Minimizing idling of equipment when not in use
- Planning construction areas to minimize soil exposure for extended periods
- Covering dirt and gravel piles
- Establishing wheel wash stations at exits from spoils handling and truck-loading sites
- Sweeping paved roadways to reduce mud and dust
- Replanting exposed areas as soon as practical after construction

Sound Transit would implement the following measures to minimize, reduce, or control air emissions from the on-site paint booth:

- Install exhaust ventilation to remove particulates
- Dispose of paint materials appropriately
- Provide personal protective equipment to staff

3.8.2.6 Indirect Impacts

Indirect impacts are changes to air quality that may occur for reasons related to the project but are not part of it and that may occur separated by distance or time. The air quality analysis includes the indirect effects of the project and other traffic growth that would be associated with the project. Indirect construction GHG emissions are also known as embodied and life-cycle emissions. Both embodied and life-cycle emissions were included in the direct construction GHG methodology.

The expanded light rail system, which the OMF South would support, reduces regional vehicle miles of travel and associated auto-related criteria pollutants within the region (Sound Transit 2016). Therefore, the build alternatives would indirectly support improvements in air quality.

3.8.3 Mitigation Measures

Overall, existing air quality in the project area meets the national standards for criteria pollutants. With implementation of the controls required for the various aspects of construction activities and consistent use of BMPs to minimize on-site emissions, construction and operation of the proposed project would not be expected to substantially affect air quality. No mitigation is anticipated.

3.9 Noise and Vibration

This section contains the noise and vibration impact assessment for the OMF South project alternatives. Sound Transit uses FTA noise and vibration guidance in its environmental methodology to assess impacts from transit projects.

For the purposes of the noise analysis, sound is defined as small changes in air pressure above and below the standard atmospheric pressure, and noise is usually considered to be unwanted sound. The three parameters that define noise include:

- **Level:** The level of sound is the magnitude of air pressure change above and below atmospheric pressure and is expressed in decibels (dB). Typical sounds fall within a range between 0 dB (the approximate lower limit of human hearing) and 120 dB (the highest sound level generally experienced in the environment).
- **Frequency:** The frequency (pitch or tone) of sound is the rate of air pressure change and is expressed in cycles per second, or hertz (Hz). Human ears can detect a wide range of frequencies from around 20 to 20,000 Hz. The A-weighting system, which reduces the sound levels of higher- and lower-frequency sounds, is used to provide a measure (A-weighted decibels, or dBA) that correlates with human response to noise.
- **Time Pattern:** Because environmental noise is constantly changing, it is common to condense all this information into a single number, called the “equivalent” sound level (Leq). The Leq represents the changing sound level over a period of time, typically 1 hour or 24 hours in transit noise assessments. For assessing the noise impact of rail projects at residential land uses, the day-night sound level (Ldn) is used, which is a 24-hour cumulative noise exposure metric that accounts for increased noise sensitivity at night.

FTA criteria are based on both the existing level of noise and the change in noise exposure due to a project and depend on the land use category of the sensitive receptor. The descriptors and criteria for assessing noise impact vary according to land use categories adjacent to the project. For Category 2, land uses where people live and sleep (e.g., residential neighborhoods, hospitals, and hotels), the Ldn is the assessment parameter. For other land use types (Category 1 or 3) where there are noise-sensitive uses (e.g., outdoor concert areas, schools, and libraries), the Leq for an hour of noise sensitivity that coincides with train activity is the assessment parameter.

In addition, the noise assessment evaluates the noise impacts of the OMF at each build alternative under WAC 173-60, Maximum Environmental Noise Levels, which is used by Federal Way and Kent. WAC 173-60 defines the maximum allowable noise level (expressed as Leq) for each noise abatement designation, or land use zone, which can also be defined as residential, commercial, or industrial. As the WAC regulations only apply to stationary noise sources, the mainline track transit operations were not evaluated under these criteria.

For the purposes of the vibration analysis, ground-borne vibration from trains refers to the fluctuating or oscillatory motion experienced by persons on the ground and in buildings near railroad tracks. The response of humans, buildings, and equipment to vibration is most accurately described using velocity or acceleration. Because the human body tends to respond to an average of the vibration impulses, the root mean square (RMS) velocity is used to describe the "smoothed" vibration amplitude. RMS velocities are normally described in inches per second (in/sec) in the U.S., which can be expressed in decibel notation as vibration decibels (VdB).

Typical vibration levels can range from below 50 to 100 VdB, and the human threshold of perception is approximately 65 VdB. The operational vibration impact criteria used for the project are based on the information contained in Section 6 of the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The criteria for a general vibration assessment are based on land use and train frequency.

See Appendix G2, Noise and Vibration Technical Report, for further information on FTA noise and vibration criteria, WAC limits and applicability to the project, and more detail about the noise and vibration assessment.

3.9.1 Affected Environment

3.9.1.1 Noise- and Vibration-Sensitive Land Uses

Sensitive receptors near the build alternatives sites include single-family and multi-family residences, hotels, and religious facilities. There are no commercial or industrial land uses nor any special buildings, such as recording studios or buildings with specialized equipment highly sensitive to vibration, known to be near any of the build alternatives.

Preferred Alternative

The noise-sensitive land uses adjacent to the mainline track options and the test track between the Federal Way Downtown Station and the Preferred Alternative are a mix of single- and multi-family residences.

The study area around the Preferred Alternative OMF site includes a mix of commercial and noise-sensitive residential land uses. To the north of the OMF site is a noise-sensitive residential community with a mix of single- and multi-family residences and the Russian-Ukrainian Seventh-Day Adventist Church. To the south is a mix of commercial uses with a few scattered noise-sensitive residences and the Restoration Life Church. To the west are commercial uses on both sides of SR 99, along with the KAC Baptist Church, and I-5 is to the east.

South 344th Street Alternative

The land uses around the mainline track options and the test track between the Federal Way Downtown Station and the South 344th Street Alternative are the same as described above for the Preferred Alternative. The land uses around the mainline tail track alignments to the south of the South 344th Street Alternative are commercial, with no noise-sensitive land uses.

The study area around the South 344th Street Alternative includes a mix of commercial, institutional, and noise-sensitive residential land uses. To the north of the OMF site is a noise-sensitive residential community with a mix of single- and multi-family residences, the Christian Faith Center and associated school, the Russian-Ukrainian Seventh-Day Adventist Church, and the KAC Baptist Church. To the south are commercial uses. To the west are commercial uses on both sides of SR 99, and I-5 is to the east.

Midway Landfill Alternative

The land use around the Midway Landfill Alternative includes primarily commercial land uses to the west on both sides of SR 99, along with three religious facilities that are noise sensitive: the Great Commission Presbyterian Church, the New Jerusalem Haitian Baptist Church, and the

Seattle Full Gospel Church. Noise-sensitive uses also include a mobile home park to the north and hotels and a single-family residential community to the south.

3.9.1.2 Existing Noise Conditions

Existing ambient noise levels were characterized through 24-hour direct measurements at selected sites in the areas near the OMF South alternatives during November 2019. Noise sources in the project area include traffic on I-5, local roadway traffic, aircraft overflights, and local community activities. The existing ambient sound levels vary by location, depending on the proximity to I-5, and are generally typical of a suburban environment near a busy interstate highway. The results of the existing noise measurements are shown in Table 3.9-1, and the locations of the measurements are shown in Figures 3.9-1 through 3.9-3.

Table 3.9-1 Summary of Existing Ambient Noise Measurement Results

Site	Measurement Location Description	Meas. Duration (hours)	Noise Exposure (dBA) Ldn	Noise Exposure (dBA) 1 Hour Leq
D	Mainline Track – 11 The Dunes Court, Belmor	24	65	59
E	Mainline Track – 326 Oakland Hills Boulevard, Belmor	24	70	65
F	Preferred Alt/S 344th – Christian Faith Center West	24	67	62
G	Preferred Alt/S 344th – Christian Faith Center East	24	72	66
H	Preferred Alt – 20th Avenue S and S 31st Place	24	73	67
A	Midway Landfill – Southwest Corner	24	65	62
B	Midway Landfill – Southeast Corner	24	71	66
C	Midway Landfill – North Side	24	67	62

3.9.1.3 Existing Vibration Conditions

Vibration-sensitive land uses for the build alternatives are the same as the noise-sensitive land uses described above. Existing vibration sources include auto, bus, and truck traffic on local streets. However, vibrations from street traffic are not generally perceptible at receivers in the study area unless streets have substantial bumps, potholes, or other uneven surfaces. Furthermore, the FTA vibration impact criteria are not ambient based; that is, future project vibrations are not compared with existing vibrations to assess impact. Therefore, the vibration measurements for the project focused on characterizing the vibration propagation properties of the soil along the mainline track design options rather than characterizing the existing vibration levels. One vibration propagation test site, Site VP-A in Belmor, was selected for the 2019 measurements. The location of the site is shown in Figures 3.9-1 and 3.9-2.

6/22/2023 | ST_OMFS_Ph3 | OMFS_Fig3_9_123_NoiseMeasurementLocs.mxd

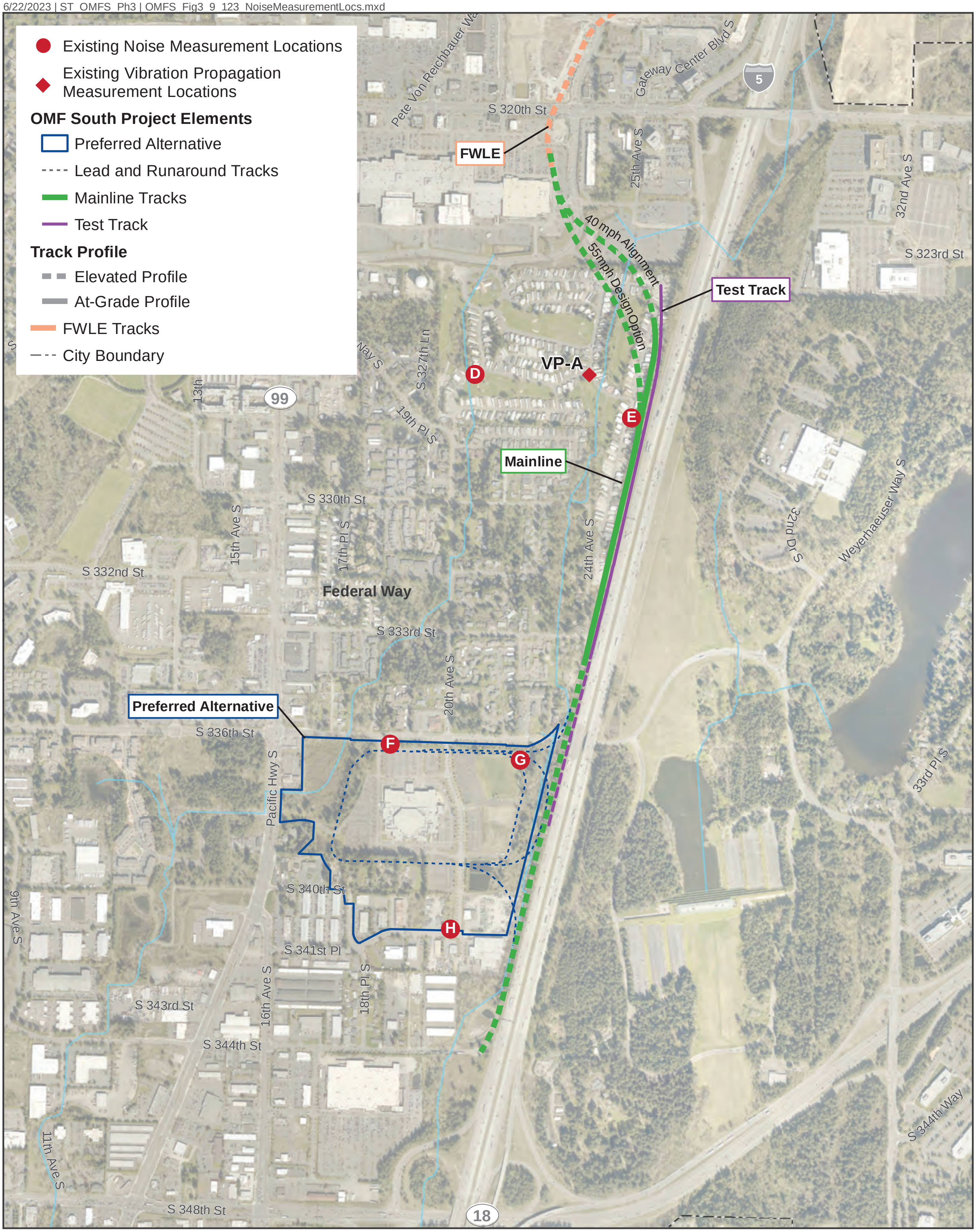
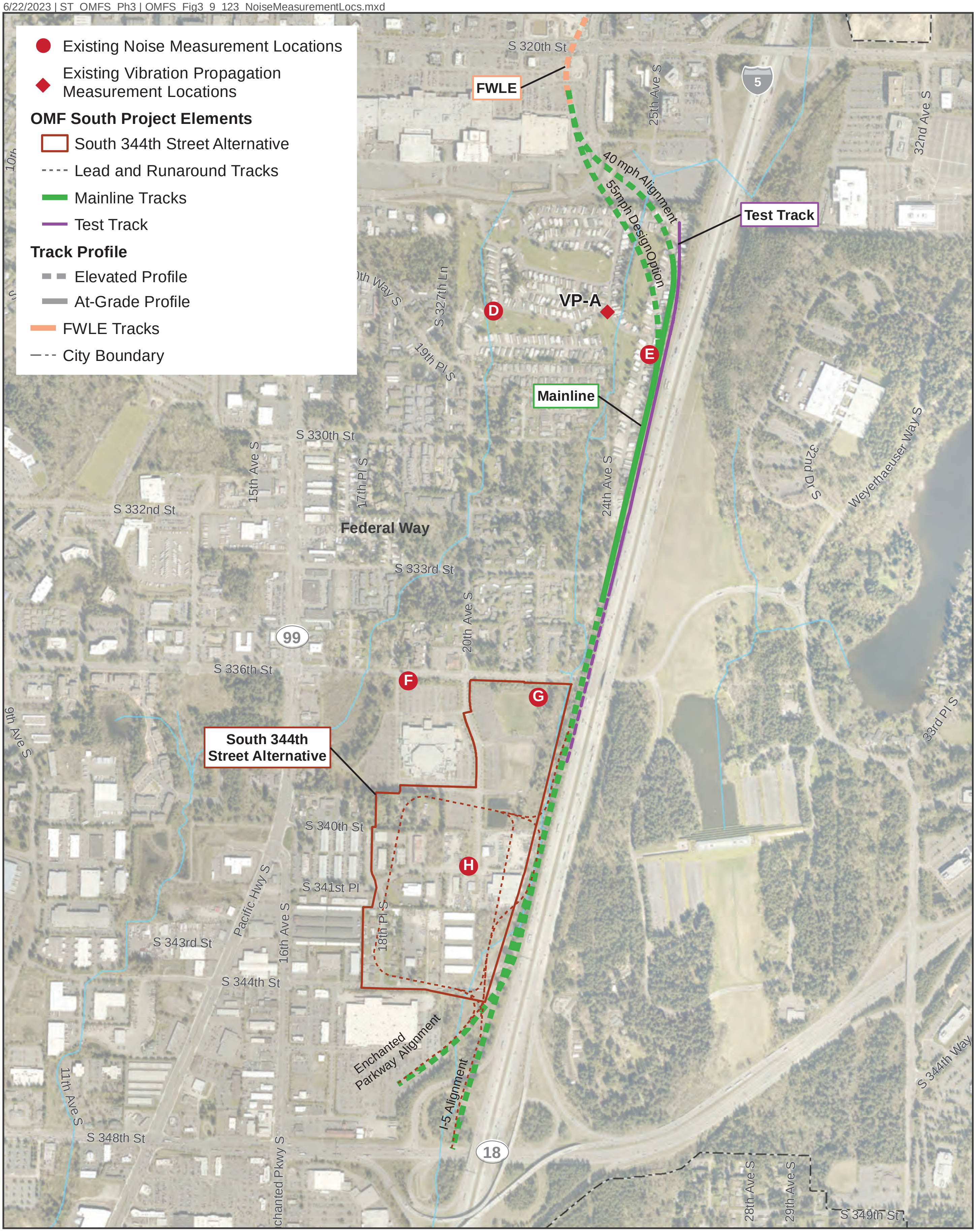

● Existing Noise Measurement Locations
◆ Existing Vibration Propagation Measurement Locations
OMF South Project Elements
Preferred Alternative
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Pete Von Reichbauer Way
Gateway Center Blvd S
5
S 320th St
FWLE
25th Ave S
32nd Ave S
40 mph Alignment
55mph Design Option
S 323rd St
Test Track
Way S
S 327th Ln
D
VP-A
13th
99
E
19th Pl S
Mainline
S 330th St
24th Ave S
32nd Dr S
Weyerhaeuser Way S
15th Ave S
17th Pl S
S 332nd St
Federal Way
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
F
G
Pacific Hwy S
33rd Pl S
S 340th St
9th Ave S
H
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
S 344th Way
11th Ave S
S 348th St
18
N
0
1,000
2,000 Feet

FIGURE 3.9-1

Measurement Locations for Existing Ambient Noise and Vibration: Preferred Alternative

OMF South



● Existing Noise Measurement Locations
◆ Existing Vibration Propagation Measurement Locations
OMF South Project Elements
South 344th Street Alternative
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
S 320th St
FWLE
5
25th Ave S
32nd Ave S
40 mph Alignment
55mph Design Option
Test Track
VP-A
D
E
Mainline
S 327th Ln
19th Pl S
S 330th St
15th Ave S
17th Pl S
S 332nd St
Federal Way
24th Ave S
32nd Dr S
Weyerhaeuser Way S
S 333rd St
99
20th Ave S
S 336th St
F
G
South 344th Street Alternative
9th Ave S
33rd Pl S
S 340th St
H
S 341st Pl
Pacific Hwy S
16th Ave S
18th Pl S
S 343rd St
S 344th St
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 344th Way
S 348th St
18
Enchanted Pkwy S
28th Ave S
29th Ave S
S 349th St
N
0
1,000
2,000 Feet

FIGURE 3.9-2

Measurement Locations for Existing Ambient Noise and Vibration: South 344th Street Alternative

OMF South

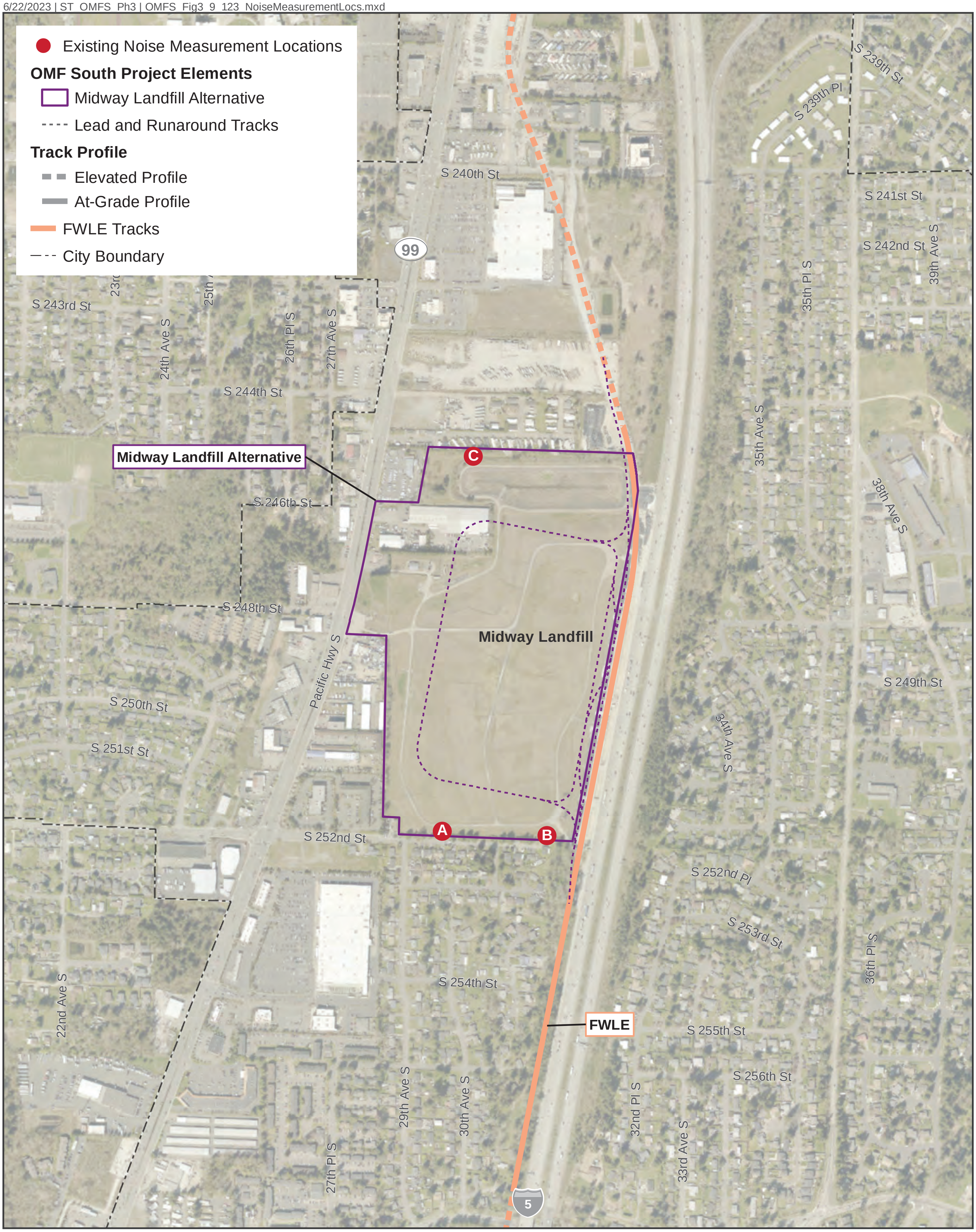

● Existing Noise Measurement Locations
OMF South Project Elements
Midway Landfill Alternative
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
A
B
C
Midway Landfill Alternative
Midway Landfill
FWLE
99
5
S 239th St
S 239th Pl
S 240th St
S 241st St
S 242nd St
S 243rd St
S 244th St
S 246th St
S 248th St
S 249th St
S 250th St
S 251st St
S 252nd St
S 252nd Pl
S 253rd St
S 254th St
S 255th St
S 256th St
22nd Ave S
23rd
24th Ave S
25th
26th Pl S
27th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
35th Ave S
35th Pl S
36th Pl S
38th Ave S
39th Ave S
Pacific Hwy S
N
0
1,000
2,000 Feet

FIGURE 3.9-3

Measurement Locations for Existing Ambient Noise: Midway Landfill Alternative

3.9.2 Environmental Impacts

3.9.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to noise and vibration from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. The noise and vibration effects of FWLE on sensitive receptors near the Midway Landfill Alternative were addressed in the 2016 Federal Way Link Extension Final Environmental Impact Statement. FWLE constructed noise walls adjacent to the residential areas near the Midway Landfill to mitigate the anticipated noise impacts from that project. No vibration impacts from FWLE are anticipated in the area. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. The noise and vibration effects of TDLE and Federal Way's City Center Access Project on sensitive receptors within the study area for the Preferred and South 344th Street alternatives are discussed in Chapter 4, Cumulative Effects Analysis. Noise and vibration impacts from TDLE will be further detailed in the TDLE Draft EIS, which is expected to be published in mid-2024.

3.9.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Noise-generating activities at OMF South would include vehicles moving within the OMF site, vehicle washing and drying, limited testing of train bells and horns, a traction power substation, and vehicles moving on the mainline tracks (for the Preferred and the South 344th Street alternatives) into service in the morning and back to the OMF in the late evening, and test track operations.

Wheel squeal is possible on curves with a radius of less than 600 to 1,000 feet, depending on the speed and type of trackway. Wheel squeal is not included in the noise model because Sound Transit has committed to reducing any potential wheel squeal by installing wayside lubricators on all curves with a radius of less than 600 feet in noise-sensitive areas and by preparing all curves for wayside lubricators that have a radius of between 600 and 1,000 feet. There are numerous tight radius curves within the OMF sites for all three build alternatives that would also be prepared for wayside lubricators.

The slow speeds within the OMF South site would reduce any impact noise associated with crossover connections between tracks within the facility. Crossover tracks connecting to the mainline tracks would have higher speed operations and the potential for additional noise from vehicles traveling over them.

There are no FTA noise impacts or WAC exceedances associated with the OMF sites for any of the build alternatives. Noise impacts for the mainline tracks are discussed below. There are no vibration impacts associated with any of the build alternatives for all project elements including the mainline tracks.

Preferred Alternative

As several homes would be acquired along the mainline alignment, there would be no residential receptors immediately adjacent to the mainline or test tracks. As a result, there are no FTA noise impacts for the 40 mph Alignment, but there are FTA noise impacts at four single-family residences for the 55 mph Design Option, all due to their proximity to the proposed mainline tracks. The noise impact locations are described in Table 3.9-2 for the 40 mph Alignment and are described in Table 3.9-3 and shown in Figure 3.9-4 for the 55 mph Design Option.

Tables 3.9-2 and 3.9-3 compare the estimated noise levels from the project against existing noise levels to determine the locations and severity of any noise impacts based on the FTA noise criteria. The existing noise level was measured at locations near the OMF and mainline tracks, as described in the Affected Environment section above. The project noise level was determined based on project parameters, such as the speed of the trains, headways and hours of operation, and the distance to sensitive receptors from the tracks. FTA moderate and severe noise criteria are based on the existing noise level (see Appendix G2, Noise and Vibration Technical Report, for information regarding the determination of the impact criteria). There are no noise or vibration sensitive receptors near the mainline tail tracks and no FTA noise impacts, WAC exceedances, or vibration impacts. There are no FTA noise impacts, WAC exceedances, or vibration impacts for the Preferred Alternative OMF site. The only activity that would generate vibration would be vehicles moving on the mainline or test tracks. Details regarding the model and assumptions used for the noise and vibration impact assessment are included in Appendix G2, Noise and Vibration Technical Report.

Table 3.9-2 Summary of Noise Impacts: 40 mph Alignment Mainline Track

Location	Side of Track	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 324th Street to Burning Tree Boulevard	SB[1]	80	70	62	64	69	0	0
Burning Tree Boulevard to S 330th Street	SB	111	70	56	64	69	0	0
S 330th Street to S 333rd Street	SB	81	72	58	65	71	0	0
S 333rd Street to S 336th Street	SB	197	72	64 (58)[2]	65	71	0 (0)[2]	0 (0)[2]
Total:							**0 (0)[2]**	**0 (0)[2]**

Note: If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(1) SB = southbound

(2) The Preferred Alternative is shown first followed by the South 344th Street Alternative in parenthesis. The lead tracks and crossovers from the OMF would be further south for the South 344th Street Alternative in comparison to the Preferred Alternative.

Table 3.9-3 Summary of Noise Impacts: 55 mph Design Option Mainline Track

Location	Side of Track	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 324th Street to Burning Tree Boulevard	NB[1]	76	65	61	64	69	2	0
S 324th Street to Burning Tree Boulevard	SB[1]	57	65	63	61	66	2	0
Burning Tree Boulevard to S 330th Street	SB	85	70	57	64	69	0	0
S 330th Street to S 333rd Street	SB	81	72	58	65	71	0	0
S 333rd Street to S 336th Street	SB	197	72	64 (58)[2]	65	71	0 (0)[2]	0 (0)[2]
						Total:	**4 (0)[2]**	**0 (0)[2]**

Note: If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

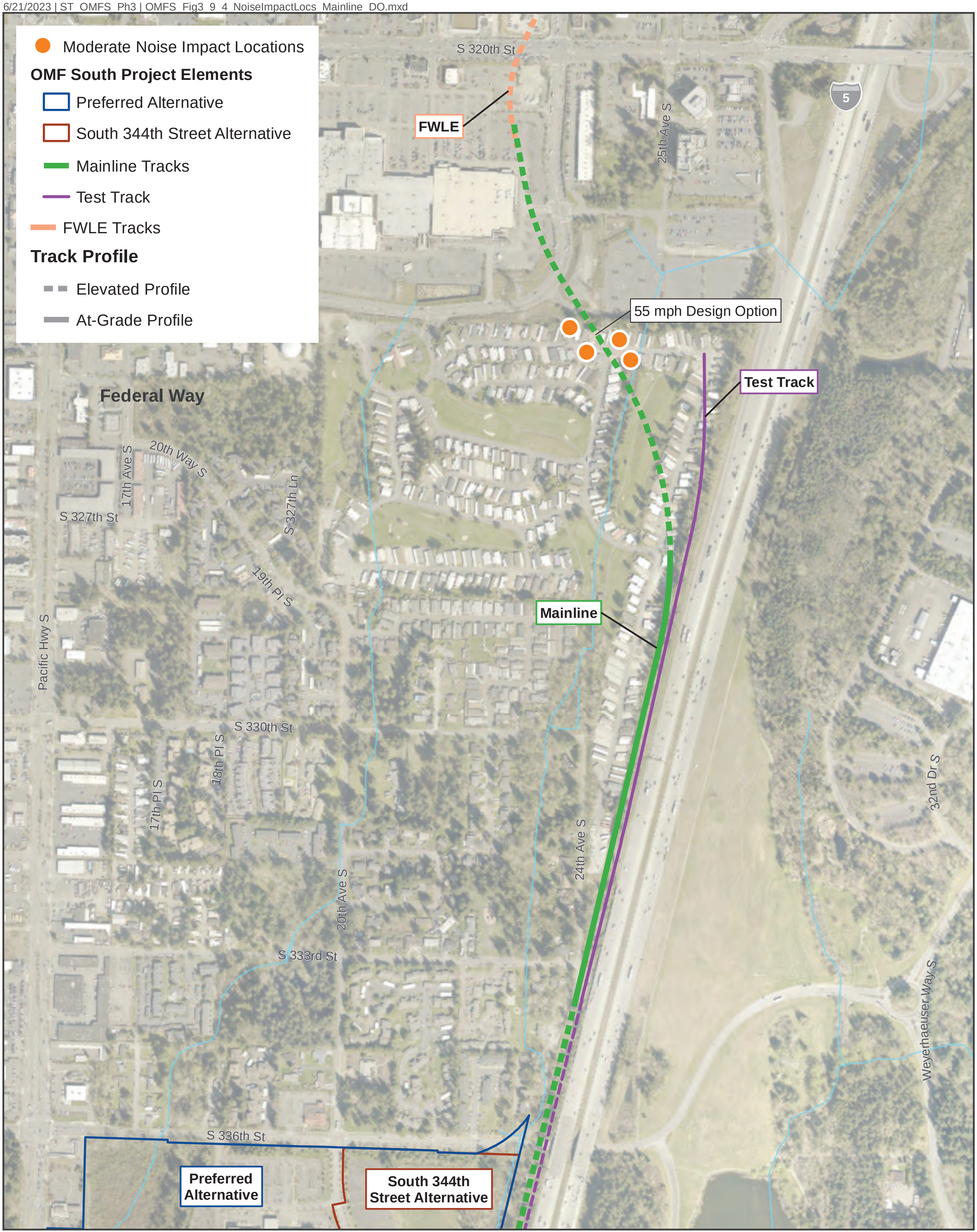
(1) NB = northbound, SB = southbound

(2) The Preferred Alternative is shown first followed by the South 344th Street Alternative in parenthesis. The lead tracks and crossovers from the OMF would be further south for the South 344th Street Alternative in comparison to the Preferred Alternative.

Construction of either mainline alignment would modify a portion of an existing berm and remove noise walls adjacent to I-5 that screen residences from traffic noise between S 320th Street and S 336th Street. The berm and noise walls were anticipated to be removed by the City of Federal Way's City Center Access Project, which would construct a new interchange with roundabouts and a new bridge over I-5 at S 324th Street. However, the City Center Access Project is now anticipated to be constructed after OMF South. As a result, Sound Transit would modify the existing berm and remove approximately 1,390 linear feet of noise walls as part of the OMF South project.

While the retained fill structure to support the mainline would serve as a barrier to traffic noise from I-5, the modification of the existing berm and noise walls is anticipated to result in traffic noise impacts for about one to three residences (Sound Transit 2023a). In final design, Sound Transit would conduct additional noise analysis in coordination with Federal Way and WSDOT to verify the findings of the noise analysis, determine whether replacement of noise walls would be necessary, and ensure that the location of any new noise walls would be consistent with the plans for the City Center Access Project.

6/21/2023 | ST_OMFS_Ph3 | OMFS_Fig3_9_4_NoiseImpactLocs_Mainline_DO.mxd


● Moderate Noise Impact Locations
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
S 320th St
FWLE
5
25th Ave S
55 mph Design Option
Test Track
Federal Way
20th Way S
17th Ave S
S 327th St
S 327th Ln
19th Pl S
Mainline
Pacific Hwy S
S 330th St
18th Pl S
17th Pl S
24th Ave S
32nd Dr S
20th Ave S
S 333rd St
Weyerhaeuser Way S
S 336th St
Preferred Alternative
South 344th Street Alternative

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.9-4
Noise Impact Locations
55 mph Design Option
OMF South

South 344th Street Alternative

Impacts due to the mainline tracks and test track would be the same as those discussed above for the Preferred Alternative, described in Tables 3.9-2 and 3.9-3 and shown in Figure 3.9-4.

There are no noise or vibration sensitive receptors near either of the mainline tail track options and no FTA noise impacts, WAC exceedances, or vibration impacts. There are no FTA noise impacts, WAC exceedances, or vibration impacts for the South 344th Street Alternative OMF site.

Midway Landfill Alternative

There are no FTA noise impacts, WAC exceedances, or vibration impacts for the Midway Landfill Alternative.

3.9.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Noise

Elevated noise levels from construction activities are, to a degree, unavoidable for this type of project. For most construction equipment, diesel engines are typically the dominant noise source. For other activities, such as impact pile driving and jackhammering, noise generated by the actual process dominates. Noise during construction of the project can be intrusive to residents near the construction sites. Most of the construction would consist of site preparation and laying new tracks and should occur primarily during daytime hours, except when required and within city noise ordinance procedures for a variance. At some locations, more extensive work would occur, such as pile driving for elevated structures and retaining walls.

Construction noise predictions at noise-sensitive locations depend on the amount of noise during each construction phase, the duration of the noise, and the distance from the construction activities to the sensitive receptor. Conducting a construction noise impact assessment requires knowledge of the equipment likely to be used, the duration of its use, and the way it would be used by a contractor. Table 3.9-4 provides an example of a construction noise projection for typical at-grade track construction. Construction for other project features, such as buildings, would have similar results. Using these assumptions, an 8-hour Leq of 88 dBA would be projected at a distance of 50 feet from the construction site.

Table 3.9-4 Typical Construction Scenario, At-Grade Track

Equipment Type	Typical Noise Level at 50 Feet (dBA)	Equipment Utilization Factor	Leq (dBA)
Grader	85	50%	82
Backhoe	80	40%	76
Compactor	82	20%	75
Loader	85	20%	78
Roller	74	20%	67
Truck	88	40%	84
Crane, mobile	83	20%	76
Total 8-hour workday Leq at 50 feet:			**88**

Within residential land uses, the potential noise impacts from short-term, at-grade track construction could extend to approximately 120 feet from the corridor; however, if nighttime construction is conducted (when sensitivity to noise is higher and the criteria for impacts are lower), the potential for short-term noise impacts from at-grade track construction could extend to approximately 380 feet from the corridor. The distances of noise impacts would likely be similar for OMF site construction. For elevated structure construction, the distance for noise impacts during the daytime could be up to 250 feet for impact pile driving, assuming a usage factor of 20 percent during the day. If alternative methods of piling are used, the impact distance could be less.

Based on the distances above, there would be sensitive receptors within the screening distances for all three OMF South build alternatives and both mainline track design options. Noise impacts perceived by residents and other sensitive receptors would vary, depending on the proximity of the construction activity, the type of equipment being used, the time of day, and the overall duration of construction. While the noise levels would be similar for construction of any of the build alternatives, the Midway Landfill Alternative would have the greatest impact due to the extended period of time and number of daily truck trips needed for site preparation work.

Vibration

Unlike typical light rail transit operations, there is the potential for damage to nearby structures at close distances due to vibration from construction activities, such as pile driving, hoe rams, vibratory compaction, and loaded trucks. Most limits on construction vibration are based on reducing the potential for damage to nearby structures. Although construction vibrations are only temporary, it is still reasonable to assess the potential for human annoyance and damage.

As a conservative approach, the potential for construction vibration impacts was assessed based on the vibration damage criteria for the non-engineered timber and masonry building category (Category III) in the FTA guidance manual (FTA 2018). A vibration criterion of 94 VdB was used to assess potential damage impact, and the operational vibration criterion of 72 VdB was used to assess potential vibration annoyance from construction activities. With the exception of impact pile driving, the potential for vibration damage is limited to within 25 feet of construction activities. For impact pile driving, the screening distance for potential vibration damage is 55 feet. There are no sensitive receptors within 25 feet of the project alternatives, but there are several within 55 feet of both mainline alignments (40 mph Alignment and 55 mph Design Option) in Belmor. However, any potential for impacts would depend on the method of pile installation.

Because the exact location of construction equipment is important in projecting vibration levels, a more detailed assessment of potential vibration damage will be performed during final design when more accurate equipment locations are known.

3.9.2.4 Avoidance and Minimization of Impacts

For the Preferred and South 344th Street alternatives, the curves of the mainline 40 mph Alignment north of S 324th Street and from S 324th Street to Oakland Hills Boulevard would have a radius between 600 and 1,000 feet and would be prepared for wayside lubricators.

Construction activities would be carried out in compliance with Sound Transit specifications and applicable local noise regulations. Construction noise is exempt from the WAC noise limits, except at residential land uses during nighttime hours (10 p.m. to 7 a.m.). If construction is performed during nighttime hours, the contractor must meet the WAC noise level requirements or obtain a noise variance from the governing jurisdiction.

Noise-control for nighttime or daytime work may include the following measures, as necessary, to meet required noise limits and minimize temporary vibration impacts. These measures would be confirmed during final design and, if needed, the approval process for any noise variances:

- Avoiding nighttime construction in residential neighborhoods when possible
- Locating stationary construction equipment as far as possible from noise-sensitive sites
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers
- Routing construction-related truck traffic to roadways that would cause the least disturbance to residents
- Using alternative construction methods to minimize the use of impact and vibratory equipment (e.g., pile-drivers and compactors). If pile driving is necessary, it would be limited to daytime hours

In addition to the measures listed above, a detailed Noise and Vibration Control Plan would be required from the contractor as part of construction. Key elements of a plan would include:

- Contractor's specific equipment types
- Schedule (dates and times of day) and methods of construction
- Maximum noise limits for each piece of equipment with certification testing
- Prohibitions on certain types of equipment and processes during the night or daytime hours per local agency coordination and approved variances
- Identification of specific sensitive receptors near construction sites
- Methods for predicting construction noise levels
- Implementation of noise and vibration control measures where appropriate
- Methods for responding to community complaints in compliance with Sound Transit outreach requirements

3.9.2.5 Indirect Impacts

No indirect impacts related to noise and vibration would result from construction and operation of the proposed project. Most vehicle traffic and other sources of environmental vibration are below the levels of human perception and would not cause an indirect impact.

3.9.3 Mitigation Measures

3.9.3.1 Long-Term Measures

When noise would exceed FTA moderate or severe impact criteria, Sound Transit would provide noise mitigation measures consistent with its Link Light Rail Noise and Vibration Policy (Resolution No. R2023-15) (Sound Transit 2023b) and the Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The Sound Transit Link Noise Mitigation Policy provides the hierarchy for implementation of mitigation measures. It prioritizes reduction at the noise source, followed by measures to disrupt the noise path, such as sound walls. Lastly it considers residential sound insulation. For the Preferred and South 344th Street alternatives, noise barriers are proposed for mitigation along the 55 mph Design Option elevated mainline track (Figure 3.9-5).

Noise barrier locations and lengths are described in Table 3.9-5. Typical noise barriers are 4 feet in height on elevated structures. Assuming 4-foot barriers on the elevated structure at the locations described below, the barriers would provide approximately 8 dBA of noise reduction, and there would be no residual impacts after mitigation. No mitigation would be necessary for the Midway Landfill Alternative.

Table 3.9-5 Summary of Potential Noise Barrier Locations

Mainline Track Options	Approximate Location	Noise Barrier Length (ft)
55 mph Design Option	Northbound side from south of Park & Ride to south of Burning Tree Boulevard	360
55 mph Design Option	Southbound side from south of Park & Ride to south of Burning Tree Boulevard	325

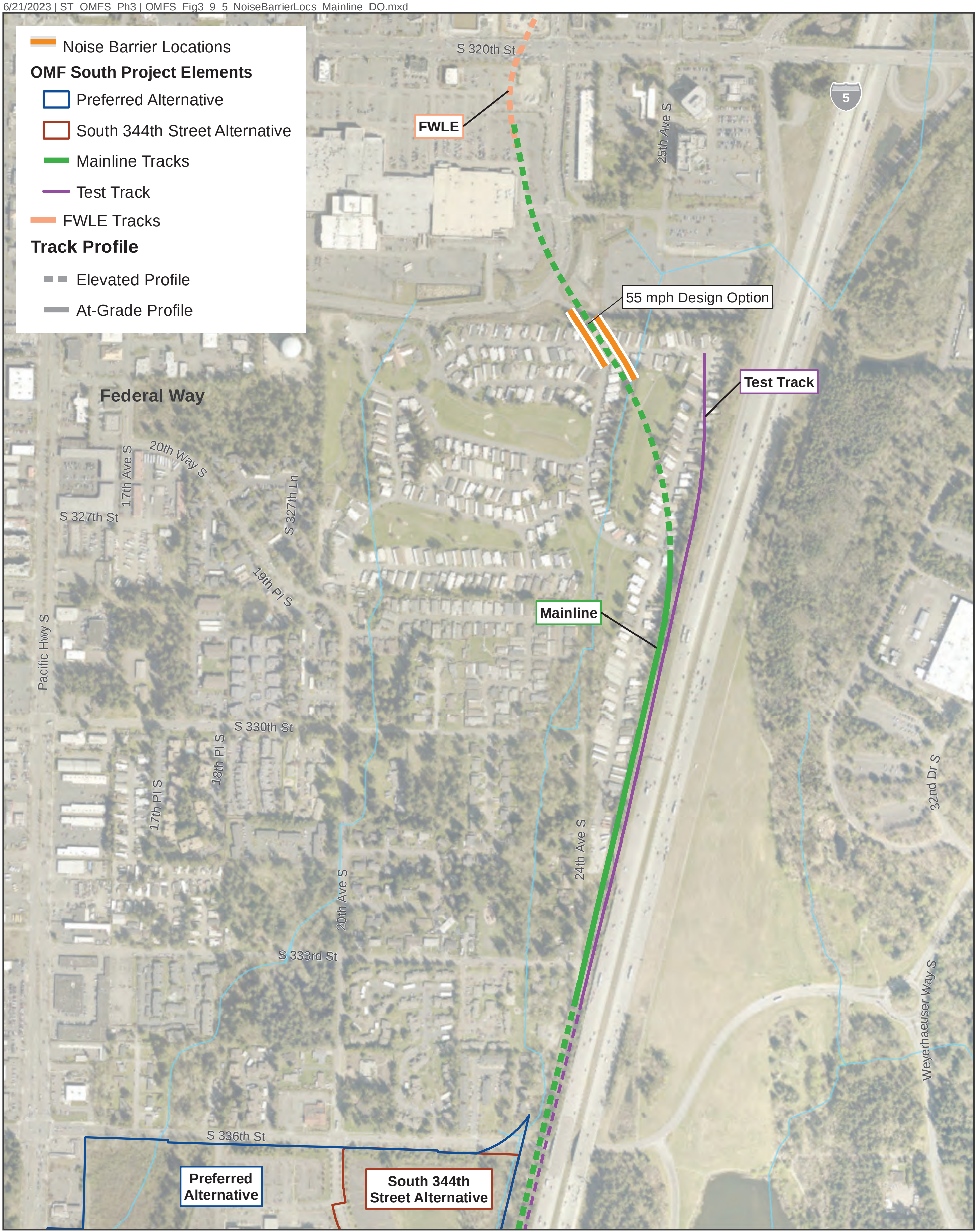
During final design, the noise analysis will be updated based on the more advanced design. All predicted noise levels and mitigation measures would be reviewed, and mitigation would be modified as needed to reduce noise levels to below the FTA impact criteria. If equivalent mitigation could be achieved by a less costly means or if the final design analysis shows no impact, then the mitigation measure may be modified or eliminated. After light rail operations begin, if the resulting noise were to exceed FTA criteria, Sound Transit would evaluate the need for additional mitigation.

For the Preferred and South 344th Street alternatives, Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing WSDOT berm and noise wall. Mitigation would be designed to maintain 2042 No-Build levels and could include replacement of noise walls and berms. Sound Transit would conduct additional noise analysis during final design in coordination with WSDOT to confirm whether noise mitigation is needed.

The noise mitigation for the cumulative effects of TDLE on sensitive receptors for the Preferred and South 344th Street alternatives, including the mainline tracks, and the City Center Access Project are discussed in Chapter 4, Cumulative Effects Analysis, and will be further detailed in the TDLE Draft EIS, which is expected to be published in mid-2024, and the City Center Access Project Noise Discipline Report.

3.9.3.2 Construction Measures

Through compliance with applicable construction permits and implementation of avoidance and minimization measures described in Section 3.9.2.4, Avoidance and Minimization of Impacts, no mitigation for construction noise impacts would be needed.


Noise Barrier Locations
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
S 320th St
FWLE
25th Ave S
5
55 mph Design Option
Test Track
Federal Way
20th Way S
17th Ave S
S 327th St
S 327th Ln
19th Pl S
Mainline
Pacific Hwy S
S 330th St
18th Pl S
17th Pl S
24th Ave S
20th Ave S
32nd Dr S
S 333rd St
Weyerhaeuser Way S
S 336th St
Preferred Alternative
South 344th Street Alternative

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.9-5
Noise Barrier Locations
55 mph Design Option

OMF South

3.10 Ecosystem Resources

This section evaluates the potential effects of the OMF South project alternatives on ecosystem resources, which include aquatic species and habitat; vegetation, wildlife, and wildlife habitat; and wetlands. Analyses in this section also evaluate potential effects on Essential Fish Habitat and threatened and endangered species that would typically be addressed during consultation under Section 7 of the Endangered Species Act (ESA). The Ecosystem Resources Technical Report (Appendix G3) provides detailed information on the regulations, analysis methods, affected environment, species, and impacts discussed in this section.

The study area for aquatic resources and wetlands includes all areas within 300 feet of the proposed construction limits of the project. This encompasses the area within which project construction and operation could deliver sediment to streams and where vegetation clearing could affect riparian habitat quality. This distance is also the largest potential width of regulatory buffers for wetlands that may be required in the project area. To address the potential impacts of stormwater runoff on fish, resource analysts also identified fish species that are known or expected to use aquatic habitats downstream of the study area.

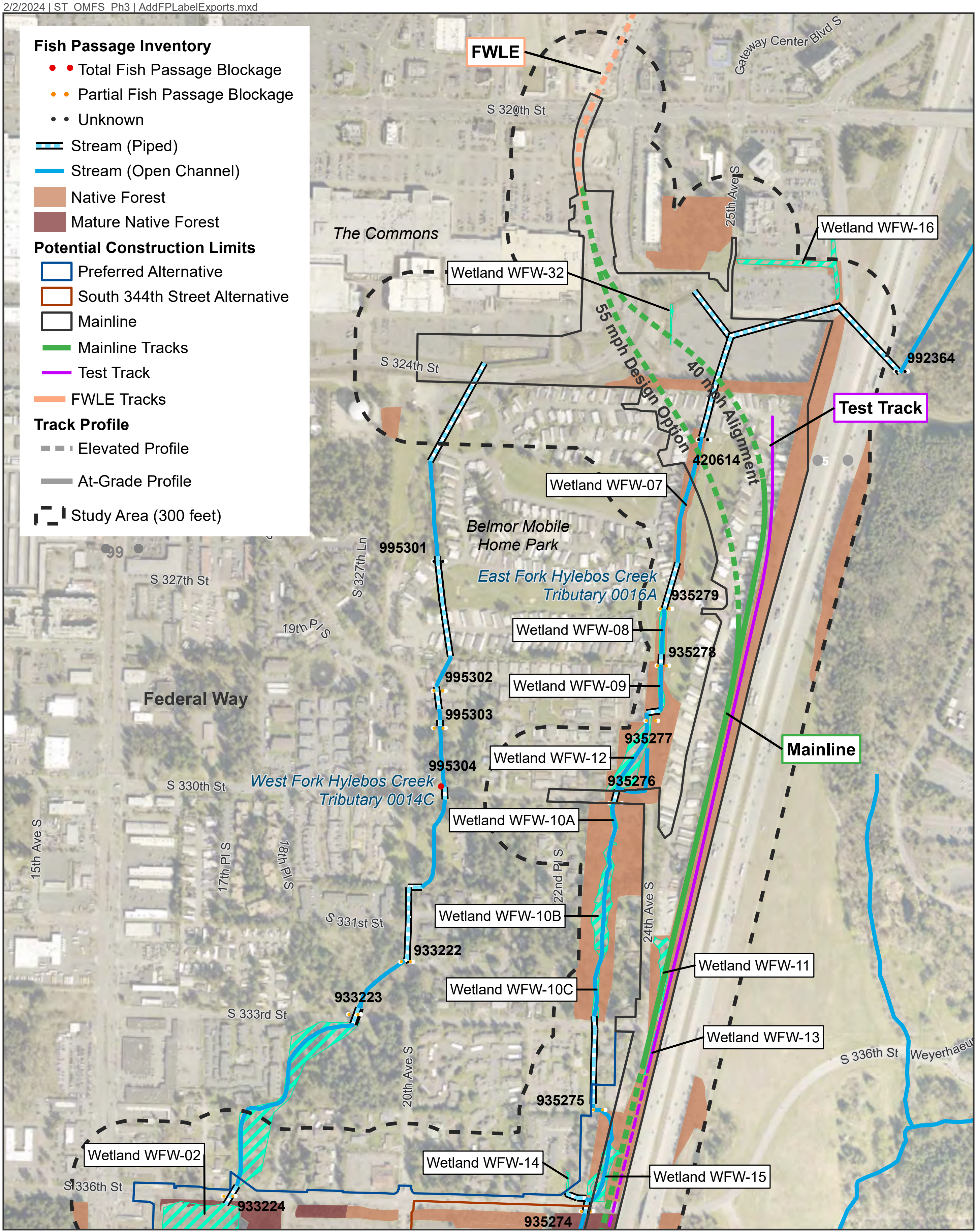
The study area for terrestrial resources includes areas within 200 feet of the proposed construction limits of the project. This represents a conservative estimate of the area in which project construction and operation could affect vegetation cover and habitat quality for terrestrial wildlife. To address wildlife potentially affected by project-related noise and human activity, resource analysts also reviewed documented occurrences of sensitive wildlife species within 0.25 mile of project construction areas.

3.10.1 Affected Environment

3.10.1.1 Aquatic Species and Habitat

The assessment of aquatic species and habitat focused on features that may be affected by the project and that are directly related to ecological functions that support aquatic ecosystems. After collecting and reviewing existing information, biologists conducted detailed field reconnaissance and delineation surveys within the study area to identify and confirm ecosystem resources that could be affected. While formal surveyed delineations are typically completed during the permitting process, biologists conducted formal delineations of the ordinary high water line of tributaries to Hylebos Creek to inform discussions with Tribes, agencies, and the public and to guide the design to avoid or minimize impacts. More detailed information about streams and aquatic species in the study area is available in Appendix G3, Ecosystem Resources Technical Report.

The study area includes two streams: East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C (Figures 3.10-1 and 3.10-2), referred to East Fork Hylebos Tributary and West Fork Hylebos Tributary, respectively, in this Final EIS. Both are tributaries to Hylebos Creek, an independent tributary that discharges to the Hylebos Waterway along the eastern shore of Puget Sound’s Commencement Bay in Tacoma. A third stream, North Fork McSorley Creek, receives discharge from a regional stormwater detention facility at the north end of the study area (Figure 3.10-3). North Fork McSorley Creek would receive additional treated stormwater runoff from the Midway Landfill Alternative but would otherwise not be affected by project construction or operation.

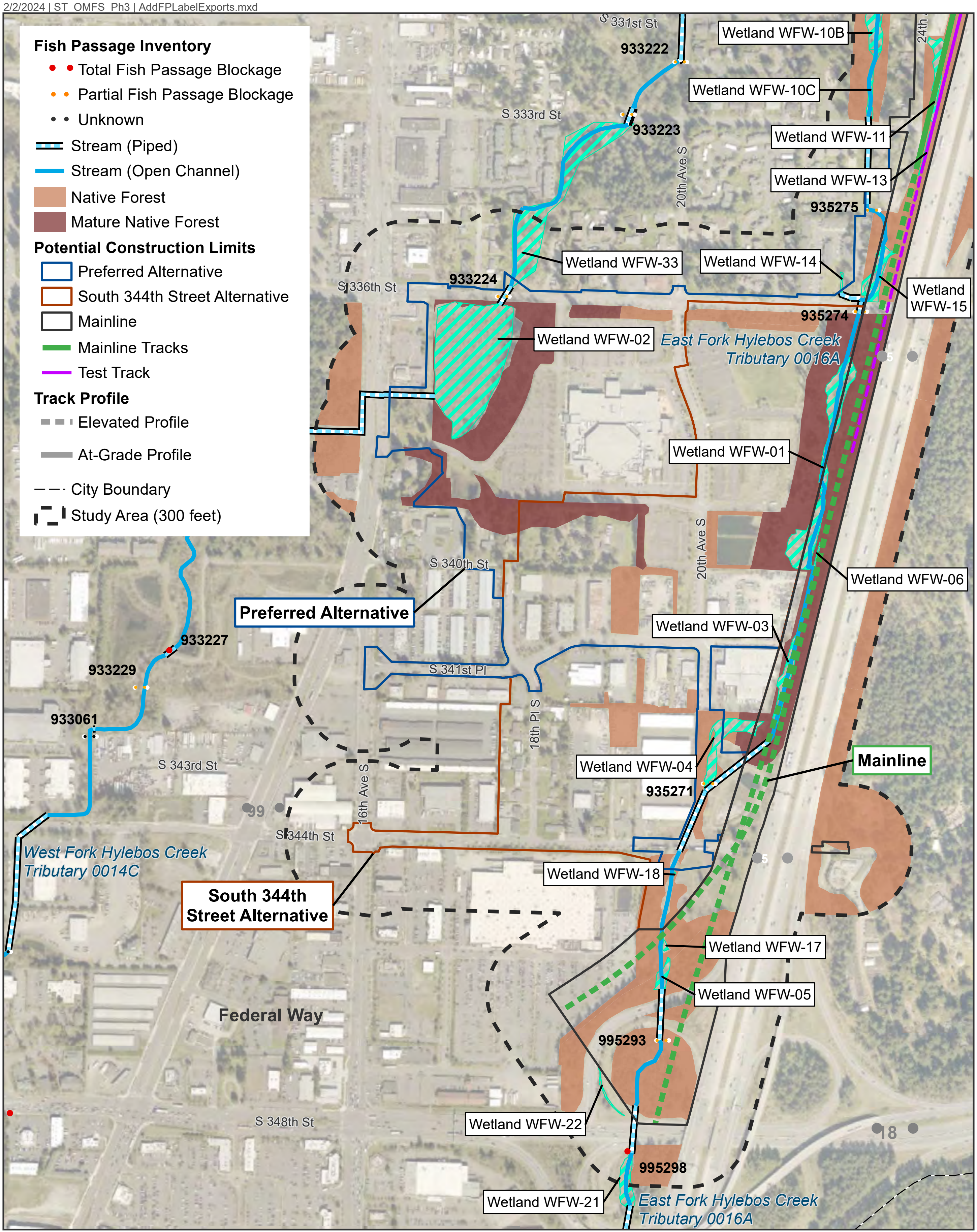

Fish Passage Inventory
● ● Total Fish Passage Blockage
● ● Partial Fish Passage Blockage
● ● Unknown
Stream (Piped)
Stream (Open Channel)
Native Forest
Mature Native Forest
Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Study Area (300 feet)
FWLE
Gateway Center Blvd S
S 320th St
25th Ave S
The Commons
Wetland WFW-16
Wetland WFW-32
55 mph Design Option
40 mph Alignment
S 324th St
992364
Test Track
420614
Wetland WFW-07
Belmor Mobile Home Park
995301
S 327th Ln
East Fork Hylebos Creek Tributary 0016A
935279
S 327th St
19th Pl S
Wetland WFW-08
935278
995302
Wetland WFW-09
Federal Way
995303
935277
Mainline
995304
Wetland WFW-12
935276
S 330th St
West Fork Hylebos Creek Tributary 0014C
Wetland WFW-10A
15th Ave S
17th Pl S
18th Pl S
22nd Pl S
24th Ave S
Wetland WFW-10B
S 331st St
933222
Wetland WFW-11
Wetland WFW-10C
933223
S 333rd St
Wetland WFW-13
S 336th St
Weyerhaeu
20th Ave S
935275
Wetland WFW-02
Wetland WFW-14
Wetland WFW-15
S 336th St
933224
935274
N
0
500
1,000 Feet

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

FIGURE 3.10-1
Ecosystem Resources
Mainline Track Options

OMF South

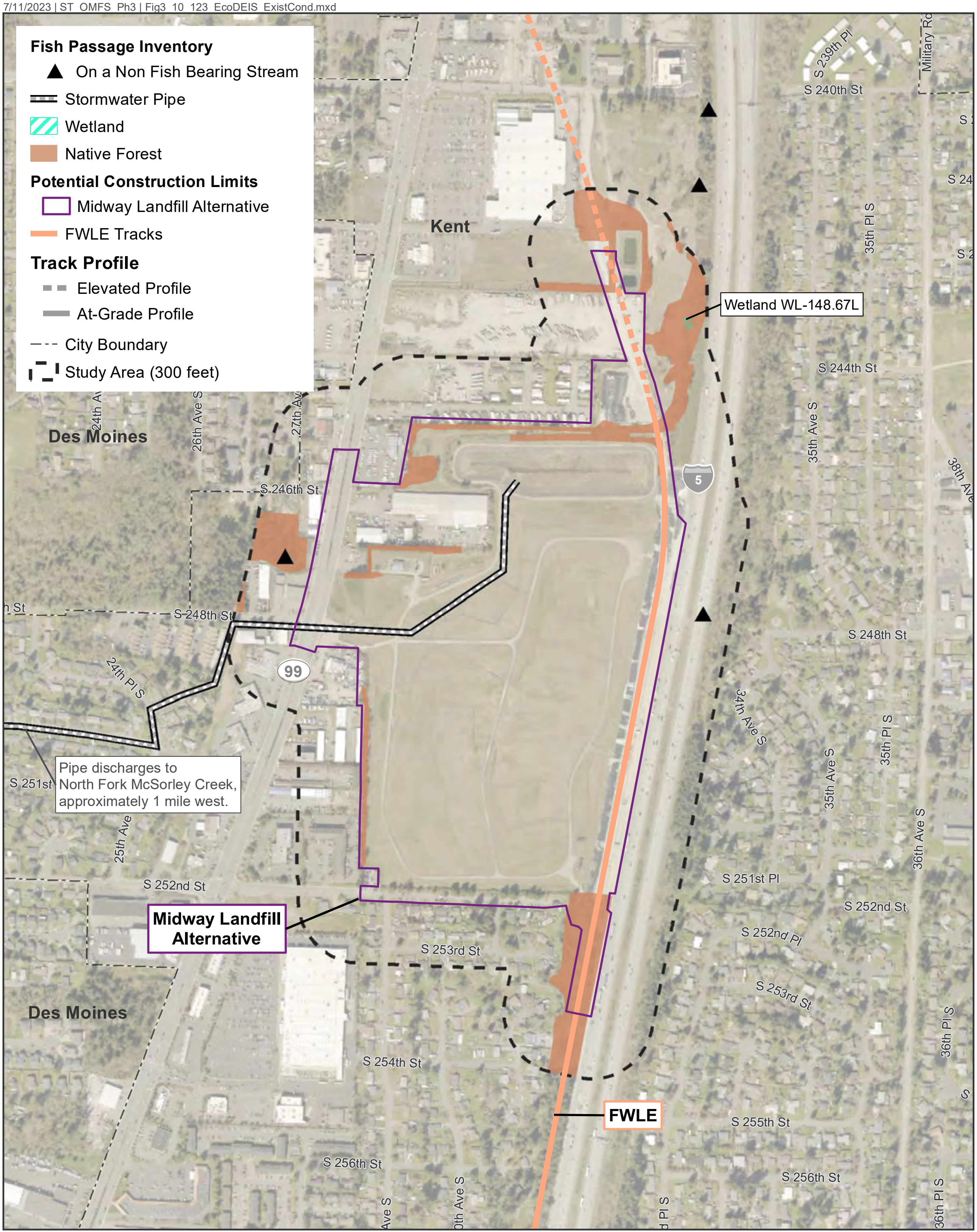
2/2/2024 | ST_OMFS_Ph3 | AddFPLabelExports.mxd


Fish Passage Inventory
● ● Total Fish Passage Blockage
● ● Partial Fish Passage Blockage
● ● Unknown
Stream (Piped)
Stream (Open Channel)
Native Forest
Mature Native Forest
Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Study Area (300 feet)
S 331st St
933222
Wetland WFW-10B
Wetland WFW-10C
S 333rd St
933223
Wetland WFW-11
Wetland WFW-13
20th Ave S
935275
24th
Wetland WFW-33
Wetland WFW-14
Wetland WFW-15
S 336th St
933224
935274
Wetland WFW-02
East Fork Hylebos Creek Tributary 0016A
Wetland WFW-01
S 340th St
20th Ave S
Wetland WFW-06
Preferred Alternative
933227
Wetland WFW-03
933229
S 341st Pl
18th Pl S
933061
S 343rd St
Wetland WFW-04
935271
Mainline
99
16th Ave S
S 344th St
West Fork Hylebos Creek Tributary 0014C
South 344th Street Alternative
Wetland WFW-18
Wetland WFW-17
Wetland WFW-05
Federal Way
995293
S 348th St
Wetland WFW-22
18
995298
Wetland WFW-21
East Fork Hylebos Creek Tributary 0016A
N
0
500
1,000 Feet

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

FIGURE 3.10-2
Ecosystem Resources
Preferred and South 344th Street Alternatives

OMF South


Fish Passage Inventory
▲ On a Non Fish Bearing Stream
Stormwater Pipe
▨ Wetland
🟫 Native Forest
Potential Construction Limits
☐ Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Study Area (300 feet)
Kent
Des Moines
Des Moines
Wetland WL-148.67L
Pipe discharges to North Fork McSorley Creek, approximately 1 mile west.
Midway Landfill Alternative
FWLE
5
99
S 239th Pl
Military Rd
S 240th St
S 244th St
S 246th St
S 248th St
S 248th St
S 251st
S 251st Pl
S 252nd St
S 252nd St
S 252nd Pl
S 253rd St
S 253rd St
S 254th St
S 255th St
S 256th St
S 256th St
24th Av
26th Ave S
27th Ave
24th Pl S
25th Ave
34th Ave S
35th Ave S
35th Ave S
35th Pl S
35th Pl S
36th Ave S
36th Pl S
36th Pl S
38th Ave
Ave S
0th Ave S
d Pl S

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE 3.10-3
Ecosystem Resources
Midway Landfill Alternative

OMF South

Using information gathered during field reconnaissance and from sources such as Tribes, local jurisdictions, WSDOT, and fish passage barrier maps maintained by the Washington State Department of Fish and Wildlife (WDFW), biologists evaluated streams in the study area to identify downstream impediments to fish passage. Salmonids are not currently known or expected to be present in reaches of East Fork Hylebos Tributary or West Fork Hylebos Tributary in the study area. These stream reaches are also not expected to currently support salmonids year-round, given the intermittent flow of the streams and the presence of constructed barriers between the study area and potential population sources downstream. None of these stream reaches is currently known or expected to be used by ESA-listed species, and no critical habitat for any such species has been designated or proposed for designation in these reaches. However, historically accessible reaches of these streams are designated as Essential Fish Habitat for Pacific salmon.

Numerous human-made barriers to fish passage currently exist downstream and throughout the study area, and those barriers deter anadromous salmonids from entering stream reaches in the study area (NWIFC 2023). Several of the downstream barriers on the East Fork Hylebos Tributary are located under I-5 or under on- and off-ramps to I-5 and are on the list of barrier culverts to be made fish passable under a 2013 federal court injunction in western Washington. Even with the removal of the state-owned barriers at some point in the future, several barriers (including two complete barriers on private property) would continue to impede access to stream reaches in the study area. The remaining complete barriers include a private road crossing approximately 1 mile downstream of the study area and a non-culvert barrier (abandoned pipeline) on private property approximately 2.8 miles downstream of the study area. If these privately owned barriers were removed along with WSDOT’s barriers, anadromous salmonids would have access to reaches of East Fork Hylebos Tributary in the study area. No plans for the correction of barriers on West Fork Hylebos Tributary downstream of the study area have been announced.

The basin size, channel width, and gradient of the streams in the study area indicate the potential to support fish use in the future. Coho salmon, steelhead, and cutthroat trout have been documented in East Fork Hylebos Creek approximately 1.9 miles downstream of the Preferred and South 344th Street alternatives (HDR 2014; NWIFC 2023). These species have also been documented in West Fork Hylebos Creek approximately 2.7 miles (steelhead) and 1.7 miles (coho) downstream of the Preferred Alternative (HDR 2014; NWIFC 2023). In addition, fisheries biologists from the Puyallup Tribe of Indians have observed Chinook salmon in West Fork Hylebos Creek as far upstream as S 356th Street, approximately 1.5 miles downstream of the study area (Marks et al. 2018, 2019, 2020, 2021). Finally, a single sub-adult bull trout was captured in West Fork Hylebos Creek in August 2018, approximately 4 miles downstream from the study area from the Preferred Alternative. These observations indicate that resident and anadromous salmonids could have access to stream reaches in the study area in the future, if downstream fish passage barriers are corrected.

East Fork Hylebos Tributary

The headwaters of East Fork Hylebos Tributary are in a wetland complex northeast of I-5 and S 320th Street. The stream is piped under the freeway and beneath the Federal Way/S 320th Street Park & Ride, emerging in the study area in Belmor. The stream flows southward through the study area, confined by I-5 to the east and by residential, commercial, and light industrial developments to the west.

The segment of East Fork Hylebos Tributary in the study area flows intermittently and meets the Federal Way Environmental Critical Areas Code classification as a Type F stream, meaning it has the potential to support fish. The streambed in this area is typically dry during late summer and early fall. Much of the stream is confined within a straight and uniform (ditch-like) channel profile. The gradient of the stream is low, generally 1 percent or less. As a result, fine sediments have accumulated in many areas, resulting in the shallowing and widening of the streambed. Dense patches of reed canarygrass have become established in some low-energy areas, exacerbating the deposition of fine sediments.

Riparian vegetation along East Fork Hylebos Tributary in the study area includes cover types that provide a range of ecological functions. Areas dominated by native forest and wetlands are considered high-quality riparian habitat because they support functions such as fish and wildlife habitat provision; food chain support; water temperature moderation; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; and stream channel formation and maintenance. In other areas, riparian habitat quality has been degraded through the conversion of native and structurally complex habitats into landscaping, mowed grasses, or invasive shrubs.

The stream is conveyed under S 336th Street in a pair of 65-foot-long culverts that are classified as partial barriers to fish passage. South of S 336th Street, the stream flows approximately 0.25 mile through a 200- to 300-foot-wide corridor of native forest habitat. At the southern end of this segment, the width of the functional riparian buffer is limited by a retaining wall along the eastern boundary of the Christian Faith Center property. The wall parallels the stream for approximately 500 feet. The width of the vegetated area between the retaining wall and I-5 is approximately 230 to 260 feet.

A few hundred feet north of S 341st Street, the forested riparian corridor narrows to approximately 80 to 100 feet, and it is confined by I-5 on the east and developed properties to the west. An existing retaining wall limits the width of the functional riparian buffer in the southern portion of this area. After flowing through that narrow area for approximately 700 feet, the stream enters a series of culverts associated with the WSDOT stormwater facility north of S 344th Street. One of those culverts is classified as a partial barrier to fish passage (Figure 3.10-1).

West Fork Hylebos Tributary

West Fork Hylebos Tributary flows through the northwestern corner of the project limits of the Preferred Alternative OMF site near the intersection of SR 99 and S 336th Street. Surface-flowing segments near the stream's headwaters are in the mainline track portion of the study area. The segment of West Fork Hylebos Tributary in the study area has intermittent flow and is considered a Type F stream based on its potential to support fish.

The high level of development and associated impervious surfaces in the West Fork Hylebos Creek basin have resulted in severe flooding issues over the years and have contributed to increased peak and base flows in West Fork Hylebos Tributary (King County 1990). As a result, Federal Way has completed numerous flood control projects, including large stormwater facilities throughout the basin.

Within the Preferred Alternative OMF site portion of the study area, West Fork Hylebos Tributary flows through a wetland (Wetland WFW-02) and an associated in-line stormwater detention facility. The stream lacks a defined bed and bank in this wetland area. When it is ponded, this facility could support fish use; however, once the facility drains, there is little or no holding water for fish. The pond's substrate is predominantly fine sediment and, as such, provides no suitable spawning habitat for anadromous or resident salmonid fish. Vegetation within the facility is dominated by native trees and shrubs that provide high-quality riparian habitat. Immediately upstream and downstream of the detention facility, the stream is contained in pipes or in other in-line stormwater facilities. Where it exits the wetland/stormwater facility, the stream flows through a raised outlet standpipe and then enters an approximately 500-foot-long culvert under SR 99. Based on field reviews performed in 2015, the culvert and standpipe have been identified as a complete barrier to fish passage (WDFW 2023).

North Fork McSorley Creek

No surface-flowing portions of North Fork McSorley Creek are within the OMF South study area for the Midway Landfill Alternative. However, a regional stormwater detention facility at the north end of the Midway Landfill site discharges to North Fork McSorley Creek, approximately 1.1 miles from the study area. For this reason, this analysis provides information about fish use in the stream reaches to which the stormwater detention facility discharges. North Fork McSorley Creek is a perennial stream and is considered a Type F stream based on its potential to support fish use.

Electrofishing surveys conducted by Washington Trout (2003) documented the presence of coastal cutthroat trout and western brook lamprey in reaches to which the stormwater detention facility discharges. According to NWIFC (2023), fall-run Chinook salmon, fall-run chum salmon, coho salmon, and winter-run steelhead could potentially use habitats in North Fork McSorley Creek 1.1 miles from the study area, but constructed barriers and/or degraded habitat quality currently preclude their presence.

3.10.1.2 Vegetation, Wildlife, and Wildlife Habitat

Biologists identified and delineated 10 vegetation cover types in the study area and evaluated their relative habitat value. The cover types are commercial, residential, grassland, invasive brush, native brush, non-native forest, mature native forest, other native forest, wetland/stream, and stormwater pond. The relative habitat value of each cover type is based on habitat structure, scarcity in the study area, disturbance types and frequency, and time required for ecosystem functions to recover following clearing and site restoration. Detailed descriptions of the cover types can be found in Appendix G3, Ecosystem Resources Technical Report.

Wildlife use of habitats in urban landscapes depends on the general location of the habitat, the size and type of undisturbed habitats, the degree of connectivity and extent of travel corridors between and among these habitats, and the types and levels of human activity. Much of the study area is dominated by areas of urban development with little vegetation cover and minimal habitat value. Trees and other landscaping in residential areas provide limited habitat value. Other common vegetation cover types, particularly in the rights-of-way of I-5 and other roads, are grassy areas and patches of invasive shrubs, such as Himalayan blackberry. The relative habitat value of developed areas is low to moderate.

Wildlife use of developed areas is generally limited to adaptable species, such as house sparrows, European starlings, rats, mice, raccoons, Virginia opossums, and eastern gray squirrels. Birds such as rock pigeons and cliff swallows commonly build nests on bridges and road overpasses, and many bat species use such structures as temporary roosting sites. Red-tailed hawks and other raptors prey on voles and other small mammals that are found in abundance in grassy vegetation, such as in the I-5 right-of-way. Open-water habitats, such as wetlands and stormwater detention ponds, provide resting and foraging areas for waterfowl. Animals that use habitats in the study area are exposed to high levels of disturbance generated by human activity in commercial, institutional, and industrial areas and by traffic on I-5 and major arterial roadways.

Structurally complex habitats, such as forested areas and wetlands, have more biological diversity and higher value as wildlife habitat. With habitat features such as large trees, snags, decaying logs, and a diverse understory, areas classified as mature native forest typically support diverse communities of forest-associated wildlife. Mature native forests have been identified as priority habitats by WDFW. Most patches of forest cover in the study area are fragmented and separated from surrounding habitat areas by commercial and residential developments and roads. Despite their isolation, these areas still provide habitat for forest-associated resident and migratory songbirds, as well as for hawks, owls, woodpeckers, and small mammals. The largest patches of forested habitat are near the Preferred and South 344th Street alternatives. These areas contain the only patches of mature native forest that have been identified in the study area. One patch, approximately 10 acres in size, parallels I-5 south of S 336th Street.

The Migratory Bird Treaty Act of 1918, administered by the U.S. Fish and Wildlife Service (USFWS), makes it unlawful to take any migratory bird, or the parts, nests, or eggs of any such bird, except under the terms of a valid permit. In the context of this Act, “take” is defined as “pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill” (Title 16 U.S. Code [U.S.C.] § 715n). Nearly all bird species that may occur in the study area are protected under the Migratory Bird Treaty Act. Protected birds or bird nests may be present in any of the cover types in the study area. Forested areas, wetlands, and other areas with comparatively complex cover types are likely to support greater densities and more diverse assemblages of nesting birds.

3.10.1.3 Wetlands

Sound Transit identified a total of 23 wetlands in the study area (Figures 3.10-1 through 3.10-3). During scoping, Tribes, agencies, and the public expressed concern about potential impacts on ecosystem resources. Sound Transit determined that detailed information collected early in the process would help the design team avoid and minimize impacts on wetlands. Therefore, biologists performed formal delineations of wetland boundaries in legally accessible areas associated with tributaries of Hylebos Creek. Wetlands that could not be accessed for formal delineations were mapped and characterized at the reconnaissance level. All wetlands analyzed as part of the OMF South EIS process were rated according to local jurisdiction critical area ordinances and the Washington State Wetland Rating System for Western Washington, 2014 Update (Hruby 2014). The Washington State system was updated in 2023, and the wetlands will be reassessed under the new system for the permitting process. Wetlands were delineated or identified based upon the criteria in the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Corps 2010). The delineation methods were not affected by the 2023 Supreme Court decision which changes the regulatory status of some "waters of the U.S., including wetlands."

Descriptions of individual wetlands are provided in Appendix G3, Ecosystem Resources Technical Report.

The portion of the study area encompassing the Preferred and South 344th Street alternatives is dominated by commercial, institutional, and industrial development, which includes substantially altered natural wetlands, watercourses, and buffers that are degraded due to development, human disturbance, and abundant non-native and invasive vegetation. Ten wetlands were identified in this portion of the study area. All but one of these are associated with East Fork Hylebos Tributary within the approximately 100- to 300-foot-wide undeveloped forested corridor adjacent to I-5. The remaining wetland, identified as Wetland WFW-02, is contained within the in-line stormwater detention facility associated with West Fork Hylebos Tributary.

At the Midway Landfill Alternative, biologists identified five areas meeting the parameters for wetland hydrology, soils, and vegetation. During preparation of the 2021 SEPA Draft EIS, the U.S. Army Corps of Engineers (Corps) determined that the areas do not meet federal criteria for jurisdictional wetlands (Tong 2019), and Ecology verified that they are non-jurisdictional under state definitions (Gresham 2020). On May 25, 2023, the Supreme Court issued a judgment limiting Corps jurisdiction on "waters of the U.S." Effective September 8, 2023, EPA and the Corps published their amendments to the Revised Definition of Waters of the United States. Ecology, which has state authority under RCW 90.48 to regulate wetlands, will likely issue administrative orders to address impacts to waters of the U.S. the Corps no longer regulates. In the case of these five areas at the Midway Landfill, Sound Transit believes that it is not likely the earlier determination will change because the Supreme Court judgment limits jurisdiction. As such, these areas are not considered regulated wetlands and are not discussed further. However, if the definition of waters of the U.S. were to expand and the Midway Landfill is selected as the project to be built, Sound Transit will comply with the applicable regulations and update project documentation as required. One wetland, previously delineated for the WSDOT SR 509 Project, was identified in the Midway Landfill Alternative portion of the study area north of the proposed OMF South site (Anchor 2019).

3.10.1.4 Threatened and Endangered Species

As discussed in Section 3.10.1.1, no ESA-listed fish are known or expected to be present in the study area under current conditions. However, Chinook salmon and steelhead have been documented in Hylebos Creek and other streams downstream of the study area. In addition, one bull trout was observed in West Fork Hylebos Creek in 2018. In the future, if all downstream barriers to fish passage are removed, individuals of these species could access the study area. Under existing conditions, contaminants in stormwater runoff from roads within the study area could harm these species in stream reaches downstream of the study area.

Five ESA-listed wildlife species (marbled murrelet, yellow-billed cuckoo, streaked horned lark, Taylor’s checkerspot, and North American wolverine) and one species proposed for listing (northwestern pond turtle) potentially occur in areas that might be affected by the project (USFWS 2023). In addition to those species, gray wolves in western Washington have a listing status of endangered. None of these species are expected to occur in the study area because no suitable habitat is present (see Appendix G3, Ecosystem Resources Technical Report). No designated critical habitat for any ESA-listed species is present in the study area. The Washington State Department of Natural Resources (WDNR) Natural Heritage Program database does not include any records of ESA-listed plant populations within 5 miles of the study area (WDNR 2019).

3.10.2 Environmental Impacts

For this analysis, the design team identified a permanent impact footprint for each alternative, based on project features that could result in long-term impacts on ecosystem resources. Each build alternative footprint includes the OMF South site, along with the short segments of lead tracks that connect the site to the mainline tracks and any new mainline tracks that would be constructed to connect the site to the southern terminus of FWLE. The Preferred Alternative and the South 344th Street Alternative include approximately 4,600 linear feet of test track paralleling the mainline tracks. The Preferred Alternative also includes the extension of 18th Place S from S 336th Street to S 340th Street, and the extension of 21st Ave S from S 341st Place to S 344th Street.

The design team also defined a larger temporary impact footprint for each build alternative, encompassing the permanent impact footprint and surrounding areas where vegetation clearing and ground-disturbing work would likely be required for project construction. Areas outside the permanent impact footprint but within the temporary impact footprint would be restored to pre-project conditions, or better, following construction. These footprints were overlaid on mapped locations of wetlands, streams, buffers, and vegetation cover types to determine the extent of the potential impacts of the alternatives on ecosystem resources.

Compared to the impacts of site facilities, road extensions, and at-grade tracks, the impacts of elevated portions of the mainline, lead, tail, and test tracks (under the Preferred Alternative or the South 344th Street Alternative) would be less severe. These structures would be relatively narrow (typically 20 to 30 feet wide) and generally more than 15 feet above the ground surface. Vegetation would be able to grow in such areas, although the density and variety of vegetation would be limited by the reduced availability of sunlight and precipitation. For operational safety, only appropriate short-stature vegetation would be planted under the elevated mainline tracks. Trees and other tall vegetation would not be allowed to grow underneath or within 15 feet of elevated track segments. A similar constraint would apply within 15 feet of at-grade track segments.

Based on site-specific conditions, retaining walls would be built in some areas to minimize disturbance to the aquatic features and their buffers. To allow maintenance access and to avoid damage, trees and other large vegetation would not be allowed to grow near the base or top of the walls.

The tables and figures in Appendix G3, Ecosystem Resources Technical Report, detail the results of the impact analysis. The permanent and temporary impact footprints developed for this analysis represent Sound Transit’s best estimates of the areas that may be affected by the OMF South alternatives. These estimates are conservative. For example, clearing of all areas within the temporary impact footprint may not be necessary, but analyses of construction-related impacts are based on the assumption that the entire temporary impact footprint would be cleared. In addition, the permanent impact footprint may include some areas where project components could be scaled down or eliminated as the project design progresses from its current, preliminary status. Moreover, not all areas within the project footprint would be converted to structures or hard surfaces. Some vegetated areas are expected to be converted to other land cover types, such as landscaping or stormwater facilities; in other areas, existing hard surfaces may be converted to vegetation. Section 3.11, Water Resources, includes more analysis on land cover conversions.

By applying a consistent set of assumptions for all the alternatives, these footprints allow Sound Transit to evaluate the relative degree of the potential impacts of the alternatives on ecosystem resources. Anticipated impacts would be further refined and determined when an alternative is selected to be built and the project design is sufficiently advanced to undergo permitting review. Additional field work would be conducted for the selected alternative to refine the understanding of project impacts.

Analyses of project-related impacts assume that appropriate BMPs would be implemented and would perform as expected to avoid and minimize certain impacts during construction. See Appendix G3, Ecosystem Resources Technical Report, for a discussion of BMPs. For each resource area, analyses of direct impacts are divided between long-term (operational) impacts and short-term (construction-related) impacts. Cumulative impacts are evaluated in Chapter 4.

3.10.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to ecosystem resources from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.10.2.2 Long-Term Impacts

Under any of the build alternatives, direct long-term impacts on ecosystem resources would occur where permanent features, such as proposed project facilities, overlap ecosystem resources, such as wetlands, wetland buffers, streams, stream buffers, or native forest. Long-term impacts of OMF South development on ecosystem resources are described below.

Aquatic Species and Habitat

Direct impacts on aquatic resources would occur where permanent features alter in-stream habitat or riparian functions. As previously discussed, no ESA-listed fish are known or expected to be present in the study area, and the study area contains no critical habitat for any ESA-listed species. Therefore, none of the OMF South alternatives would have the potential for any direct adverse effects on ESA-listed species or critical habitat.

ESA-listed Chinook and steelhead have been documented in Hylebos Creek and both the East and West Fork Hylebos creeks and, therefore, may be present in other tributary stream reaches downstream of the study area. In addition, although bull trout are not expected to use habitats in the Hylebos Creek watershed, one observation of bull trout occurred in West Fork Hylebos Creek in 2018. In the future, if all downstream barriers to fish passage are removed, individuals of these species would have access to the study area.

None of the stream segments in the study area are known or expected to support resident or anadromous salmonids under current conditions. Other aquatic organisms, such as invertebrates and non-salmonid fish, are likely present in those streams, however. In addition, the loss or degradation of stream habitat could reduce the availability of prey (e.g., benthic invertebrates) for fish and other aquatic species in downstream reaches. Impacts on stream habitat could also decrease the availability and quality of habitat for salmonids and other fish in the future if access is restored through the removal of downstream fish passage barriers.

Impacts may also occur where elevated mainline, test, or lead tracks pass over surface-flowing streams. Shade from structures placed over streams may affect the behavior of salmonids in the affected stream segments. Juvenile salmonids may respond to shadows from overwater structures by pausing at the upstream end of the darkened area or moving into deeper waters, potentially increasing their vulnerability to predation (Kemp and Williams 2008; Moore et al. 2013). Although none of the stream segments in the study area currently support salmonids, the presence of these structures could affect fish behavior if access is restored in the future. (These impact areas and length of streams affected are summarized in Table 3.10-1 and depicted in Figures G3.4-1 through G3.4-5 in Appendix G3, Ecosystem Resources Technical Report.)

Where the permanent impact footprint of an OMF South alternative overlaps a stream’s riparian buffer, the ecological function of that buffer would be diminished or lost. Substantial decreases in current riparian function would occur where areas of tree or shrub cover in a stream’s riparian zone are converted to facilities or to other vegetation types (e.g., lawns, ornamental landscaping, areas near tracks) with less structural or compositional diversity. Where riparian vegetation is removed altogether, potential future riparian functions would be eliminated. Potentially affected riparian functions and processes include fish and wildlife habitat provision; food chain support; water temperature maintenance; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; pollutant removal; and stream channel formation and maintenance. Impact areas and length of streams affected are summarized in Table 3.10-1 and depicted in Figures G3.4-1 through G3.4-5 in Appendix G3, Ecosystem Resources Technical Report.

Table 3.10-1 Potential Long-Term Impacts on Aquatic Resources

Alternative	Design Option	Project Element	Stream[1]	Stream Impact (linear feet)[2]	Total Stream Impact per Alternative (linear feet)	Stream Channel Daylighted (linear feet)	Stream Buffer Impact (acres)[3]	Total Stream Buffer Impact Per Alternative (acres)
Preferred	40 mph Alignment	Site	East Fork Hylebos Tributary	900	3,050	420	2.8	7.2
			West Fork Hylebos Tributary[4]	600		0	0.5	
		Mainline[5]	East Fork Hylebos Tributary	1,550		0	3.9	
	55 mph Design Option	Site	East Fork Hylebos Tributary	900	3,100	420	2.8	8.6
			West Fork Hylebos Tributary[4]	600		0	1.6	
		Mainline[5]	East Fork Hylebos Tributary	1,600		0	4.2	
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,850	420	4.5	10.5
		Mainline[5]		1,600		0	6.0	
	55 mph Design Option and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,900	420	4.6	11.3
		Mainline[5]		1,650		0	6.7	
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,900	420	4.6	10.9
		Mainline[5]		1,650		0	6.3	
	40 mph Alignment and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,850	420	4.6	11.0
		Mainline[5]		1,600		0	6.4	
Midway Landfill	N/A	N/A	N/A	0	0	0	0	0

Notes:

(1) Both affected streams are Type F, per WAC 222-16-030 and FWC 19.145.260.

(2) Includes the total length of surface-flowing stream within the permanent impact footprint defined for this analysis.

(3) Impact numbers presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. For this reason, stream impacts are based on the approximate centerline of the mapped stream, and buffer impacts are based on the affected area of Wetland WFW-02. See text for further discussion.

(5) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

The impacts described in Table 3.10-1 reflect potential long-term impacts to streams and aquatic resources based on the overlap between streams or stream buffers and the permanent impact footprint for each alternative. Impacts to aquatic resources within the permanent impact footprint could take several forms. For example, project features (including elevated structures, such as the mainline, test, and lead tracks) would be built near, parallel to, or over surface-flowing stream channels. In certain areas, no ground-disturbing work would take place in the stream channel, but the presence of those structures could have long-term effects on riparian and/or aquatic habitats. In other areas, an existing stream channel would need to be relocated and realigned to accommodate project features. These impacts are described further in the discussions of the impacts of the individual alternatives.

Under any of the build alternatives, runoff from impervious surfaces, including pollution-generating impervious surfaces, would be detained and treated in accordance with local, state, and federal requirements. However, water that passes through stormwater management facilities may still contain contaminants (albeit in reduced concentrations) that could harm fish in receiving waters. These impacts could extend a considerable distance downstream, potentially affecting fish (including ESA-listed species) in stream reaches outside of the study area. In addition, during major storm events, the capacity of those facilities may be exceeded, and some runoff may directly enter streams and other surface waters without receiving treatment. It is important to note that the first-flush runoff from such events (i.e., runoff with the highest concentrations of contaminants) would enter treatment facilities. Bypassing would occur later in the storm event, after most contaminants have washed off.

Recent research has found 6PPD-quinone, a contaminant found in runoff from highways and roadways, to be a major contributor to pre-spawning mortality in coho salmon (Tian et al. 2021). A 2022 study (Brinkman et al. 2022) found that rainbow trout and brook trout were sensitive to exposure, while arctic char and white sturgeon were tolerant. Another study (French et. al 2022) found that urban roadway runoff is lethal to juvenile coho, steelhead, and chinook salmonids but not sockeye. Other harmful contaminants in stormwater runoff from roadways include polycyclic aromatic hydrocarbons, which have been found to cause reduced growth, increased susceptibility to infection, and increased mortality in salmonids (Meador et al. 2006; Varanasi et al. 1993). Another common component of stormwater runoff is dissolved copper, which can impair the olfactory system of salmonids and hinder their predator avoidance behavior (Sandahl et al. 2007). Dissolved zinc is another common component of stormwater that, when at higher concentrations, can lead to internal tissue hypoxia, reduced immunity, osmoregulatory failure, acidosis, and low oxygen tensions in the arterial blood of freshwater fish (Eisler 1993).

Ecology (2022) has evaluated the effectiveness of stormwater facilities in providing treatment that prevents or reduces the toxicity of contaminants in receiving waters. Final design will use this evaluation in the selection and design of stormwater management facilities.

Because the volume of runoff from impervious surfaces would be managed in accordance with local, state, and federal requirements, none of the alternatives would be expected to have long-term adverse effects on flow regimes in streams. Peak stream flows would not increase because the stormwater systems built for the proposed project would be designed to replicate predevelopment hydrology. Additional measures to reduce stormwater runoff, such as low-impact development (LID) or other on-site measures, would be considered at a more advanced phase of project development.

Operation of the mainline or test tracks would not be expected to increase nighttime illumination of fish-bearing waters (which could increase the risk of predation on juvenile salmonids). The tracks would have no overhead lighting, and the train headlights would be directed parallel to the tracks. Lighting within the site would be shielded and directed inward toward the site to minimize spillover effects.

Preferred Alternative

The Preferred Alternative would affect approximately 3,050 to 3,100 linear feet of surface-flowing stream. The affected stream segments include approximately 2,450 to 2,500 linear feet of East Fork Hylebos Tributary (depending on whether the 40 mph Alignment or 55 mph Design Option is selected; see below) and approximately 600 linear feet of West Fork Hylebos Tributary (Table 3.10-1). Compared to the South 344th Street Alternative, the Preferred Alternative would affect approximately 400 fewer linear feet of East Fork Hylebos Tributary. But this alternative would impact West Fork Hylebos Tributary, whereas the South 344th Street Alternative would avoid those impacts. Compared to the South 344th Street Alternative, the Preferred Alternative would relocate more of East Fork Hylebos Tributary and would not daylight a segment of that stream near S 344th Street. These impacts are analyzed below.

Approximately 2,450 linear feet of East Fork Hylebos Tributary (surface-flowing) fall within the permanent impact footprint of this alternative. The affected portion of the stream extends from north of S 336th Street to S 344th Street (see Figure G3.4-4 in Appendix G3, Ecosystems Resources Technical Report). Approximately 1,650 feet of the stream channel in this area would be relocated and realigned. The current conceptual design includes meanders and other features to enhance the availability and diversity of aquatic habitats. Based on the conceptual design, the addition of meanders would increase the length of the stream channel in this area by approximately 130 linear feet. The actual layout of the stream channel would be developed by the design-build contractor in consultation with Sound Transit, permitting agencies, and other stakeholders.

Approximately 350 feet of the stream relocation would occur in the OMF site footprint, and approximately 1,300 feet would be associated with the mainline tracks. The relocated stream channel would be approximately 40 to 70 feet west of the mainline tracks. An additional approximately 750 linear feet of the stream would be within the permanent impact footprint but would not be relocated.

Currently, much of East Fork Hylebos Tributary in this area is confined within a straight and narrow channel that lacks complexity. Relocating and realigning the channel could create opportunities to add channel sinuosity and habitat complexity, potentially improving in-stream habitat conditions in some reaches. Large woody debris would be placed in and near the stream channel to restore habitat complexity. The new channel would be designed to maintain flows and water quality conditions.

Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. Any culvert on potentially fish-bearing streams that must be replaced to accommodate the project would be designed and installed in accordance with WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). Any work below the ordinary high water line of any streams in the study area would be conducted in accordance with the terms of WDFW's Hydraulic Project Approval (HPA), Clean Water Act Section 404 permit, and other applicable permits and reviews.

The current interim design indicates that some of the relocated channel would be routed through a parcel immediately south of the Christian Faith Center property. That parcel is currently unvegetated and is used for storage of heavy equipment and construction materials. Under current conditions, the vegetated riparian area along that stream segment is confined to an approximately 80-foot-wide strip. Upon project completion, the width of the area between the OMF site and the mainline tracks would be approximately 200 feet. It is assumed for this analysis that trees and other woody vegetation would be planted in all allowable areas between the OMF site and the mainline tracks. As a result, a wider area would be available to support riparian functions, but those functions would be limited in some parts of that area because trees and other tall vegetation would not be allowed to grow near the mainline and lead tracks.

Although relocating and realigning the stream channel would have some beneficial effects, changing the physical characteristics of a stream could adversely affect its hydrology and downstream sediment regimes. In addition, the presence of the OMF site to the west and the mainline tracks to the east would further reduce the width of the already limited area available to support riparian functions. From S 336th Street to the southeastern corner of the Christian Faith Center property, the vegetated riparian zone between the OMF site and the mainline tracks would be approximately 180 feet wide. Compared to the existing width of the vegetated riparian zone in this area (200 to 300 feet), under the Preferred Alternative, this zone would amount to a 10 to 40 percent reduction in the width of the existing vegetated riparian zone along approximately 1,400 linear feet of stream channel. Riparian functions in this area would be further reduced by the presence of lead tracks crossing the stream; trees and other tall vegetation would not be allowed to grow near the lead tracks.

Approximately 350 feet south of the Christian Faith Center parcel, the stream would be confined to an approximately 80-foot-wide corridor between the Ellenos Yogurt parcel and I-5. This area would include about 400 linear feet of stream channel. Much of the stream in this area would be beneath or immediately adjacent to the mainline or lead tracks. The presence of support columns near the stream would constrain options for natural or human-created modifications to channel configuration in the future. In addition, existing forested riparian vegetation in this area would be cleared and replaced with low-growing vegetation or converted to hard surfaces, substantially reducing riparian functions along this stream segment.

Downstream of the Ellenos Yogurt parcel, the realigned channel would tie into the channel that would be daylighted as part of the Preferred Alternative. Under this alternative, approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from a culvert (See Table 3.10-1) and restored to a daylighted channel. Downstream of the daylighted channel, the stream would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long structure. Under current conditions, the stream is conveyed through this area in a 4-foot-diameter corrugated steel pipe that is not considered to be a barrier to fish passage.

The permanent stream buffer impact areas (Table 3.10-1) reflect the assumption that nearly all of the existing forested riparian habitat along the affected stretch of stream would be cleared for construction. It may be possible to retain existing vegetation (including riparian forest) in some areas; the actual extent of riparian clearing and planting would be determined by the design-build contractor in consultation with Sound Transit. Where safety constraints allow, riparian areas for construction would be restored with native vegetation, with an emphasis on trees and shrubs. Trees and other tall vegetation would not be allowed to grow back near the mainline tracks and associated facilities. In those areas, some riparian habitat functions would be restored through revegetation with native shrubs and other low-growing species. In areas where mixed deciduous and coniferous forest is replaced with project features and non-forested vegetation, the capacity of those areas to support riparian functions for East Fork Hylebos Tributary would be permanently reduced. Some riparian habitat functions would be restored through revegetation with native shrubs and other low growing species.

The Preferred Alternative would also affect aquatic and riparian habitats associated with West Fork Hylebos Tributary. The impacts on aquatic habitats are difficult to quantify because the stream lacks a defined channel where it flows through Wetland WFW-02 and an associated in-line stormwater detention facility south of S 336th Street. For this reason, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. That source identifies approximately 600 linear feet of the stream that would fall within the permanent impact footprint of the Preferred Alternative.

Frontage improvements along S 336th Street to meet city standards would necessitate the installation of a replacement structure where West Fork Hylebos Tributary is crossed by the road. The current interim design for that crossing includes a structure that is approximately 3 feet longer than the existing pair of city-owned culverts (see Figure 3.10-2; WDFW ID# 933224) and that has a substantially larger hydraulic opening than the existing culverts. The installation of a single structure with a wider opening at this site would help restore hydrological capacity, allowing sediment and organic debris to pass through and providing fish unhindered passage beneath the roadway. The existing culverts are identified partial barriers to fish passage. The replacement structure would be designed and installed in accordance with WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). As such, the Preferred Alternative could have a beneficial effect on fish passage at this site, if downstream barriers are removed in the future.

As discussed in the analysis of impacts on wetlands (see below), the extension of 18th Place S in the eastern portion of Wetland WFW-02 would reduce the area of the stormwater pond/wetland complex through which the stream flows. In addition, frontage improvements along S 336th Street could necessitate fill in the northern portion of the wetland, further reducing the area of the wetland that supports riparian functions for the West Fork Hylebos Tributary. Mitigation measures for impacts to wetlands are described in Section 3.10.3. Potential impacts to the in-line stormwater detention are discussed in the Final EIS Section 3.11 Water Resources.

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Tributary. The wetland and its buffer are dominated by forest that provides high-quality riparian habitat. Clearing of these forested areas for extending 18th Place S would permanently reduce their capacity to support riparian functions. See the wetlands analysis below for additional discussion of impacts to this wetland.

The 55 mph Design Option at the northern end of the mainline tracks would affect approximately 50 linear feet more of East Fork Hylebos Tributary than would the 40 mph Alignment (Table 3.10-1). While the 55 mph Design Option would intersect the northern end of the stream in Belmor, the 40 mph Alignment would avoid it altogether.

South 344th Street Alternative

The South 344th Street Alternative would affect approximately 2,850 to 2,900 linear feet of surface-flowing stream (Table 3.10-1). Compared to the Preferred Alternative, this alternative would affect approximately 400 more linear feet of the surface-flowing channel of East Fork Hylebos Tributary but impacts on West Fork Hylebos Tributary would be avoided altogether.

Impacts on East Fork Hylebos Tributary between S 336th Street and the culvert upstream of the WSDOT stormwater facility would be as described above for the Preferred Alternative. South of S 344th Street, approximately 400 linear feet of stream channel would fall within the permanent impact footprint of this alternative. In total, approximately 1,250 feet of the stream impacts would occur in the site footprint, and approximately 1,600 feet would be associated with the mainline tracks (Table 3.10-1). In contrast to the Preferred Alternative, this alternative would not involve the relocation of a short segment of East Fork Hylebos Tributary north of S 336th Street. As a result, this alternative would entail 1,650 linear feet of stream relocation impacts, which would be the same as the Preferred Alternative.

Similar to the Preferred Alternative, the loss of mature, mixed deciduous and coniferous forest would reduce the riparian functions along the affected stream reaches. By affecting reaches downstream of S 344th Street, this alternative would degrade riparian habitat along 400 more feet of the stream than would the Preferred Alternative.

Under this alternative, approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from a culvert (See Table 3.10-1) and restored to a daylighted channel. Daylighting this segment would increase the amount of functioning aquatic and riparian habitat available in the stream system.

Emergency vehicle access to the mainline tracks would be needed in the daylighted stream location. One of the options under consideration may require approximately 60 feet of channel that is currently culverted (and that would otherwise be daylighted, as described above) to be placed in a new culvert. Because this alternative would not include the extension of 21st Avenue S, the replacement crossing structure south of the daylighted channel would be shorter, compared to the Preferred Alternative. It may be possible to eliminate the need for a culvert through detailed design of the access and of the stream meanders. The design of the emergency vehicle access would need to be coordinated and approved by Sound Transit, WSDOT, and Federal Way.

As with the Preferred Alternative, the 55 mph Design Option at the northern end of the mainline tracks would affect slightly more of East Fork Hylebos Tributary than would the 40 mph Alignment. Under the South 344th Street Alternative, the direct permanent impacts of the tail track design options on streams would be largely identical. The I-5 alignment would affect more stream/wetland buffer along East Fork Hylebos Tributary than would the Enchanted Parkway alignment.

Midway Landfill Alternative

The Midway Landfill Alternative would have no direct impact on streams or stream channels because no streams are present on the Midway Landfill Alternative site. The only project features affecting streams under this alternative relate to stormwater runoff and detention.

Compared with the other alternatives, the Midway Landfill Alternative would convert more pervious land cover to impervious land cover (see Section 3.11.2.2 for additional information about the permeability of the existing membrane cap at the landfill). However, all stormwater runoff from the site would be detained and treated in an underground vault system that would be designed in accordance with Kent Stormwater Manual. The treatment vaults in turn would likely discharge to the on-site regional stormwater treatment and detention facility, which ultimately discharges to the North Fork McSorley Creek approximately 1.1 miles west. As a result, an increase in the area of impervious surface under this alternative would not be expected to adversely affect fish resources, stream hydrology, or aquatic habitat.

Vegetation, Wildlife, and Wildlife Habitat

Long-term impacts on vegetation and wildlife habitat would vary, depending on the affected land cover type. Land cover types include both vegetated areas (e.g., forest, grassland) and developed areas (e.g., commercial, residential). In much of the study area, the replacement of existing impervious surfaces and structures would constitute a minimal change in ecological functions, such as the capacity to support wildlife. The surrounding grass and low-growing vegetation along the alignment would provide some habitat for ground-dwelling small mammals, such as mice and voles.

The severity of impacts on plants and animals would be greater where cover types dominated by native forest — mature native forest in particular — are affected. Removing trees, snags, and understory vegetation would eliminate nesting and foraging sites for birds (including migratory birds), roosting sites for bats, and hiding cover for small mammals. Similarly, impacts on the wetland/stream cover type would have an elevated potential for adverse effects on plants and animals, based on the presence of water and diverse plant communities in many such areas. Alternatives that affect a greater area of these habitat types would have a higher likelihood of adverse effects on vegetation and wildlife. Table 3.10-2 presents a comparison of the build alternatives' potential impacts on vegetation in the study area, based on the amount of each land cover type in the permanent impact footprint.

The severity of impacts would also depend on the type of structure. Construction of the OMF site and at-grade segments of mainline tracks would mean the permanent removal of nearly all vegetation within the permanent impact footprint (although some vegetation would be allowed to grow in landscaped portions of the OMF site). In contrast, as previously discussed, elevated structures that are high enough above the ground would allow for some vegetation to grow underneath.

Operation of OMF South would entail moderate to high levels of human activity and associated noise and light. Notably, all three build alternatives are adjacent to I-5 and are in developed areas with relatively high levels of human activity. In addition to the noise, light, and vehicle traffic on the highway, regular human activity associated with residential, commercial, institutional, and industrial development is a common feature of the landscape throughout the study area. Wildlife that uses habitats in or near the build alternatives is regularly exposed to human activity, noise, and light.

Table 3.10-2 Potential Long-Term Impacts on Vegetation

Alternative	Design Option	Land Cover Type[1]									Total[2]
		Commercial	Residential	Grassland	Invasive Brush	Non native Forest	Mature Native Forest	Other Native Forest	Wetland/Stream	Stormwater Pond	
OMF Site Impacts (acres)											
Preferred	N/A	34	4	4	3	1	11	4	5	1	**68**
South 344th Street	N/A	38	7	4	5	<0.5	6	6	2	2	**70**
Midway Landfill	N/A	9	1	57	1	1	0	4	0	5	**78**
Mainline Impacts[3] (acres)											
Preferred	40 mph Alignment	2	7	<0.5	1	0	3	3	2	<0.5	**18**
	55 mph Design Option	1	8	<0.5	1	0	3	3	2	<0.5	**20**

Table 3.10-2 Potential Long-Term Impacts on Vegetation (continued)

Alternative	Design Option	Land Cover Type[1]									Total[2]
		Commercial	Residential	Grassland	Invasive Brush	Non native Forest	Mature Native Forest	Other Native Forest	Wetland/Stream	Stormwater Pond	
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	2	7	<0.5	2	0	4	6	2	1	**24**
	55 mph Design Option and I-5 Tail Track Alignment	2	8	1	2	0	4	7	2	1	**26**
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	2	8	<0.5	2	0	4	6	2	1	**25**
	40 mph Alignment and I-5 Tail Track Alignment	2	7	<0.5	2	0	4	7	2	1	**24**
Midway Landfill[4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

Notes:

(1) Land cover types are described in Appendix G3, Ecosystem Resources Technical Report.

(2) The total values for some rows do not equal the sum of the values in the row due to rounding.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be constructed later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) The Midway Landfill Alternative would not include any mainline or test track construction.

If activity or noise levels at the maintenance facility noticeably exceed current conditions, affected animals may be displaced from otherwise suitable habitat, potentially leading to competition with animals that occupy suitable habitat at other sites with less disturbance. Such competition may produce increased stress and decreased reproductive success for affected individuals. Adverse behavioral responses to increased night lighting may have similar consequences. Animals displaced from areas of suitable habitat may be exposed to an elevated risk of predation or vehicle collisions while they are seeking new areas of suitable habitat.

Based on the limited amount of suitable habitat that would be affected under any of the alternatives, the project would not be expected to measurably reduce the regional populations of any wildlife species. None of the build alternatives are within 0.25 mile of a known breeding area or other sensitive site for any wildlife species of concern.

As previously discussed, no ESA-listed plant or wildlife species are known or expected to be present in the study area, and the study area contains no critical habitat for ESA-listed species. As such, none of the OMF South alternatives would have the potential for any adverse effects on ESA-listed species or critical habitat.

Preferred Alternative

The extent of this alternative's effects on the mature native forest, other native forest, and wetland/stream cover types would be greater than the Midway Landfill Alternative and approximately equal to the South 344th Street Alternative. Under this alternative (with either mainline track design option), construction and operation of the facility and mainline tracks would result in permanent impacts on approximately 14 acres of mature native forest, 7 acres of other native forest, and 7 acres of the wetland/stream cover type (Table 3.10-2). Most impacts (11 of 14 acres) on the mature native forest cover type would be associated with the OMF site rather than the mainline tracks. Approximately 5 acres of mature native forest habitat surrounding Wetland WFW-02 would fall within the permanent impact area of the facility, as would approximately 6 acres of this habitat type along the eastern edge of the facility.

Compared with the South 344th Street Alternative, the Preferred Alternative would affect less of the forested wetland and riparian habitats associated with East Fork Hylebos Tributary. The 55 mph Design Option at the northern end of the mainline tracks would not have a noticeably different effect on native forests or wetlands and streams as compared to the 40 mph Alignment (Table 3.10-2).

Based on the prevalence of the commercial and residential cover types on the existing site and in the surrounding study area, OMF South operations at the Preferred Alternative site would probably result in a less noticeable increase in human activity and associated noise and light compared with the Midway Landfill Alternative. By affecting more areas with the native forest and wetland/stream cover types, however, this alternative would likely degrade or eliminate more areas that currently provide resting cover, hiding cover, or travel corridors for wildlife. As such, the potential for long-term behavioral disruption or displacement from suitable habitats may be greater under this alternative than under the Midway Landfill or South 344th Street alternatives.

South 344th Street Alternative

The extent of the South 344th Street Alternative's effects on the native forest and wetland/stream cover types would be similar to but lower than that of the Preferred Alternative (Table 3.10-2). Differences between these two alternatives arise primarily from the exclusion of Wetland WFW-02 and surrounding forested areas from the impact area of the South 344th Street Alternative. Compared to the Preferred Alternative, this alternative would affect fewer acres of the mature native forest (10 acres, compared to 14) and wetland/stream (3 acres, compared to 7) cover types. This alternative would affect 5 to 6 more acres of other native forest than the Preferred Alternative, depending on the tail track design option. Similar to the Preferred Alternative, most of the impacts on mature native forest would be associated with the OMF site, not the mainline tracks.

The impacts of the 55 mph Design Option at the northern end of the mainline tracks would be essentially identical to those of the 40 mph Alignment (Table 3.10-2). At the southern end of the facility, the design options for the tail tracks would have essentially identical impacts on the mature native forest and wetland/stream cover types, while the I-5 alignment would have slightly more impacts on other native forest, compared to the Enchanted Parkway alignment (Table 3.10-2).

Based on the smaller extent of impacts on the native forest and wetland/ stream cover types (and the similar degree of existing development in the study area), this alternative would likely have a lower potential to disturb wildlife over the long term compared with the Preferred Alternative, but greater than the Midway Landfill Alternative.

Midway Landfill Alternative

Compared with the other build alternatives, the Midway Landfill Alternative would have minimal effects on native or complex habitats (i.e., the mature native forest, native forest, and wetland/stream cover types). Most of the permanently affected area consists of the grassland cover type, which supports limited habitat functions that are widely available elsewhere in the study area. Only about 4 acres of other native forest cover would be affected, and no mature native forest or wetland/stream habitats would be affected (Table 3.10-2).

OMF South operations at the Midway Landfill site would result in a greater increase in human activity and associated noise and light compared with the other build alternatives. This is because most of the site is currently fenced to limit access to the landfill. In contrast, the Preferred and South 344th Street alternative sites are surrounded by commercial and residential areas with relatively high levels of human activity. Compared to the other two alternatives, however, the Midway Landfill Alternative would have a lower potential for adverse effects on wildlife because it would affect fewer acres of structurally complex habitat types such as native forests and wetlands.

Wetlands

Filling, excavating, or clearing within wetlands or wetland buffers would diminish wetland functions through the loss of area, changes to surface or subsurface water flows, or long-term changes to vegetation. Project actions that may entail such impacts include construction of buildings, roadways, mainline tracks, lead tracks, or test track (including support columns), train storage areas, retaining walls, parking areas, and stormwater facilities. The wetland impact areas are summarized in Table 3.10-3 below and depicted in Figures G3.4-1 through G3.4-5 in Appendix G3, Ecosystem Resources Technical Report. Wetland buffer impacts are summarized in Table 3.10-4 below.

Table 3.10-3 Potential Long-Term Impacts on Wetlands

Wetland Rating[1]	Alternative		
	Preferred[2]	South 344th Street[2,3]	Midway Landfill
OMF Site Impacts (acres)			
Category II Wetlands	1.8	0	0
Category III Wetlands	0.9	1.4	0
Total OMF Site Impacts	*2.7*	*1.4*	*0*
Mainline Impacts[4,5] (acres)			
Category III Wetlands	1.6	1.5	N/A
Category IV Wetlands	<0.1	<0.1	N/A
Total Mainline Impacts	*1.6*	*1.5*	*N/A*
Total Impacts	***4.3***	***3.0***	***0***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) The impacts of the design options for the curve at the northern end of the mainline tracks would differ by 0.01 acre.

(3) The impacts of the design options for the mainline tracks, including the tail tracks, for the South 344th Street Alternative would differ by 0.01 acre; see Table 3.10-6 for details.

(4) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(5) The test track is included in the Preferred Alternative and the South 344th Street Alternative but not the Midway Landfill Alternative.

Table 3.10-4 Potential Long-Term Wetland Buffer Impacts

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1]	Affected Wetland Buffers
OMF Site Impacts[2]			
Preferred		7.8	WFW-01, WFW-02, WFW-03, WFW-04, WFW-15
South 344th Street		6.3	WFW-01, WFW-03, WFW-04, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-18
Midway Landfill		0	N/A
Mainline Impacts[3,4]			
Preferred	With 40 mph Alignment	4.7	WFW-01, WFW-03, WFW-04, WFW-06, WFW-11, WFW-13, WFW-15, WFW-32
	With 55 mph Design Option	5.1	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15
South 344th Street	With 40 mph Alignment and Enchanted Parkway Tail Track Alignment	7.0	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-32
	With 55 mph Design Option and I-5 Tail Track Alignment	7.2	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17
	With 55 mph Design Option and Enchanted Parkway Tail Track Alignment	7.2	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17
	With 40 mph Alignment and I-5 Tail Track Alignment	7.0	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-32
Midway Landfill	N/A	N/A	N/A

Notes:

(1) Impact numbers presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream area and stream buffers; therefore, this table likely overestimates the extent of buffer impact areas. Stream areas, defined by the ordinary high water line, are excluded from wetland buffer areas.

(2) For both the Preferred and S 344th Street Alternatives, there is only one site design; therefore, only one set of impact values is presented for the OMF site.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is under environmental review.

(4) The test track is included in the Preferred Alternative and the South 344th Street Alternative but not the Midway Landfill Alternative.

Not all wetlands underneath elevated structures, such as the lead, test, and mainline tracks, would be permanently filled. However, trees and other tall vegetation would not be allowed to grow near track segments. This would result in the permanent conversion from trees and tall shrubs to short-statured shrubs and herbaceous vegetation. In addition, the long-term presence of structures above vegetation would reduce the amount of sunlight and precipitation the plants receive, potentially making these areas more sparsely vegetated. Also, the interception of precipitation by overhead structures could have the potential for long-term impacts on wetland hydrology. For any given wetland, the degree of those impacts would depend on the proportion of the wetland that is affected as well as the extent to which precipitation contributes to wetland hydrology at that site.

Preferred Alternative

The Preferred Alternative would have the greatest extent of long-term impacts on wetlands and wetland buffers among the build alternatives largely due to the construction of the OMF site and associated roadways, including the extensions of 21st Avenue S and 18th Place S (Tables 3.10-3 and 3.10-4). Approximately 60 percent of the area of long-term impacts on wetlands under this alternative would result from construction of the OMF site. A large proportion of the total wetland impact area (nearly 40 percent) would occur in Wetland WFW-02, a Category II forested wetland that is associated with West Fork Hylebos Tributary and contained within a stormwater facility in the northwestern portion of the OMF site footprint (see Table G3.4-7 and Figure G3.4-4 in Appendix G3, Ecosystem Resources Technical Report for more detail). The extension of 18th Place S and the construction of a bike/pedestrian pathway to meet local code requirements would require wetland fill and retaining walls in the eastern portion of this wetland. These impacts would reduce wetland habitat and functions, as well as reducing wetland buffer functions. Sound Transit is exploring options to further avoid and minimize impacts on wetlands during the design development process, if feasible.

Most of the other wetlands that fall within the permanent impact footprint for the Preferred Alternative (or have buffers that do) are riverine wetlands associated with East Fork Hylebos Tributary. Others are depressional or slope wetlands within or near the I-5 right-of-way.

Similar to direct impacts on wetlands, impacts on wetland buffers would occur primarily at the OMF site. The permanent impact footprint of the site would overlap 7.6 acres of wetland buffer, while that of the mainline tracks overlaps 4.7 to 5.0 acres of buffer (Table 3.10-4).

Impacts on Wetland WFW-07 would vary with the track design option at the northern end of the mainline tracks. The 55 mph Design Option would intersect a small portion (less than 0.05 acre) of that wetland and its buffer; the 40 mph Alignment would avoid it, and its buffer, altogether.

South 344th Street Alternative

The extent of long-term impacts on wetlands under the South 344th Street Alternative would be less than under the Preferred Alternative, primarily because the OMF site would not impact Wetland WFW-02. This alternative would have 3.0 acres of permanent impacts on wetlands, compared to 4.1 acres under the 336th Street Alternative (Table 3.10-3). The impacts of the mainline tracks would be similar in scale to those of the Preferred Alternative.

The direct long-term impacts of the mainline track design options on wetlands would be essentially identical. As under the Preferred Alternative, the 40 mph Alignment would avoid long-term impacts on Wetland WFW-07 and its buffer. Neither of the tail track options would have any direct impacts on wetlands, and their impacts on wetland buffers would be essentially identical.

Compared to the Preferred Alternative, the long-term buffer impact footprint of the site is slightly smaller (6.8 acres, compared to 7.6 acres), while the impacts of the mainline tracks would be greater due to the tail tracks (6.8 to 7.0 acres, compared to 4.7 to 5.0 acres; see Table 3.10-4).

Midway Landfill Alternative

The Midway Landfill Alternative would have no long-term impacts on wetlands because there are no regulated wetlands or wetland buffers within the temporary or permanent impact footprints of this alternative.

3.10.2.3 Construction Impacts

Temporary construction-related impacts would occur where wetlands, wetland buffers, streams, stream buffers, or native forest are affected by clearing, grading, and ground-disturbing work but are revegetated following construction. The temporary impacts of OMF South construction on ecosystem resources are described below. For each ecosystem component, the impacts common to all alternatives are described first, followed by comparisons of the effects of the alternatives.

Aquatic Species and Habitat

Temporary construction-related impacts on aquatic resources would occur where stream buffers are affected by clearing, grading, and ground-disturbing work but are revegetated following construction. In addition to impacts on riparian vegetation, temporary impacts on stream habitats would occur if streams were diverted or placed in temporary pipes. Also, ground-disturbing work and equipment use in or near surface-flowing waters would present the risk of delivering sediment or contaminants (e.g., fuel, hydraulic fluids) to streams, temporarily degrading water quality. The risk of adverse effects would be minimized through the implementation of BMPs during construction and post-construction restoration. Temporary, construction-related impacts on streams and stream buffers are summarized in Table 3.10-5.

The duration of such impacts would vary, depending on the existing condition of the affected area. Where clearing affects low-growing vegetation (e.g., grasses, herbaceous species) or invasive species, the riparian functions of the disturbed areas would likely be restored within one growing season of clearing and replanting. Where invasive species are cleared and replaced with native species, riparian functions may be improved. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide preconstruction functions, such as shade and large woody debris recruitment.

Preferred Alternative

Most of the Preferred Alternative's impacts on aquatic resources (including impacts associated with the OMF site, mainline, lead, and test tracks) would be long-term and are discussed in Section 3.10.2.2. Approximately 500 linear feet of East Fork Hylebos Tributary would fall within the temporary impact footprint (250 linear feet for the OMF site and 250 feet along the mainline tracks; see Table 3.10-5). Impacts would include temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above. Site construction would temporarily affect approximately 1.4 acre of stream buffer habitat along East Fork Hylebos Tributary, and mainline track construction would affect approximately 2.2 acres.

Similar to permanent impacts, direct temporary impacts on West Fork Hylebos Tributary are difficult to quantify because the stream lacks a defined bed and bank in most of the study area. As with the analysis of permanent impacts, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. No part of the line representing West Fork Hylebos Tributary south of S 336th Street falls within the temporary impact footprint of the Preferred Alternative. North of S 336th Street, approximately 50 linear feet of the mapped stream channel fall within the temporary impact footprint. Project construction is anticipated to have temporary impacts on the stream, such as temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above. During construction of frontage improvements along S 336th Street and installation of a replacement structure where the stream is crossed by the road, a small segment of the stream would likely be placed in a temporary bypass while construction is underway.

Table 3.10-5 Potential Temporary (Construction-Related) Impacts on Aquatic Resources

Alternative	Design Option	Project Element	Stream[1]	Stream Impact (linear feet)[2]	Total Stream Impact per Alternative	Stream Buffer Impact (acres)[3]	Total Stream Buffer Impact per Alternative (acres)
Preferred	40 mph Alignment	Site	East Fork Hylebos Tributary	250	550	1.4	6.5
			West Fork Hylebos Tributary[4]	50		2.9	
		Mainline[5]	East Fork Hylebos Tributary	250		2.2	
	55 mph Design Option	Site	East Fork Hylebos Tributary	250	650	1.4	7.2
			West Fork Hylebos Tributary[4]	50		2.9	
		Mainline[5]	East Fork Hylebos Tributary	350		2.9	
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	50	900	0.1	4.4
		Mainline[5]		850		4.3	
	55 mph Design Option and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	50	1,050	0.1	4.7
		Mainline[5]		1,000		4.6	
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	50	1,050	0.1	5.1
		Mainline[5]		1,000		5.0	
	40 mph Alignment and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	50	900	0.1	3.9
		Mainline[5]		850		3.8	
Midway Landfill	N/A	N/A	N/A	0	0	0	0

Notes:

(1) Both affected streams are Type F, per WAC 222-16-030.

(2) Includes the total length of surface-flowing stream within the temporary (construction-related) impact footprint defined for this analysis.

(3) Values presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. Direct impacts on the stream are considered permanent and are discussed above. Temporary impacts on the stream buffer are calculated as the affected area of Wetland WFW-02, plus the area of temporary impacts on the stream's buffer north of S 336th Street. See text for further discussion.

(5) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Tributary. As with the analysis of permanent impacts, temporary impacts on the stream buffer in that area are identified for this analysis as the extent of temporary impacts on Wetland WFW-02 (approximately 2.7 acres). An additional 0.2 acre of this stream's buffer north of S 336th Street (i.e., outside of Wetland WFW-02) also fall within the temporary impact footprint.

The temporary impact footprint of the 55 mph Design Option at the northern end of the mainline tracks would overlap approximately 100 linear feet more of East Fork Hylebos Tributary than would the 40 mph Alignment (Table 3.10-5).

South 344th Street Alternative

Mainline track construction for the South 344th Street Alternative would temporarily affect between approximately 850 and 1,000 linear feet of East Fork Hylebos Tributary, depending on the design option (Table 3.10-5). Site construction would temporarily affect approximately 0.1 acre of stream buffer habitat along East Fork Hylebos Tributary, and mainline track construction would affect approximately 3.8 to 5.0 acres, depending on the design option. This alternative would have no temporary impacts to West Fork Hylebos Tributary.

As with the Preferred Alternative, the 40 mph Alignment at the northern end of the mainline tracks would have a smaller construction-related impact on the northern end of East Fork Hylebos Tributary, compared to the 55 mph Design Option (Table 3.10-5). The direct temporary impacts of the tail track design options on streams would be identical. The Enchanted Parkway alignment, however, would affect approximately 0.4 acre more stream/wetland buffer along East Fork Hylebos Tributary than would the I-5 alignment (Table 3.10-5).

Midway Landfill Alternative

The Midway Landfill Alternative would have no temporary construction-related impacts on aquatic resources.

Vegetation, Wildlife, and Wildlife Habitat

Construction-related impacts on terrestrial resources would include temporary loss or degradation of terrestrial habitats as well as disturbance due to construction-related noise, light, and human activity. The duration of temporary impacts would vary depending on the type of vegetation that is affected. Impacts on grasses and areas dominated by fast-growing invasive species would generally be short-lived, with functions typically returning to pre-impact performance within one growing season. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs require several years or decades to achieve the size and stature necessary to provide pre-impact functions, such as canopy habitat. Table 3.10-6 presents a comparison of the build alternatives' potential construction impacts on vegetation in the study area, based on the amount of each land cover type in the temporary impact footprint. Land cover types include both vegetated areas (e.g., forest, grassland) and developed areas (e.g., commercial, residential).

Areas cleared for construction would be susceptible to colonization by noxious weeds and other invasive plants. The risk of colonization would be proportional to the amount of area temporarily disturbed by construction; an alternative with a greater extent of ground disturbance would pose a higher risk of contributing to the establishment or spread of noxious weeds and invasive plants.

In disturbed areas, any of the build alternatives would provide the opportunity to temporarily reduce invasive species, such as Himalayan blackberry, through vegetation removal. In some areas, noxious weeds may be eradicated because cover types dominated by invasive species would be converted to landscaping and other areas where invasive species would be controlled. In areas where invasive species are replaced with native species, construction-related impacts may result in improved habitat function.

Table 3.10-6 Potential Temporary (Construction-Related) Impacts on Vegetation

Alternative	Design Option	Land Cover Type[1]									
		Commercial	Residential	Grassland	Invasive Brush	Non native Forest	Mature Native Forest	Other Native Forest	Wetland /Stream	Stormwater Pond	Total[2]
OMF Site Impacts (acres)											
Preferred	N/A	8	2	<0.5	1	<0.5	<0.5	1	<0.5	1	**13**
South 344th Street	N/A	1	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	0	**1**
Midway Landfill	N/A	1	<0.5	2	2	0	0	1	0	<0.5	**7**
Mainline Impacts[3] (acres)											
Preferred	40 mph Alignment	13	6	2	3	0	2	6	<0.5	1	**33**
	50 mph Design Option	13	6	3	3	0	2	6	<0.5	1	**34**
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	16	6	3	3	0	2	11	<0.5	1	**42**
	55 mph Design Option and I-5 Tail Track Alignment	17	6	5	3	0	2	10	<0.5	1	**42**
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	16	6	5	3	0	2	11	<0.5	1	**43**
	40 mph Alignment and I-5 Tail Track Alignment	16	6	3	3	0	2	10	<0.5	1	**41**
Midway Landfill[4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

Notes:

(1) Land cover types are described in Appendix G3, Ecosystem Resources Technical Report.

(2) The total values for some rows do not equal the sum of the values in the row due to rounding.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is under environmental review.

(4) The Midway Landfill Alternative would not include any mainline or test track construction.

Preferred Alternative

The temporary impact footprint for this alternative includes a large amount of clearing at the northern end of the mainline tracks to accommodate staging, stockpiling, and other construction activities (see Figure G3.4-9 in Appendix G3, Ecosystem Resources Technical Report). Most of the affected area would consist of the commercial or residential cover types (Table 3.10-6).

The total extent of temporary construction-related impacts on the other native forest cover type would be less than that of the South 344th Street Alternative and greater than the

Midway Landfill Alternative (Table 3.10-6). Nearly all temporary impacts on vegetation would be associated with construction of the mainline and test tracks, not the OMF site. The associated potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction would thus be slightly lower than that of the South 344th Street Alternative. The temporary impacts of the Preferred and the South 344th Street alternatives on the mature native forest and wetland/stream cover types would be essentially identical. However, it may take several years for the forested vegetation communities and several decades for the mature forested community to return to their preconstruction habitat function.

Based on the total extent of temporary, construction-related impacts, the risk of contributing to the establishment and spread of noxious weeds and invasive plants would be slightly greater than that of the South 344th Street Alternative and substantially greater than that of the Midway Landfill Alternative.

The 40 mph Alignment for the mainline and test tracks would have a slightly larger area of temporary impacts compared to the 55 mph Design Option (Table 3.10-6). This difference reflects areas at the northern end of the mainline track segment that would be permanently impacted under the 55 mph Design Option but only temporarily impacted under the 40 mph Alignment.

South 344th Street Alternative

Similar to the Preferred Alternative, the temporary impact footprint for this alternative includes a large amount of clearing at the northern end of the mainline tracks to accommodate staging, stockpiling, and other construction activities. In addition, the temporary impact footprint for this alternative extends farther south than that of the Preferred Alternative, affecting areas around the I-5/SR 18 interchange (see Figure G3.4-11 and Figure G3.4-12 in Appendix G3, Ecosystem Resources Technical Report). As a result, the total extent of temporary, construction-related impacts under the South 344th Street Alternative would be greater than either of the other build alternatives. As with the Preferred Alternative, most of the affected area would consist of the commercial or residential cover types (Table 3.10-6).

The temporary impacts of the Preferred and the South 344th Street alternatives on the mature native forest and wetland/stream cover types would be essentially identical, as would the associated potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction. The total extent of temporary, construction-related impacts — and the associated risk of contributing to the establishment and spread of noxious weeds and invasive plants — would be slightly less than that of the Preferred Alternative (Table 3.10-6).

For the same reasons as described for the Preferred Alternative, the 55 mph Design Option for the curve at the northern end of the mainline tracks would have a slightly smaller area of temporary impacts compared to the 40 mph Alignment. At the southern end of the facility, the design options for the tail tracks would have essentially identical temporary impacts on the mature native forest and wetland/stream cover types. The Enchanted Parkway alignment would have slightly more impacts on other native forest compared to the I-5 alignment (Table 3.10-6).

Midway Landfill Alternative

The extent of temporary construction-related impacts would be substantially smaller under the Midway Landfill Alternative than under the other build alternatives (Table 3.10-6). Also, much less of the other native forest cover type (and no mature forest or and wetland/stream) is within the temporary impact area of this alternative compared to the other two build alternatives. As such, this alternative would have the lowest potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction.

Based on the small size of the temporary disturbance area, this alternative would have the lowest risk of contributing to the establishment and spread of noxious weeds and invasive plants.

Wetlands

Temporary impacts on wetland resources may include reduction or alteration of wetland area, soils, hydrology, and/or vegetation. Construction-related dewatering may temporarily alter groundwater discharge to wetlands. Wetland and wetland buffer functions could also be impacted by soil compaction, accidental spills of hazardous substances, noise and other human-caused disturbance, sedimentation, and introduction of invasive species. Impact areas are summarized in Table 3.10-7. Temporary impacts on wetland buffers are summarized in Table 3.10-8.

Table 3.10-7 Potential Temporary (Construction-Related) Impacts on Wetlands

Wetland Rating[1]	**Alternative**		
	Preferred	**South 344th Street**	**Midway Landfill**
OMF Site Impacts			
Category II Wetlands	2.7	0	0
Category III Wetlands	0.3	0	0
Category IV Wetlands	<0.05	0	0
Total Site Impacts	*3.0*	*0*	*0*
Mainline Impacts[2, 3]			
Category III Wetlands	<0.05	0.3	N/A
Category IV Wetlands	<0.05	<0.05	N/A
Total Mainline Impacts	*0.1*	*0.3*	*N/A*[4]
Total Impacts			
Total Impacts	***3.0 - 3.1***[2]	***0.3***	***0***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) Under either the Preferred Alternative or the South 344th Street Alternative, the impacts of the design options for the curve at the northern end of the mainline tracks would differ by less than 0.05 acre. For the Preferred Alternative, this difference causes the total impact area to round to 3.1 acres or 3.2 acres, depending on the design option. See text for details. The tail track design options for the South 344th Street Alternative would have identical impacts on wetlands.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) The Midway Landfill Alternative would not include any mainline or test track construction.

The duration of temporary impacts on wetlands would vary, depending on the type of vegetation that is affected. For instance, temporary impacts on emergent wetlands would generally be short-lived, with functions typically returning to pre-impact levels within one growing season. Where invasive species are replaced with native species, construction-related impacts may result in improved habitat function. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide pre-impact functions, such as canopy habitat.

Table 3.10-8 Potential Temporary (Construction-Related) Impacts on Wetland Buffers

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1]	Affected Wetland Buffers[2]
OMF Site Impacts			
Preferred		1.7	WFW-02, WFW-04, WFW-14, WFW-15, WFW-18, WFW-33
South 344th Street		0	N/A
Midway Landfill		0	N/A
Mainline Impacts[3]			
Preferred	With 40 mph Alignment	3.5	WFW-01, WFW-03, WFW-04, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-32
	With 55 mph Design Option	4.1	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-32
South 344th Street	With 40 mph Alignment and Enchanted Parkway Tail track Alignment	3.9	WFW-01, WFW-03, WFW-05, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 55 mph Design Option and I-5 Tail Track Alignment	4.6	WFW-01, WFW-03, WFW-05, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 55 mph Design Option and Enchanted Parkway Tail track Alignment	4.6	WFW-01, WFW-03, WFW-05, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 40 mph Alignment and I-5 Tail Track Alignment	4.0	WFW-01, WFW-03, WFW-05, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32

Notes:

(1) Values presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream area and stream buffers.

(2) Wetland WFW-07 buffer is only impacted by the 55 mph Design Option.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Preferred Alternative

Overall, construction-related impacts on wetlands under the Preferred Alternative would be greater than under the South 344th Street Alternative (Table 3.10-7), primarily because this alternative would affect Wetland WFW-02 while the South 344th Street Alternative would not. Other temporary impacts on wetlands would result from construction roadway extension as part of the site and of the mainline. Construction of the OMF site and the mainline tracks would also temporarily affect the buffers of several wetlands (Table 3.10-8).

The direct temporary impacts of the design options for the curve at the northern end of the mainline tracks would be essentially indistinguishable. The design options would differ in their impacts on wetland buffers, with the 40 mph Alignment having fewer buffer impacts by avoiding the buffer of Wetland WFW-07 as compared to the 55 mph Design Option (Table 3.10-8).

South 344th Street Alternative

Construction of the South 344th Street Alternative site would not cause any temporary impacts on wetlands or wetland buffers; all temporary impacts would be associated with mainline track construction (Table 3.10-7). Only three wetlands under this alternative would be impacted by construction-related activities. The total extent of temporary, construction-related impacts (OMF site and mainline tracks combined) would be substantially less than under the Preferred Alternative, primarily because this alternative would not impact Wetland WFW-02, and it would not have any temporary impacts on Wetland WFW-04. As with the Preferred Alternative, the 40 mph Alignment also avoids the buffer of Wetland WFW-07 and would have fewer construction-related impacts than 55 mph Design Option at its northern end. There are no temporary wetland impacts from the tail track design options for the South 344th Street Alternative, but the buffers of Wetlands WFW-17 and WFW-05 would receive some impacts (see Figures G3.4-5 and G3.4-6 in Appendix G3, Ecosystem Resources Technical Report).

Midway Landfill Alternative

The Midway Landfill Alternative would have no temporary construction-related impacts on wetlands because no regulated wetlands or wetland buffers fall within the temporary impact footprint of this alternative.

3.10.2.4 Avoidance and Minimization of Impacts

The avoidance and minimization of impacts to ecosystem resources was a guiding principle in the preliminary design of the build alternatives. The development of the design for OMF South was strongly influenced by the presence and location of wetlands, habitat features, vegetation conditions, and the potential presence of fish and wildlife. During the conceptual design phase, the project design was adjusted to avoid and minimize impacts on streams, riparian areas, wetlands (Wetland WFW-02 in particular), and areas of mature native forest, particularly along East Fork Hylebos Tributary. For example, the design of the Preferred Alternative includes retaining walls along the eastern and northwestern boundaries of the OMF site to minimize impacts on streams and associated wetlands in those areas. In addition, the OMF site in the Preferred Alternative was shifted west to widen the corridor available for stream restoration.

Additional avoidance and minimization measures will be implemented, as practicable, as project design continues to develop. Sound Transit is exploring options for reducing impacts on West Fork Hylebos Tributary without jeopardizing the operability of the Preferred Alternative. In addition, Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. However, two to three culverts may need to be replaced as part of the Preferred Alternative, and these replaced culverts, which may be longer, would be made fish passable. Relocated stream segments would be designed to include meanders (where space allows) and other features that would enhance the availability and diversity of aquatic habitats over the long term. Examples of additional measures include minimizing vegetation clearing, restoring temporarily affected areas, and preparing and implementing a revegetation plan.

Sound Transit would restrict clearing activities during the active bird nesting period, to the extent possible, to comply with the Migratory Bird Treaty Act administered by USFWS. If avoidance scheduling is infeasible, Sound Transit would conduct pre-construction surveys to determine the presence or absence of nesting migratory birds to assist in complying with the Migratory Bird Treaty Act.

Sound Transit would comply with standard specifications, BMPs, and applicable federal, state, and local mitigation requirements during design, construction, and post-construction activities. Sound Transit would meet all regulatory requirements and continue to implement proactive avoidance and minimization measures related to these BMPs in adherence with federal, state, and local regulations.

3.10.2.5 Indirect Impacts

For aquatic species and habitat, indirect impacts would be minimal because the surrounding areas are already heavily developed. The construction and operation of OMF South should not interfere with future projects that may provide habitat improvements, such as road projects that may improve fish passage or projects that may enhance vegetated and wetland areas in the project corridor. OMF South would be designed to ensure that it would not preclude future culvert replacement(s) by WSDOT to provide fish passage. Facilities that provide water quality treatment could minimize long-term indirect impacts on water quality in streams that provide habitat for fish sensitive to the toxic effects of contaminants in stormwater runoff. However, as discussed in the analysis of long-term impacts, treated water discharged from such facilities and untreated water that bypasses those facilities during major storm events may contain contaminants that can harm fish and other aquatic life.

Long-term indirect impacts on vegetation, wildlife, and wildlife habitat could include habitat loss or increased disturbance due to changes in land use patterns near the OMF South alternatives. Such impacts would be unlikely under any of the build alternatives, however, because OMF South is not anticipated to influence surrounding land uses, and all three site alternatives are in areas that are highly developed.

Indirect impacts from OMF South may result in long-term wetland degradation from stormwater discharges and alterations in wetland hydrology. Impacts to wetland hydrology would be minimized through the use of stormwater management facilities that meet the standards established by local, state, and federal agencies with regulatory authority. Facilities that provide water quality treatment could minimize long-term indirect impacts on water quality in wetlands. However, as discussed in the analysis of long-term impacts, treated water discharged from such facilities and untreated water that bypasses those facilities during major storm events may contain contaminants that can harm fish and other aquatic life.

3.10.3 Mitigation Measures

Construction of either the Preferred Alternative or the South 344th Street Alternative would have unavoidable impacts on ecosystem resources. On-site restoration would be undertaken to offset temporary construction impacts. Examples of such restoration activities include restoring in-stream habitat with large woody debris and planting temporarily disturbed wetlands and riparian buffers with native species. As the project design is advanced, Sound Transit would work with Tribes and permitting agencies to identify mitigation needs and opportunities. For unavoidable long-term impacts on streams and stream buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. Impacts on streams would be mitigated through restoration actions developed in collaboration with federal, state, local, and Tribal biologists.

Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. For unavoidable long-term impacts on wetlands and wetland buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. These guidelines and regulatory standards include the 2008 Federal Compensatory Mitigation Rule (Title 40 Code of Federal Regulations [CFR] § 230 and 33 CFR § 325 and 332.), interagency guidance contained in Wetland Mitigation in Washington State (Ecology et al. 2021, or as updated), and the applicable local critical areas ordinances. Sound Transit could use a combination of mitigation strategies to achieve no net loss of wetland function and area, such as off-site compensatory mitigation within the Hylebos Creek watershed, mitigation bank, and/or in-lieu fee program.

Compensatory mitigation would be provided for construction impacts lasting more than one growing season and for permanent conversion of wetlands from one vegetation type to another (e.g., forested wetland to emergent or scrub-shrub wetland) as well as for indirect impacts on wetlands. In areas where stream buffers and wetland buffers overlap, mitigation for impacts would be based on the local jurisdiction's requirements for mitigating impacts either to wetland buffers or to stream buffers — whichever requirements are more stringent.

In cooperation with resource agencies and Tribes, Sound Transit would develop plans to mitigate the effects of the project on wetlands, streams, riparian corridors, and regulatory buffers on a watershed basis. To the extent possible, off-site compensatory mitigation sites would be identified and would compensate for lost values in kind. Potential off-site mitigation areas are identified in Appendix G.3, Ecosystems Technical Report. These or other areas may be used for off-site mitigation. It may be necessary to use several sites and Sound Transit does not anticipate the need to implement mitigation to compensate for diminished habitat functions due to impacts on vegetation outside of streams, wetlands, and their buffers.

The 2008 Federal Compensatory Mitigation Rule established a preference for the use of approved wetland mitigation banks and in-lieu fee programs over the development of permittee-responsible mitigation sites (40 CFR § 230 and 33 CFR § 325 and 332). The study area is located within the service areas of one mitigation bank (the Port of Tacoma's Upper Clear Creek mitigation bank, certified in June 2020) and one in-lieu fee program (the King County Mitigation Reserves Program).

3.11 Water Resources

This section discusses potential impacts of the OMF South project alternatives on water resources, which includes surface waters, stormwater utilities, shorelines, floodplains, and groundwater. The amount of stormwater runoff to surface waters and infiltration to groundwater that occurs in a basin is controlled in part by the types of soil and land cover that are present, which are also discussed.

Federal Way and Kent are Phase II permittees under Ecology's National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Permit (Ecology 2017). The permit requires compliance with BMPs for design related to flow control and water quality as outlined in the Stormwater Management Manual for Western Washington (Ecology 2019) or equivalent manuals. Federal Way and Kent have each adopted the King County Surface Water Design Manual (King County 2016a) and the King County Stormwater Pollution Prevention Manual (King County 2016b), and each city has included amendments to meet their respective needs (City of Federal Way 2017; City of Kent 2017). A list of regulations applicable to water resources in the study area is provided in Appendix H5, Water Resources Technical Appendix.

3.11.1 Affected Environment

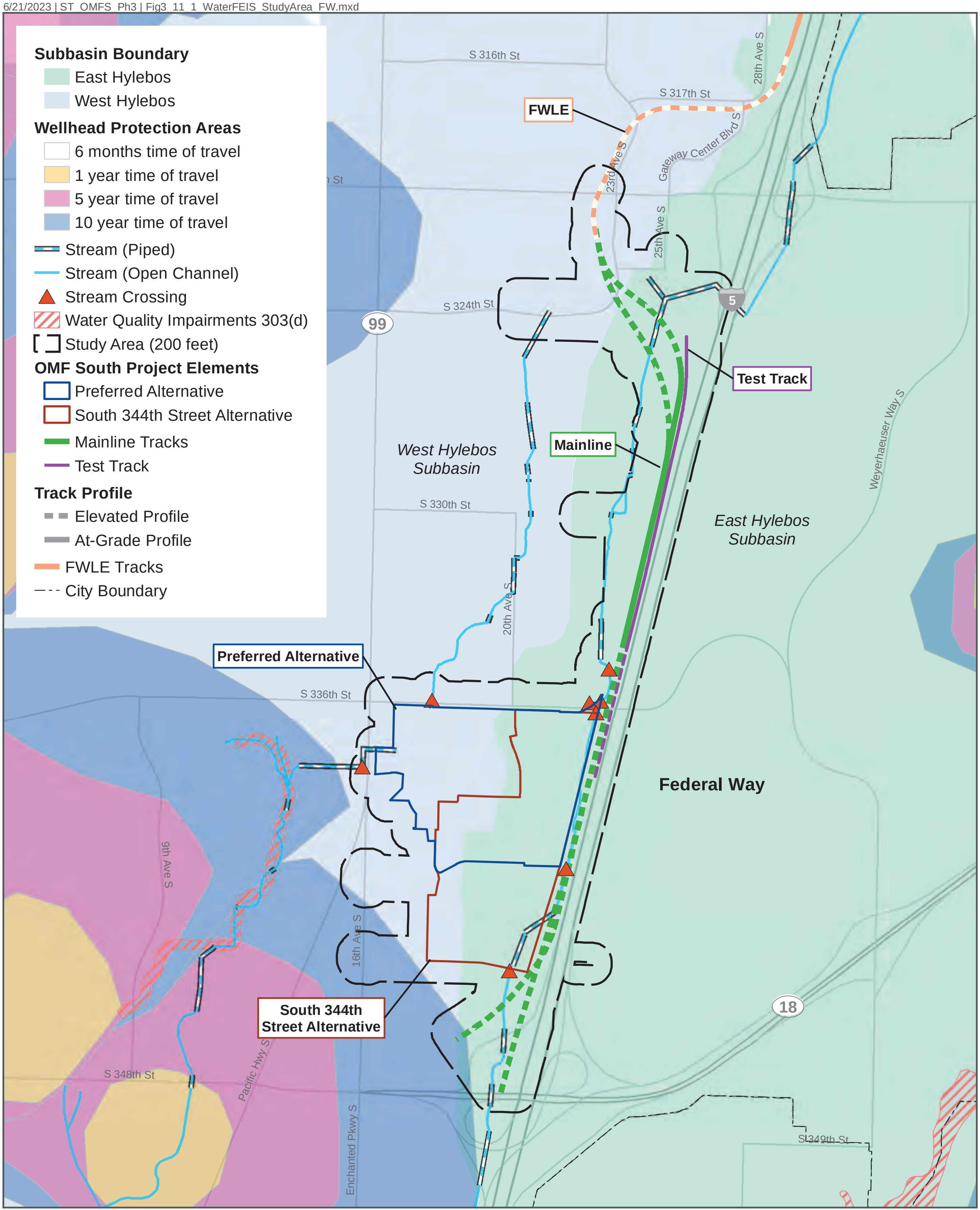
The affected environment includes the surface water, shorelines, stormwater, floodplains, and groundwater resources in the study area, as shown in Figures 3.11-1 and 3.11-2. The Preferred and South 344th Street alternatives are in Water Resource Inventory Area 10, the Puyallup-White Watershed, as designated by WDNR. The Midway Landfill Alternative is in Water Resource Inventory Area 9, the Green/Duwamish and Central Puget Sound Watersheds.

Natural Water Bodies

The Preferred and South 344th Street alternatives discharge to two tributaries in the Hylebos Creek basin in the Puyallup–White Watershed, while the surface waters in the Midway Landfill Alternative study area discharge to the urban stream basin of McSorley Creek in in the Lower Puget Sound–Des Moines/Federal Way Watershed (Figures 3.11-1 and 3.11-2). The surface streams in the study area are each part of a drainage system that ultimately discharges to Puget Sound. Only streams in the immediate vicinity of the alternatives or those receiving surface flows from the sites will be discussed here. Details regarding streams, typing, and classification are presented in Section 3.10, Ecosystem Resources.

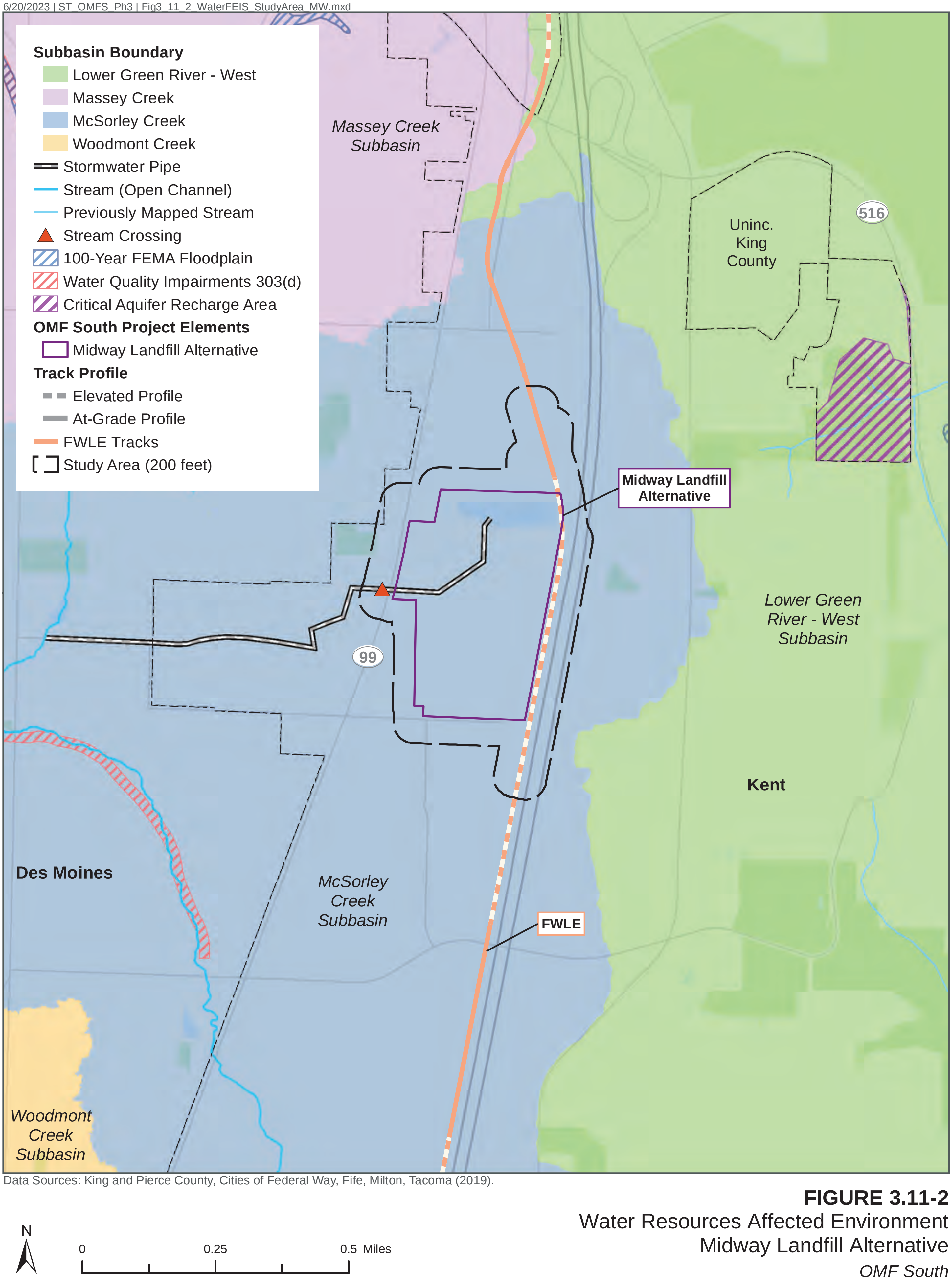
The surface waters in the study area have been historically impacted by urbanization, and all the streams have reaches that are either piped within stormwater facilities or are confined within straight and narrow channels that lack complexity. The industrial and urban development in the study area has prompted restoration efforts to protect water quality and wildlife habitat. The following sections describe each water body in the study area and identify those designated as impaired on the Water Quality Assessment Clean Water Act Section 303(d) list. Table 3.11-1 identifies water quality impairments and the documented floodplains associated with each stream. Discussion of fish species that may currently be present in stream reaches within and downstream of the study area is presented in Section 3.10.1.1, Aquatic Species and Habitat.

6/21/2023 | ST_OMFS_Ph3 | Fig3_11_1_WaterFEIS_StudyArea_FW.mxd


Subbasin Boundary
East Hylebos
West Hylebos
Wellhead Protection Areas
6 months time of travel
1 year time of travel
5 year time of travel
10 year time of travel
Stream (Piped)
Stream (Open Channel)
Stream Crossing
Water Quality Impairments 303(d)
Study Area (200 feet)
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
S 316th St
S 317th St
28th Ave S
FWLE
Gateway Center Blvd S
23rd Ave S
25th Ave S
S 324th St
99
5
Test Track
Mainline
West Hylebos Subbasin
East Hylebos Subbasin
Weyerhaeuser Way S
S 330th St
20th Ave S
Preferred Alternative
S 336th St
Federal Way
9th Ave S
16th Ave S
South 344th Street Alternative
18
Pacific Hwy S
S 348th St
Enchanted Pkwy S
S 349th St
N
0
0.25
0.5 Miles

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

FIGURE 3.11-1
Water Resources Affected Environment
Preferred and South 344th Street Alternatives
OMF South


Subbasin Boundary
Lower Green River - West
Massey Creek
McSorley Creek
Woodmont Creek
Stormwater Pipe
Stream (Open Channel)
Previously Mapped Stream
Stream Crossing
100-Year FEMA Floodplain
Water Quality Impairments 303(d)
Critical Aquifer Recharge Area
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
Study Area (200 feet)
Massey Creek Subbasin
Uninc. King County
516
Midway Landfill Alternative
Lower Green River - West Subbasin
99
Kent
Des Moines
McSorley Creek Subbasin
FWLE
Woodmont Creek Subbasin
N
0
0.25
0.5 Miles

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

FIGURE 3.11-2
Water Resources Affected Environment
Midway Landfill Alternative
OMF South

- **Hylebos Creek.** The Hylebos Creek basin is made up of the West and East Forks of Hylebos Creek and their respective tributaries (Tributaries 0014C and 0016A), all of which join in confluence before discharging to Puget Sound's Commencement Bay via the Hylebos Waterway, approximately 6.9 miles downstream. Historically, the Hylebos Creek basin has seen extensive and rapid suburban development that has led to a loss of stream and wetland function and value. Development has altered the natural hydrologic balance, which has negatively impacted both hydrologic functions of flow control and water quality and resulted in increased flooding, erosion, and water quality impairments as well as loss of aquatic habitat and life (King County 1990).
    - East Fork Hylebos Tributary flows through the eastern portion of both the Preferred and South 344th Street alternatives just west of I-5 (Figure 3.11-1). There is currently no documented fish use in East Fork Hylebos Tributary within the study area (see Section 3.10.1.1). East Fork Hylebos Tributary does not have any listed 303(d) water quality impairments (Ecology 2012). Riparian vegetation along East Fork Hylebos Tributary in the study area may provide a range of benefits to water resource functions. Areas dominated by native forest and wetlands support functions such as fish and wildlife habitat (see Section 3.10.1.1); water temperature moderation; improved infiltration; groundwater recharge; sediment delivery, transport, and storage; nutrient and pathogen removal; and erosion control and stream channel stabilization.
    - West Fork Hylebos Tributary flows through the northwestern corner of the project limits of the Preferred Alternative, through a wetland (WFW-02) and an associated in-line stormwater detention facility with no defined channel. The wetland drains to the west through a long, piped segment that joins several other tributaries to form the West Fork of Hylebos Creek (Figure 3.11-1). There is presently no documented fish presence in West Fork Hylebos Tributary within the study area (see Section 3.10.1.1). Heavy urbanization and development in the upper watershed have likely contributed to elevated levels of pollutants associated with vehicle use, including metals such as copper, lead, and zinc, which are listed on the 303(d) water quality assessment impairments along with polycyclic aromatic hydrocarbons (Ecology 2018).
- **McSorley Creek.** There are no surface-flowing segments of McSorley Creek or its tributaries in the study area. The on-site stormwater facility at the Midway Landfill discharges to the North Fork of McSorley Creek, approximately 1 mile west of the study area (Figure 3.11-2). North Fork McSorley Creek would receive additional treated stormwater runoff from the Midway Landfill Alternative but would otherwise not be affected by project construction or operation. The North Fork originates in Des Moines and joins the South Fork in confluence in Saltwater State Park to form McSorley Creek before it discharges to Puget Sound. Fish have been documented in North Fork McSorley Creek (see Section 3.10.1.1). The 303(d) list identifies no water-body impairments for North Fork McSorley Creek, but approximately 1.2 miles downstream of the Midway Landfill, McSorley Creek has been listed for bacterial and dissolved oxygen impairments (Ecology 2012).

Table 3.11-1 Potentially Affected Surface Water Bodies

Surface Water Body	Stream Index Number[1]	Alternative	Water Quality Impairments[2]	Water Quality Impairments Category[2]	FEMA Floodplains[3]
Hylebos Creek Basin					
East Fork Hylebos Tributary	10.0016A	Preferred Alternative, South 344th Street	None	5	None
West Fork Hylebos Tributary	10.0014C	Preferred Alternative, South 344th Street	Copper, Lead, PAHs[4], Zinc	5	None
Lower Puget Sound Basin					
North Fork McSorley Creek[5]	09.0382	Midway Landfill	None	None	None
McSorley Creek[5]	09.0381	Midway Landfill	Bacterial, Dissolved Oxygen	5	None

Notes:

(1) Water Resource Inventory Area identification numbers according to King County (1990).

(2) According to the 303(d) Water Quality Impairment List (Ecology 2018).

(3) According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) (53053C0968E, 53033C1250F) (FEMA 1995).

(4) PAHs: polycyclic aromatic hydrocarbons; specifically listed are Dibenzo(a,h)anthracene and Benzo(a)pyrene.

(5) No surface flowing portion of North Fork McSorley Creek is within the study area; however, because the Midway Landfill Alternative may potentially discharge stormwater to the stream, which discharges to McSorley Creek downstream, it has been included in this analysis.

Stormwater Runoff Characteristics Related to Hydrologic Soil Group

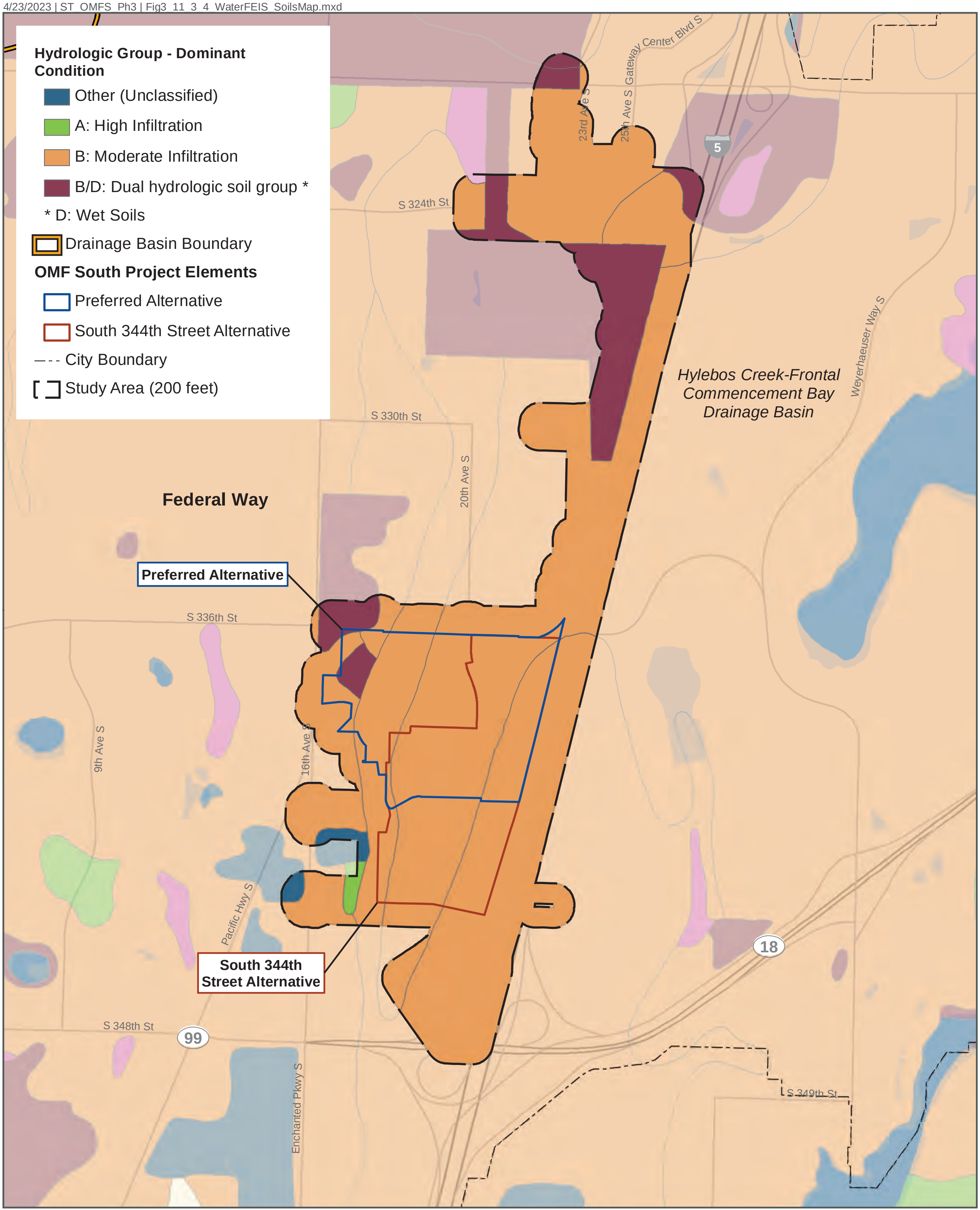
The study area contains Hydrologic Soil Groups A, B, and D, and Pits (Figures 3.11-3 and 3.11-4). Group A has low runoff potential and moderate- to high-infiltration potential and is generally compatible with a variety of LID approaches to stormwater facilities (USDA NRCS 2007, 2019a, 2019b). Group B has moderately low runoff potential and moderate infiltration capacity. Group D has high runoff potential and tends to restrict water movement and infiltration. Some portions of the study area have dual hydrologic classifications (B/D), where the first classification applies to the dry condition and the second to the wet condition. The Midway Landfill is classified as Pits, which is a pit-fill soil with properties modified by years of solid waste disposal and fill processes (USDA NRCS 2007) and not included in any hydrologic soil group.

Stormwater Runoff Characteristics Related to Land Use

Most of the basin areas occupied by the build alternatives are urbanized, with impervious surface cover currently ranging from approximately 50 to 80 percent. The Preferred and South 344th Street alternatives located in Federal Way are a mix of suburban/residential, commercial, industrial, and recreational land use. Other developed portions of the study area include major roadways (I-5, SR 99, SR 18, SR 161, and SR 167), as well as surrounding suburban developments.

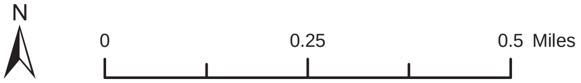
The Midway Landfill Alternative is on a 68-acre site in Kent that was a gravel pit from 1945 to 1966 and a landfill for Seattle from 1966 to 1983. The site was listed as a Superfund site in May 1986, and cleanup was completed September 2000. The cleanup included covering the landfill with an engineered multilayer cap with a top layer of till grass, installing a gas extraction system to remove and control methane gas, and making improvements to the surface water drainage system, such as grading, alterations, and creation of a surface water holding pond (Ecology 2005).

4/23/2023 | ST_OMFS_Ph3 | Fig3_11_3_4_WaterFEIS_SoilsMap.mxd



Hydrologic Group - Dominant Condition
Other (Unclassified)
A: High Infiltration
B: Moderate Infiltration
B/D: Dual hydrologic soil group *
* D: Wet Soils
Drainage Basin Boundary
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
City Boundary
Study Area (200 feet)
Federal Way
Hylebos Creek-Frontal Commencement Bay Drainage Basin
Preferred Alternative
South 344th Street Alternative
Gateway Center Blvd S
23rd Ave S
25th Ave S
S 324th St
S 330th St
20th Ave S
Weyerhaeuser Way S
S 336th St
9th Ave S
16th Ave S
Pacific Hwy S
S 348th St
Enchanted Pkwy S
S 349th St
5
18
99

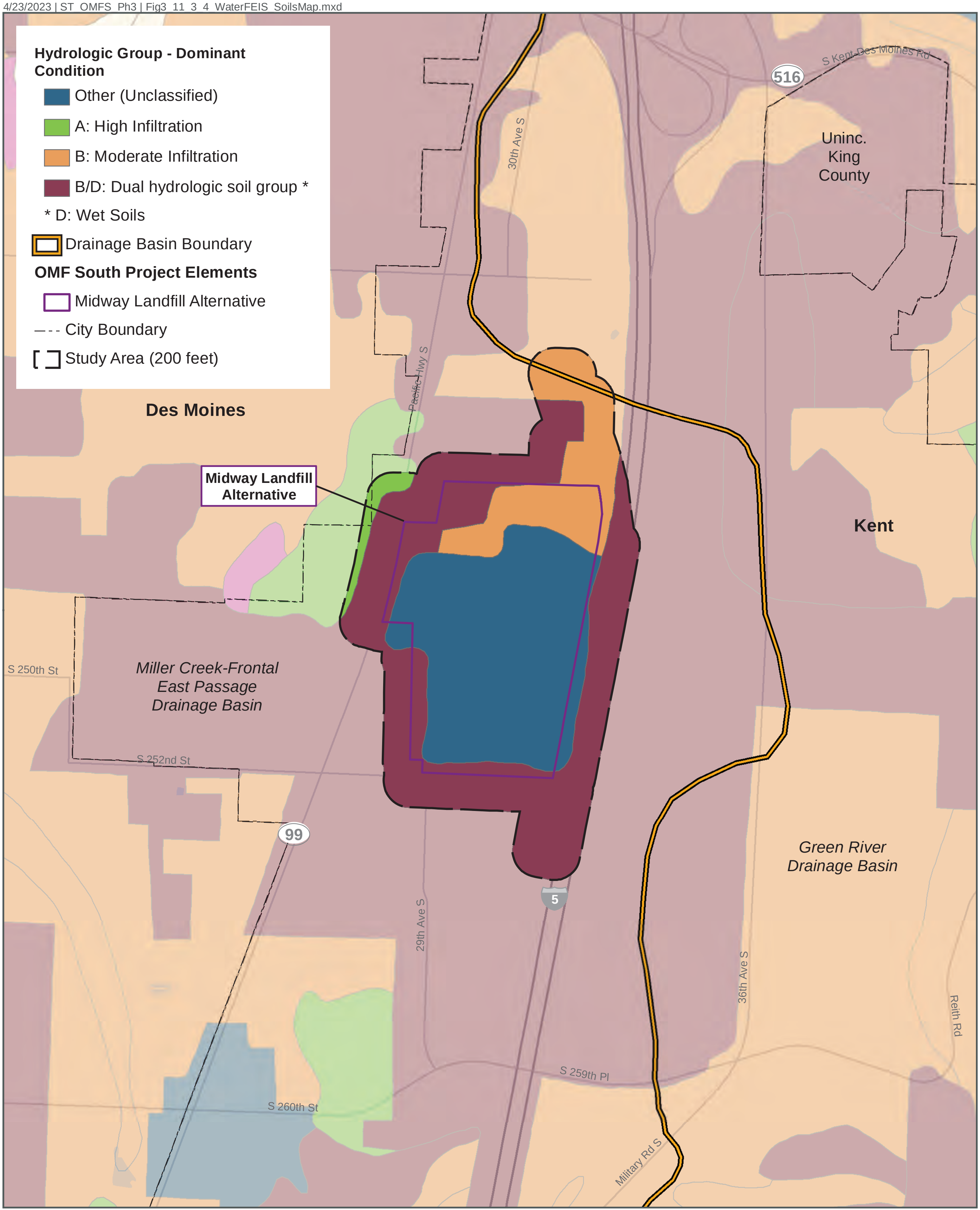
Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).



N
0
0.25
0.5 Miles

FIGURE 3.11-3
Study Area Hydrologic Soil Groups
Preferred and South 344th Street Alternatives
OMF South

4/23/2023 | ST_OMFS_Ph3 | Fig3_11_3_4_WaterFEIS_SoilsMap.mxd


Hydrologic Group - Dominant Condition
Other (Unclassified)
A: High Infiltration
B: Moderate Infiltration
B/D: Dual hydrologic soil group *
* D: Wet Soils
Drainage Basin Boundary
OMF South Project Elements
Midway Landfill Alternative
City Boundary
Study Area (200 feet)
Des Moines
Midway Landfill Alternative
Miller Creek-Frontal East Passage Drainage Basin
Kent
Uninc. King County
Green River Drainage Basin
S Kent-Des Moines Rd
516
30th Ave S
Pacific Hwy S
S 250th St
S 252nd St
99
5
29th Ave S
36th Ave S
Reith Rd
S 259th Pl
S 260th St
Military Rd S
N
0
0.25
0.5 Miles

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

FIGURE 3.11-4
Study Area Hydrologic Soil Groups
Midway Landfill Alternative
OMF South

Stormwater Management Systems

In the study area for all three alternatives, there are conveyance systems and management facilities that receive stormwater from the sites. The surface stormwater runoff is collected in piped municipal systems that consist of stormwater facilities, ditches, media filter drains, stormwater ponds, and vaults. The stormwater system also connects to piped stream reaches and historically modified wetlands that serve as in-line detention and flood control facilities (King County 1990). The modifications to the natural hydrologic system have historically disrupted natural flow patterns and processes, such as infiltration and groundwater recharge, and resulted in water quality degradation.

The Preferred and South 344th Street alternative sites currently discharge into regional stormwater facilities within Federal Way. Although the existing regional facilities will remain, the OMF South alternatives have been designed to have stormwater management facilities independent of the function of the existing regional facilities. The Preferred and South 344th Street alternative sites currently include some WSDOT managed stormwater facilities. The Midway Landfill has a regional stormwater facility that receives stormwater from off-site areas. The storm drain system downstream of that regional facility routes stormwater through Kent and ultimately discharges into McSorley Creek within Des Moines.

Shorelines, Floodplains, and Floodways

No regulated shorelines of the state have been identified within the study area (City of Kent 2009; City of Federal Way 2011, 2014). No regulated floodplains have been identified within the study area, either on adopted FEMA Flood Insurance Rate Maps or preliminary Flood Insurance Rate Maps (FEMA 1995).

Groundwater

The Preferred and South 344th Street alternatives are within Federal Way’s 100-year Wellhead Capture Zone, and both alternatives have a permanent impact footprint that grazes the fringe of the 10-year travel zone for the Wellhead Protection Area (Figure 3.11-1). Lakehaven Water and Sewer District manages the three main aquifer systems that underlie the city — the Redondo-Milton Channel Aquifer, the Intermediate Aquifer System (Mirror Lake and Eastland Upland Aquifers), and the Deep Aquifer — in cooperation with Federal Way. To protect the drinking water supply, they have implemented both the state of Washington’s Wellhead Protection Program and Section 1428 of the 1986 Amendments to the Federal Safe Drinking Water Act (City of Federal Way 2015). There are no sole-source aquifers designated by EPA in the study area of any of the alternatives (EPA 2019).

The Midway Landfill Alternative is not within any of the Wellhead Protection Areas (up to 10-year travel times) or Critical Aquifer Recharge Areas (categories 1 through 3) as identified by King County. As previously discussed, the Midway Landfill was listed as a Superfund site, with cleanup completed in 2000. The cleanup included covering the unlined landfill with an engineered multilayer cap and making improvements to the surface water drainage system (Ecology 2005). Rainwater is collected from the surface of the landfill and released into the North Fork of McSorley Creek. While some groundwater contamination at the site is above federal drinking water standards, there are no active sources of drinking water collection in the Midway Landfill Alternative study area. Kent’s drinking water supply is mainly provided by a well drilled into an underground aquifer. To meet additional system demands, Kent sources water from partnerships with Lakehaven Water and Sewer District, Covington Water District, and Tacoma Water to obtain surface water from the Green River Watershed (City of Kent 2018).

3.11.2 Environmental Impacts

3.11.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to water resources from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas, but they would be required to manage stormwater effectively and minimize impacts to water resources. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.11.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Surface Water Resources

An increase in impervious surfaces (from new maintenance yards, associated mainline tracks, stormwater ponds, parking areas, building roofs, project road improvements, etc.) is associated with any area where vegetation or other pervious surface is converted to paved surface. These surfaces are associated with an increase in runoff volumes and decrease in groundwater recharge, which may increase flooding and flow frequencies. Also, the increased surface flow volumes and water quality impairments can contribute to stream erosion and aquatic habitat degradation, if not properly managed. Stormwater management facilities will be evaluated as part of the project design and are discussed in more detail in Section 3.11.2.4.

OMF South would add both pollution-generating impervious surfaces and non-pollution-generating impervious surfaces in the study areas for the proposed alternatives. Pollution-generating impervious surfaces are subject to vehicular use and include parking areas, bus holding areas, project-associated roads or road realignments, and yard and apron areas; these areas have the potential to accumulate contaminants that can be transported by stormwater runoff into receiving water bodies. Non-pollution-generating impervious surfaces are not subject to vehicular use and include the light rail tracks,[4] sidewalks, and rooftops, and stormwater ponds. Tables 3.11-2 and 3.11-3 summarize the range of impervious surface changes that would result from OMF South for the three build alternatives when compared with existing conditions. These alternatives would mainly redevelop existing parking lots and commercial business areas, in addition to some undeveloped areas along the I-5 corridor.

---

[4] Sound Transit and Ecology entered into a Memorandum of Understanding dated December 9, 2019, in which Sound Transit agreed to conduct a study to characterize the quality of the stormwater discharged from light rail mainline tracks. The data and analysis from the study will be used to inform the design of light rail projects that are scheduled in the Sound Transit 3 Plan to be completed between 2030 and 2041, and, as necessary, Sound Transit will identify all known, available, and reasonable methods of prevention, control, and treatment (abbreviated as AKART) to define light-rail specific BMPs. OMF South is scheduled to be completed by 2032.

Table 3.11-2 Total Impervious Surface Land Cover Changes

Alternative with Mainline Track Options	Project Element	Existing (acres)	Proposed (acres)	Change (acres)
Preferred Alternative				
40 mph Alignment	OMF Site	30	47	+17
	Mainline[2]	8	12	+4
	Total	**38**	**59**	**+21**
55 mph Design Option	OMF Site	30	47	+17
	Mainline[2]	8	13	+5
	Total	**38**	**60**	**+22**
South 344th Street				
40 mph Alignment and Enchanted Parkway Tail Track Alignment	OMF Site	32	51	+19
	Mainline[2]	8	14	+6
	Total	**40**	**65**	**+25**
55 mph Design Option and I-5 Tail Track Alignment	OMF Site	31	51	+20
	Mainline[2]	8	15	+7
	Total	**39**	**66**	**+27**
55 mph Design Option and Enchanted Parkway Tail Track Alignment	OMF Site	32	51	+19
	Mainline[2]	9	14	+5
	Total	**41**	**65**	**+24**
40 mph Alignment and I-5 Tail Track Alignment	OMF Site	31	51	+20
	Mainline[2]	7	14	+7
	Total	**38**	**65**	**+27**
Midway Landfill				
Midway Landfill	OMF Site	17	62[1]	+45

Sources: Existing land cover analysis developed from project survey data and aerial imagery using GIS. Proposed land cover analysis developed from project design files using GIS.

Notes:

(1) For the water resource impact analysis, the landfill area was categorized as existing pervious grass in order to avoid underestimating potential impacts; however, this existing condition assumption should not necessarily be used for stormwater management design sizing.

(2) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Table 3.11-3 Pollution-Generating Impervious Surface Land Cover Changes

Alternatives with Mainline Track Options	Project Element	Existing (acres)	Proposed (acres)	Change (acres)
Preferred Alternative				
40 mph Alignment	OMF Site	22	23	+1
	Mainline[1]	4	4	+0
	Total	**26**	**27**	**+1**
55 mph Design Option	OMF Site	22	23	+1
	Mainline[1]	4	5	+1
	Total	**26**	**28**	**+2**
South 344th Street				
40 mph Alignment and Enchanted Parkway Tail Track Alignment	OMF Site	22	25	+3
	Mainline[1]	5	5	+0
	Total	**27**	**30**	**+3**
55 mph Design Option and I-5 Tail Track Alignment	OMF Site	21	25	+4
	Mainline[1]	4	5	+1
	Total	**25**	**30**	**+5**
55 mph Design Option and Enchanted Parkway Tail Track Alignment	OMF Site	22	25	+3
	Mainline[1]	5	6	+1
	Total	**27**	**31**	**+4**
40 mph Alignment and I-5 Tail Track Alignment	OMF Site	21	25	+4
	Mainline[1]	4	5	+1
	Total	**25**	**30**	**+5**
Midway Landfill				
Midway Landfill	OMF Site	11	26	+15

Sources: Existing land cover analysis developed from project survey data and aerial imagery using GIS. Proposed land cover analysis developed from project design files using GIS.

Note:

(1) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

Shorelines, Floodplains, and Floodways

No regulated shorelines of the state exist within the study area; therefore, no impacts on shoreline resources would result from any of the proposed alternatives. All of the build alternatives are outside of mapped FEMA floodplains, and the preliminary design for the alternatives would span the mapped stream crossings without columns being placed within the boundaries. As a result, no impacts on mapped FEMA floodplains or floodways are expected.

Groundwater

The Preferred and Midway Landfill alternatives would not be located within groundwater protection boundaries and are not anticipated to adversely impact groundwater resources. The footprint of the South 344th Street Alternative may include the installation of columns to support the elevated guideway that could be placed on or near the edge of the 10-year wellhead protection area. Potential impacts would depend on design depth and column placement, but generally would be expected to be minimal.

Preferred Alternative

The Preferred Alternative, including both mainline track options, would convert approximately 20 fewer acres of land to impervious cover than the Midway Landfill Alternative and a similar amount to all mainline and tail track combinations of the South 344th Street Alternative. The Preferred Alternative, including both options, would result in the lowest net amount of pollution-generating impervious surfaces and would create the least new pollution-generating impervious surfaces compared to the South 344th Street and Midway Landfill alternatives.

For operational safety, trees and other tall vegetation would not be allowed to grow near the mainline, lead, tail, or test tracks. As a result, clearing of native forested vegetation close to proposed tracks in areas of the riparian zone associated with the East Fork Hylebos Tributary would be necessary. Under the Preferred Alternative, a loss of riparian vegetation may contribute to long-term impacts to water resources in the project area and downstream areas, including increased stream temperatures; decreased runoff interception and pollutant filtration functions; reduced groundwater recharge; increased erosion and sedimentation; and loss of stream channel stabilization. These impacts are discussed further in Section 3.10.2 and Appendix G3, Ecosystem Resources Technical Report. Shorter-stature trees and native vegetation may be replanted or replaced through natural establishment under elevated guideways to minimize riparian impacts.

The Preferred Alternative includes an extension of 18th Place S that would encroach upon a portion of a wetland (WFW-02) associated with West Fork Hylebos Tributary. The area of the wetland serves as an in-line stormwater detention facility through which the West Fork Hylebos Tributary currently flows. The construction of this road extension and bike/pedestrian pathway would place fill within the wetland boundary and construct retaining walls in the eastern portion of the wetland/detention facility. Potential impacts to the detention currently provided would be evaluated as the project design progresses and addressed in compliance with local and state requirements. Potential impacts to the wetland area and function are described in Section 3.10, Ecosystem Resources.

Frontage improvements along S 336th Street to meet city standards would necessitate the replacement of existing culverts that convey West Fork Hylebos Tributary under that roadway. If any culverts on potentially fish-bearing streams are replaced, the replacement structures would be designed and installed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013). The current conceptual design indicates that the replacement structure for West Fork Hylebos Tributary would have a larger hydraulic opening than the existing culverts at that site (see Section 3.10.2.2). Replacing the existing culverts with a larger opening could support more natural sediment transport patterns in the stream and potentially improve water quality. In addition, crossings may require a flood risk assessment to document proposed project impacts to adjacent lands and floodplains changes.

For the Preferred Alternative, the project team has coordinated with Federal Way regarding the use of regional facilities. Although the existing regional facilities will remain, the Preferred Alternative has been designed to have stormwater management facilities independent of the function of the existing regional facilities to minimize impacts to the existing stormwater system capacity and stream functions. Federal Way requires redevelopment structures to return flow control regimes to fully forested predevelopment conditions. In addition, the proposed on-site facilities have been designed to separate stormwater from the flows of the West Fork Hylebos Tributary until they have received water quality treatment, to avoid impacts to downstream water quality.

The Preferred Alternative proposes to relocate and realign approximately 1,650 linear feet of East Fork Hylebos Tributary, which could potentially benefit stream habitat by adding channel sinuosity and habitat complexity. When existing structures and paved areas are redeveloped to current stormwater design standards, downstream receiving waters benefit because of improved flow control and water quality treatment. In addition, relocation and redesign of heavily modified conveyance systems that return them to more naturally connected states can result in beneficial impacts on water resources. A full discussion of habitat and stream buffer details is presented in Section 3.10, Ecosystem Resources.

South 344th Street Alternative

All of the combinations of mainline and tail track options associated with the South 344th Street Alternative would convert approximately 20 fewer acres of land cover to an impervious condition than the Midway Landfill Alternative and would convert similar amounts of land as compared to the Preferred Alternative. Both mainline track options for the South 344th Street Alternative would create the least amount of new pollution-generating impervious surfaces when paired with the Enchanted Parkway tail track alignment. Potential impacts on East Fork Hylebos Tributary and its riparian zone resulting from the clearing of vegetation would be similar in nature to those described for the Preferred Alternative, but they would extend over a greater distance. The South 344th Street Alternative would have similar long-term impacts to stormwater runoff as the Preferred Alternative because of similar increases in impervious surfaces.

The South 344th Street Alternative is located in a commercial and industrial area that is bordered by the I-5 corridor to the east. The South 344th Street Alternative also discharges to West Fork Hylebos Tributary. The design proposes to realign and meander East Fork Hylebos Tributary and daylight an approximately 420-foot-long section of currently piped stream. There is ongoing coordination with WSDOT to design the project to avoid or minimize impacts to the existing WSDOT stormwater facility near the southeast corner of the site. The remaining area would be used for the stream.

Emergency vehicle access to the mainline tracks would be needed in the daylighted stream location. One of the options under consideration may require approximately 60 feet of channel that is currently in culverts (and that would otherwise be daylighted, as described above) to be placed in a new culvert. Because this alternative would not include the extension of 21st Avenue S, the replacement crossing structure south of the daylighted channel would be shorter compared to the Preferred Alternative. It may be possible to eliminate the need for a culvert through detailed design of the access and of the stream meanders. The design of the emergency vehicle access would need to be coordinated and approved by Sound Transit, WSDOT, and Federal Way.

Similar to the Preferred Alternative, the proposed realignment and restoration of approximately 1,650 linear feet of East Fork Hylebos Tributary could potentially benefit habitat by adding channel complexity. When existing structures and paved areas are redeveloped to current design standards, it can result in a positive impact to downstream receiving waters because of improved flow control and water quality treatment. In addition, relocation and redesign of heavily modified conveyance systems that return them to more naturally connected states can result in beneficial impacts on water resources. A full discussion of habitat and stream buffer details is presented in Section 3.10, Ecosystem Resources.

The Enchanted Parkway tail track option for the South 344th Street Alternative may include elevated guideway columns that could touch the edge of the 10-year wellhead protection area. Potential impacts would depend on design depth and column placement, but generally would be expected to be minimal.

Midway Landfill Alternative

The Midway Landfill Alternative includes the site of a former landfill, which presents both short-term risks associated with construction and long-term risks and benefits associated with permanent structures and operational activities. Over time, landfill waste settles at different rates, creating an uneven surface that contributes to engineering challenges and long-term operational and maintenance concerns. Additionally, Midway Landfill is a Superfund site and is under active monitoring and reporting to ensure that the cleanup measures continue to function as planned, which includes an active methane gas extraction system.

The surface of the Midway Landfill is grass on dense, compacted soils that overlay an impermeable membrane cap, which prevents infiltration and directs runoff to an on-site surface water collection system. This landfill cover does not strictly meet the definition of either a pervious or impervious surface. For the purposes of the water resources impact analysis, the landfill area was categorized as existing pervious grass in order to avoid underestimating potential impacts. However, this existing condition assumption should not necessarily be used for later stormwater management design sizing.

Sound Transit has analyzed three potential subsurface construction design options for siting an OMF on the landfill, all of which would be compatible with the current FWLE design of at-grade mainline tracks. Common to the three subsurface construction design options would be the replacement of the landfill cap to prevent surface water and stormwater from entering any remaining portion of landfill and ongoing monitoring, testing, and management of landfill materials, as needed. These options are discussed in detail in Chapter 2, Alternatives Considered.

The Platform subsurface construction design option would build the OMF structure above the landfill. However, the elevated platform option could create pathways for groundwater contamination through the installation of concrete-filled drilled shafts.

The placement of the slab and beam system in the Hybrid subsurface construction design option would have the potential to partially impede access to the hazardous materials in the landfill and could create pathways for the contamination to enter the groundwater table through the installation of concrete-filled drilled shafts. The Platform and Hybrid subsurface construction design options for the Midway Landfill Alternative, which require concrete-filled drilled shafts or other structures to be installed, would need to be designed to prevent the downward migration of more contaminated groundwater or leachate to the aquifer below. Each of the three subsurface design options would result in refuse left on site, which would require the preservation, or reinstallation, of a permanent landfill cap system, a landfill gas monitoring system, and a groundwater monitoring system to ensure the ability to continue monitoring the site as required by the Consent Decree and Record of Decision.

The Full Excavation subsurface construction design option would have the greatest long-term benefit to water resources in the study area by potentially removing sources of contamination of surface and groundwater resources.

3.11.2.3 Construction Impacts

Impacts Common to All Build Alternatives

OMF South construction would primarily affect surface and groundwater quality by increasing the potential for flooding, erosion, or degrading water quality when runoff is generated in construction areas. In general, OMF South build alternatives would have similar potential construction-related impacts on water resources because of similarities in construction equipment and techniques. The activities that could affect water resources include:

- **Earthwork, trench work, stockpiling, and material transport.** Soil exposed in sloped excavations, fills, or trench work is especially susceptible to erosion until vegetation is established or the surface is stabilized with pavement. If exposed soil becomes dry, it can be eroded by wind. Loose soil can be carried off site by water or wind to stormwater drains or streams, where it increases water turbidity. Construction vehicle tires can carry soil onto roadways, where it can then be washed into ditches or streams during storms. Increased turbidity from sediment reduces light transmission as well as decreases dissolved oxygen in the water.
- **Concrete work and paving.** The pH in surface water can be increased to levels harmful to fish and wildlife if runoff mixes with process water or slurry from concrete work or curing concrete.
- **Stream relocations, culvert replacements, and crossings.** Over-water work, stream relocations, culvert replacements, stream crossings, and construction in stream buffers can pose a direct risk to water quality through pollutant spills, sediment transport, or wind deposition of stockpiled materials.
- **In-water work.** The risk of scour is usually increased during the construction phase of in-water work. This work, including activities that may disturb the stream bed or banks, has the potential to mobilize sediments at the project site and contribute to turbidity and sedimentation.
- **Construction machinery.** Equipment leaks or spills can affect water quality in nearby water resources. Hydrocarbons and other hazardous materials associated with construction machinery can create imbalances to parameters such as pH levels or dissolved oxygen in the water.

Preferred Alternative

West Fork Hylebos Tributary runs through the northwest corner of the Preferred Alternative, which has a wetland (WFW-02) and an associated in-line stormwater detention facility. Clearing and grading activities, including the placement of fill in the combined wetland/stormwater facility, could lead to short-term degradation of water quality through sedimentation and turbidity impacts. Construction-related impacts on East Fork Hylebos Tributary from the mainline track options would be higher for the 55 mph Design Option than for the 40 mph Alignment. During construction of frontage improvements along S 336th Street and installation of a replacement structure where the stream is crossed by the road, a segment of the stream would likely be placed in a temporary bypass while construction is underway. Discussion of the impacts analysis associated with the stream buffer and linear length in proximity to construction is presented in Section 3.10, Ecosystem Resources.

South 344th Street Alternative

The daylighting of East Fork Hylebos Tributary has the potential for direct risk to water quality through pollutant spills, sediment transport, or wind deposition of stockpiled materials due to the proximity of construction work to the stream channel. The risk of scour is usually increased during the construction phase of in-water work, which has the potential to mobilize sediments at the project site and contribute to turbidity and sedimentation.

The South 344th Street Alternative OMF site would have fewer temporary impacts to East Fork Hylebos Tributary than the Preferred Alternative. However, the South 344th Street Alternative mainline tracks (including all design options) would have more temporary impacts to East Fork Hylebos Tributary than the Preferred Alternative mainline tracks. Between the mainline track options for the South 344th Street Alternative, the 55 mph Design Option would have more temporary impacts to East Fork Hylebos Tributary than the 40 mph Alignment. The tail track options would have identical temporary stream impacts. Full impacts analysis associated with the stream buffer and linear length in proximity to construction is presented in Section 3.10, Ecosystem Resources.

Midway Landfill Alternative

Construction-related impacts on water resources are expected for each of the three Midway Landfill Alternative subsurface construction design options. Each has the potential to release contaminated air, soil, and groundwater through excavation or installation of concrete-filled shafts. Substantial remediation would be necessary, including cleanup and proper disposal of any excavated materials during construction to minimize contamination as well as groundwater monitoring in the surrounding area. Any transport of the hazardous materials being removed through excavation increases the risk of mobilizing them in the environment by exposure to wind, rain, and runoff, which could impact water resources at the site, along the transportation route, and those present at the final disposal destination.

The Platform subsurface construction design option involves drilling support shafts, which could affect water resources by compromising the landfill cap membrane and creating pathways for downward mobilization of contaminants into the groundwater and ultimately the aquifer recharge system in surrounding areas. The entire cap membrane system would be removed and replaced after the shafts have been installed to avoid this possibility. However, cap removal has the potential to prolong or increase exposure and mobilization risks associated with hazardous materials known to be present at the site.

The Hybrid subsurface construction design option involves some excavation with placement of a slab and beam system at grade for the tracks and drilling support shafts to support the buildings at the site. The partial excavation and drilling would involve the removal and replacement of the entire cap membrane system and has the potential to prolong or increase exposure and mobilization risks associated with hazardous materials known to be present at the site.

The Full Excavation subsurface construction design option would pose the greatest risk during construction for exposure and mobilization of hazardous materials present in the sediments being removed. This option has the most substantial excavation and, therefore, the greatest potential for a spill or mobilization of contaminated groundwater and sediments.

3.11.2.4 Avoidance and Minimization of Impacts

Sound Transit seeks to prevent or minimize potential impacts on water resources by implementing project design and development measures that follow local code requirements and stormwater management regulations, using required BMPs, encouraging sustainable LID approaches where feasible, and preparing for climate-related uncertainties where practicable. For example, seasonal limitations for in-water work will likely be required by resource agencies during permitting. In addition to traditional stormwater management facilities, BMPs also include project planning measures, design elements, implementation practices, inspections, and monitoring. This section discusses BMPs that would be included in the project design regardless of the findings of this water resources impact analysis. Therefore, they are not considered mitigation measures and are instead part of the proposed alternatives.

Sound Transit's Link Design Criteria Manual (Sound Transit 2020) requires project-related stormwater management to conform to the requirements of the local jurisdictions. These measures include minimizing impervious footprints, avoiding placement of design-related structural elements in or near water resources and their associated buffers when possible, and installing or upgrading water quality treatment and flow control facilities when required.

In addition, based on Sound Transit design standards (Sound Transit 2020) and Ecology requirements (Ecology 2019), stormwater management facilities would be designed using LID approaches where feasible (Puget Sound Partnership 2012). However, due to the presence of till-type soils with low infiltration and high runoff potential in the study area, the use of infiltration-based LID approaches may not be feasible, and other stormwater management approaches may be necessary.

Measures Common to All Build Alternatives

Flow Control

Flow control would be implemented by controlling runoff based on a target standard simulating forested land use conditions. Proposed BMPs were developed using a conservative approach to drainage concepts, consulting the Western Washington Hydrology model developed by Ecology to estimate hydrology and facility sizing. Currently, the use of underground detention vaults is assumed for all alternatives. However, as design progresses, flow control may be provided by stormwater ponds or combinations that include other facility types, where feasible.

Water Quality Treatment

The project would provide water quality management based on enhanced treatment standards (intended to provide a higher rate of removal of dissolved metals than basic treatment) for all post-project pollution-generating impervious surfaces. This level of treatment uses Ecology-approved BMPs meeting standards for all known, available, and reasonable methods of prevention, control, and treatment (abbreviated as AKART). These BMPs are expected to treat water quality to the standards protective of designated uses of groundwater and surface waters under WAC 173-200 and WAC 173-201A, respectively. However, while impacts to designated uses of natural waters are not expected, it is possible that some sensitive aquatic species could be harmed due to the limitations of available treatment technology. Even with AKART, some pollutants may not be completely removed from runoff, and discharges from sites with approved BMPs may still release low concentrations of pollutants that could harm some sensitive aquatic species. See Section 3.10.2.2 for additional discussion of sensitive species.

Use of Existing Facilities

Stormwater could be routed to existing regional or on-site facilities or could be managed through new facilities. Using existing facilities would reduce the stormwater facility footprint, and this approach will be evaluated as part of the ongoing design process. However, the conceptual engineering design is based on providing project-specific stormwater BMPs rather than using existing regional or on-site BMPs.

Construction

The risk of construction-related impacts on water resources would be controlled by complying with the NPDES Construction Stormwater General Permit process and the WDFW Hydraulic Project Approval (as required) and by following guidance from the Sound Transit Design Criteria Manual, the WSDOT Highway Runoff Manual, the King County Stormwater Pollution Prevention Manual, the Pierce County Stormwater Management and Site Development Manual, and Ecology Manual standards and BMPs, as appropriate. Through compliance with these requirements, an approved Construction Stormwater Pollution Prevention Plan (CSWPPP) would be developed and implemented for the proposed Project. The CSWPPP would serve as the overall construction stormwater mitigation plan by describing overall procedural and structural pollution-prevention and flow control BMPs, including location, size, maintenance requirements, and monitoring. An Ecology-certified erosion and sediment control lead (CESCL) would be employed to conduct the inspections, and deficiencies would be promptly corrected. In addition, the CSWPPP would include, at a minimum, the following plans:

- Temporary Erosion and Sediment Control Plan – This plan would outline the design and construction specifications for BMPs to be used to identify, reduce, eliminate, or prevent sediment and erosion problems.
- Spill Prevention, Control, and Countermeasures Plan – This plan would outline requirements for and implementation of spill prevention, inspection protocols, equipment, material containment measures, and spill response procedures.
- Concrete Containment and Disposal Plan – This plan would outline the management, containment, and disposal of concrete debris, slurry, and dust and discuss BMPs that would be used to reduce high pH.
- Dewatering Plan – This plan would outline procedures for pumping groundwater away from the construction area, and storing (as necessary), testing, treating (as necessary), and discharging or disposing of the dewatering water.
- Fugitive Dust Plan – This plan would outline measures to prevent the generation of fugitive dust from exposed soil, construction traffic, and material stockpiles.

Specific BMPs would be incorporated into construction plans and specifications based on the manuals previously mentioned. BMPs could include, but are not limited to, the following:

- Developing construction plans for sensitive areas such as streams and their buffers
- Phasing the work to minimize the amount of disturbed area at any one time
- Stabilizing construction entrances, haul roads, and other surfaces that could produce erosion or sediment tracking
- Providing tire wash, silt fence, stockpile covers, and other protection measures to avoid sediment transport

- Cleaning construction site track-out from public roads, as necessary
- Constructing silt fences downslope from exposed soil
- Protecting catch basins from sediment
- Containing and controlling concrete, fuel, and hazardous materials on site
- Installing temporary ditches, asphalt berms to route runoff around or through construction sites, with periodic check dams to slow and settle runoff
- Providing erosion control covering and temporary piped conveyances to protect slopes from concentrated runoff
- Providing temporary plastic or mulch to cover soil stockpiles and exposed soil
- Using temporary erosion control blankets or mulch on exposed steep slopes to minimize erosion before vegetation is established
- Constructing temporary sedimentation ponds or cells to remove solids from concentrated runoff and dewatering before being discharged
- Conducting vehicle fueling and maintenance activities no closer than 100 feet from waters of the state
- Providing secondary containment for all potential sources of leaks and spills
- Implementing stream protection measures, including diverting stream flow around the construction area, and limiting the construction period to the required “work window,” a period of the year when fish would be minimally affected

Preferred Alternative

As previously stated, the extension of 18th Place S would encroach upon a portion of a wetland (WFW-02) associated with West Fork Hylebos Tributary that serves as an in-line stormwater detention facility. Potential impacts to the detention currently provided will be evaluated as the project design progresses and mitigation will be developed in compliance with local and state requirements.

Measures for mitigating impacts to water quality resulting from stream channel relocation for the Preferred Alternative could include those outlined by the WDFW in Chapter 13 of the Water Crossing Design Guidelines (Barnard et al. 2013). This could involve preventive BMPs, such as erosion and sediment control measures, the use of cofferdams, complete stream bypass, and restorative planting efforts. The construction of the Preferred Alternative would have the potential to impact water quality parameters such as turbidity; however, through compliance with applicable construction permits and the BMPs incorporated by the permits, the risks to water resources would be minimized.

South 344th Street Alternative

Similar to the Preferred Alternative, compliance with applicable construction permits and BMPs would minimize risks to water quality during construction. Measures for mitigating impacts to water quality resulting from stream channel relocation for the South 344th Street Alternative would be similar to those discussed above for the Preferred Alternative. In addition, the South 344th Street Alternative would include the daylighting of a piped segment of East Fork Hylebos Tributary.

Midway Landfill Alternative

For the Midway Landfill Alternative, Sound Transit would implement BMPs that include material handling and disposal plans for contaminated media and hazardous construction debris developed in conjunction with the appropriate regulatory agencies, including BMPs to prevent the potential downward migration of contaminants during construction of drilled shafts. All of the subsurface construction design options for the Midway Landfill Alternative would require placement of a low-infiltration cap to protect water resources in accordance with the current Superfund remedy, which could exclude the potential for infiltration-based LID approaches and make other stormwater management approaches necessary.

Special precautions at Midway Landfill would be required by the CSWPPP for temporary drainage systems and surface treatment after removal and during replacement or remediation of the existing membrane cover system.

A discussion of the impacts related to construction at a site with known hazardous substances is presented in Section 3.13, Hazardous Materials. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection of water resources.

3.11.2.5 Indirect Impacts

No indirect impacts related to water resources would result from construction and operation of the proposed project.

3.11.3 Mitigation Measures

The project would apply required stormwater BMPs, such as the flow control or treatment facilities described in Section 3.11.2.4, Avoidance and Minimization of Impacts. As previously discussed, these BMPs are expected to treat water quality to the standards protective of designated uses of groundwater and surface waters under WAC 173-200 and WAC 173-201A, respectively, and the need for additional mitigation to protect these designated uses is not anticipated. However, while impacts to designated uses of natural waters are not expected, it is possible that some sensitive aquatic species could be harmed due to the limitations of available treatment technology. Even with AKART, some pollutants may not be completely removed from runoff, and discharges from sites with approved BMPs may still release low concentrations of pollutants that could harm some sensitive aquatic species. Mitigation with regard to sensitive species and mitigation for ecosystem impacts related to wetlands, streams, and their buffers is addressed in Section 3.10, Ecosystem Resources.

3.12 Geology and Soils

This section addresses topography, geology, soil characteristics, geological hazards, and groundwater and potential impacts to these resources from the OMF South project alternatives. These considerations affect project design construction methods. The OMF South build alternatives are in Federal Way and Kent, both of which have adopted critical area ordinances for geologically sensitive areas, which are defined as areas that are not readily suited for development because of their susceptibility to erosion, sliding, earthquake-induced damage, or other geologic events. The study area includes resources within 100 feet of the potential construction limits of the alternatives.

3.12.1 Affected Environment

3.12.1.1 Topography

Elevations in the study areas are similar, ranging from 400 to 450 feet above sea level. Topographical features in the study area include various drainage systems, small water bodies, natural slopes, constructed slopes for bridges and other road-related elements, and associated topographic features indicative of Pleistocene continental glaciation.

3.12.1.2 Geology

The study areas are primarily underlain by Vashon till, a glacial till consisting of a generally unsorted mixture of clay, silt, sand, cobbles, and boulders deposited by continental Pleistocene glaciation. The regional geology includes glacially consolidated soils and sediments to a depth of almost 1,600 feet near the South 344th Street Alternative to over 1,200 feet near the Midway Landfill Alternative (Jones 1996). The areas beneath the highway on/off-ramps and overpasses directly adjacent to the Preferred and South 344th Street alternatives consist of Holocene artificial fill. Before it was used as a landfill, the Midway Landfill Alternative site was a gravel pit. Excavation exposed Pleistocene sand and gravels of glacial origin below the Vashon till.

3.12.1.3 Soils

Soils within the study area for all build alternatives primarily consist of gravelly sandy loams and sandy loams that have developed on the Pleistocene continental glacial drift of the Vashon till described above. Generally, these soils are moderately to excessively well drained. Many of the original soils within the project area have been removed or modified by land development.

3.12.1.4 Soil, Aggregate, and Rock Resources

There are no existing economic soil, aggregate, or rock resources within the study area. As noted, the Midway Landfill Alternative site was a gravel pit before 1966 when it was converted to a landfill.

3.12.1.5 Geotechnical Characteristics and Hydrogeology

Preferred and South 344th Street Alternatives

Understanding of the subsurface in the vicinity of the Preferred and South 344th Street alternatives is based on work completed for the S 336th Street/I-5 overcrossing and the I-5/SR 18 interchange (Shannon & Wilson 2020). The soil beneath the build alternative sites, including the mainline and tail tracks, are thought to include a 5- to 15-foot-thick layer of surficial fill soil that is associated with past site development. The composition and compactness of the fill is unknown and likely to be highly variable. Beneath the fill, native soils consist of dense to very dense glacial sand and gravel outwash and glacial till. The groundwater table is anticipated to be shallow at the site, ranging from 15 to 25 feet below the existing ground surface.

Midway Landfill Alternative

The Midway Landfill Alternative site contains municipal solid waste underlain by native glacially derived sand, gravel, and glacial till. The municipal solid waste is estimated to be deepest in the southeast portion of the landfill, where waste fill thickness could be up to 130 feet or more. It is believed that the municipal solid waste fill thickness decreases to the north and west, where it is thought to typically be about 50 to 60 feet thick (City of Kent 2019).

The municipal solid waste fill is underlain by advance outwash soils and till deposits. The advance outwash soils generally consist of sand and gravel that were deposited by streams or rivers in front of the advancing continental glaciers. The till deposits are generally classified as compact silts and sands that have been glacially overridden. Shallow groundwater adjacent to the landfill occurs as discontinuous lenses at a depth of approximately 30 feet below ground surface. Leachate within the solid waste fill has been noted at depths of 30 to 40 feet below ground surface. See Appendix D4, Midway Landfill Human Health Risk Assessment, for further information regarding geotechnical characteristics at the Midway Landfill.

3.12.1.6 Geologic Hazards and Resources

Seismicity and Earthquakes

Earthquake hazards in the study area are primarily related to the convergent plate boundary of the North American continental plate and the Juan de Fuca oceanic crustal plate, known as the Cascadia Subduction Zone. This subduction zone boundary has a long history of large earthquakes (Frankel and Peterson 2008).

Additionally, intracrustal faults, such as the Tacoma and Seattle faults, can rupture, which can also cause substantial ground displacement and shaking. The Tacoma Fault Zone runs east-west through the Preferred and South 344th Street alternatives study area and has the potential to produce a major seismic event and ground rupture (Gomberg et al. 2010). The Tacoma Fault Zone lies approximately 3 miles south of the Midway Landfill Alternative. The Seattle Fault lies approximately 9 miles north of the Midway Landfill Alternative, and it is unlikely it would cause ground displacement in the study area.

Volcanic Hazards

Mount Rainier, an active stratovolcano located approximately 40 miles to the southeast, has produced substantial lahars (a mud or debris flow composed of water, debris, and pyroclastic material) in the Puyallup River Valley that have reached Puget Sound. The most recent lahar to reach Puget Sound occurred approximately 5,600 years ago. Based on the historical extent of lahar deposits (WDNR 2020), the three OMF South alternatives are unlikely to be affected by a lahar originating from Mount Rainier.

Landslides, Steep Slopes, and Erosion Hazards

Landslide hazard areas are generally defined as areas prone to earth movements through a combination of site factors, including slope, local geologic and soil conditions, precipitation and groundwater flow, freeze/thaw cycles, seismic events, and human impacts. Historical landslides and erosion hazards (a consideration of slope and soil types and characteristics) have not been identified in the study area. The Preferred Alternative has an area of steep slope (defined as over 40 percent) on the west side of the site.

Soil Properties

Particular soil properties can be challenging for development and infrastructure projects. Soils with particular textures, pH, and salt contents can be corrosive to both concrete and uncoated steel. Within the project area, multiple soil types in the study areas are considered corrosive to steel (USDA NRCS 2020).

Hydric soils are generally described as having been formed in saturated environments and having a water table close to ground surface. These soils create surface conditions susceptible to standing water and are generally limiting for construction purposes. The only hydric soil mapped within the study areas of any of the alternatives is a discrete area (approximately 2.6 acres) of Tukwila Muck in the northwest corner of the Preferred Alternative. This soil unit is also described as Wetland WFW-02 in Section 3.10, Ecosystem Resources.

Groundwater, Sole Source Aquifer Resources

The Preferred and South 344th Street alternatives are within Federal Way's 100-year Wellhead Capture Zone, and both alternatives have a permanent impact footprint that touches the outer edge of the 10-year travel zone for the Wellhead Protection Area. The Midway Landfill Alternative is not located within any of the Wellhead Protection Areas or Critical Aquifer Recharge Areas (categories 1 through 3). There are no sole source aquifers designated by EPA in the study area of any of the build alternatives. Groundwater resources are discussed in further detail in Section 3.11, Water Resources.

3.12.2 Environmental Impacts

A summary of long-term, construction, and indirect impacts to geologic and hydrogeologic conditions is presented below.

3.12.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to geology and soils from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. FWLE conducted some grading and filling in the Midway Landfill Alternative study area, adjacent to I-5, but these impacts to geology and soils were relatively minor. Other projects planned to be constructed within the alternative study areas may impact geology depending on the extent of grading and filling activities. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. However, these impacts are also anticipated to be minor. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.12.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

The build alternative sites are located on highly urbanized land, and long-term effects on existing geologic and hydrogeologic conditions are likely to be limited. Long-term effects related to the completion and operation of OMF South that could occur are discussed below. All three build alternatives are in areas of relatively flat topography, with the exception of the steep slope on the Preferred Alternative site, and existing slope stability and landslide issues would be of minor concern during the period of operation at each of the sites.

Project structures, including elevated mainline, lead, test, and tail tracks, would be designed to withstand a major seismic event, as all build alternatives are within a seismically active area. Strong shaking has the potential to cause settlement, slope instability, and increased lateral pressure on retaining walls. Facilities would be designed in accordance with the International Building Code, which would result in an increased resistance to seismic shaking and reduce risk to the project. Each build alternative is in areas of low seismic liquefaction potential. Areas of introduced fill would be more highly susceptible to liquefaction, which would be assessed during final design.

Long-term changes in groundwater flow after construction are not expected.

Preferred Alternative

There are no additional impacts specific to the Preferred Alternative beyond those discussed above, under Impacts Common to All Build Alternatives. The steep slope on the Preferred Alternative site would likely be regraded with construction of the 18th Place S extension.

South 344th Street Alternative

The only additional impact from the South 344th Street Alternative, beyond those discussed above, is the potential for the installation of columns associated with the Enchanted Parkway tail track option, which has the potential to impact groundwater within the Federal Way 10-year wellhead protection area depending on the design depth.

Midway Landfill Alternative

Naturally corrosive soils as well as potentially corrosive leachate or groundwater within or in the vicinity of the Midway Landfill may compromise steel or concrete structures. Based on specific site conditions, structures can be designed with materials that resist the corrosivity of site-specific soil, groundwater, or leachate characteristics. The Platform and Hybrid subsurface construction design options for the Midway Landfill Alternative, which require support structures to be installed, would need to be designed to prevent the downward migration of more contaminated groundwater or leachate to the aquifer below.

While the Full Excavation subsurface construction design option removes all refuse from the landfill and replaces it with competent fill, the Platform and Hybrid subsurface construction design options would require alteration and replacement of the landfill gas mitigation system required by the EPA Record of Decision. Additionally, each subsurface construction design option would require the removal and replacement of at least a portion of the cap required by the Record of Decision. The Platform and Hybrid subsurface construction design options would leave refuse in place, which could lead to settlement issues within the project area.

3.12.2.3 Construction Impacts

Impacts Common to All Build Alternatives

The extent of earthwork needed for the build alternatives is dependent on site-specific topography, planned future site grades, and the usability of existing site soils for reuse. The nature and composition of excavated site soils would be evaluated for reuse as structural fill for construction purposes. Some soils that are not suitable for reuse as structural fill may be used for other on-site purposes if the need exists. While all build alternatives are in areas of relatively flat topography, all sites would need to be regraded, which would result in the need for retaining walls in certain locations.

Table 3.12-1 shows relative approximate cut and fill volumes for the alternatives and assumes that all unusable cut materials would need to be exported. The cut volume for the Midway Landfill Alternative includes soils and landfill materials. Imported fill would be soil. For the Platform and Hybrid subsurface construction design options at the Midway Landfill Alternative, there would also be imported concrete (approximately 531,000 and 165,000 cubic yards respectively).

Table 3.12-1 Cut and Fill Volumes for the OMF South Build Alternatives

Alternative	Cut Volume (cubic yards)	Cut Volume Reuse[1] (cubic yards)	Imported Soil Fill (cubic yards)	Material Removed from Site (cubic yards)
Preferred[2]	425,000	220,000	185,000	205,000
South 344th Street[2]	580,000	270,000	200,000	310,000
Midway Landfill –Platform	1,010,000	340,000	0	670,000
Midway Landfill – Hybrid	4,270,000	1,710,000	1,240,000	2,560,000
Midway Landfill – Full Excavation	4,870,000	1,950,000	1,610,000	2,920,000

Notes:

(1) Reusable quantities of cut volume are assumed to be 40 percent for Midway Landfill alternatives and 80 percent for the Preferred and South 344th Street alternatives.

(2) Volume estimates do not include quantities for the mainline or tail track construction. The quantities would be relatively small and would be associated with building the foundations for the elevated portions of track and the short length of mainline tracks that would be built on retained fill.

With a shallow groundwater table expected in the vicinity of the Preferred and South 344th Street alternatives, there may be a need for dewatering or managing groundwater in deeper excavations, depending on design requirements. There may also be a need for BMPs limiting the downward migration of potential contaminants during the installation of columns for the South 344th Street Alternative tail tracks as the southern end intersects with the 10-year wellhead protection area for municipal water supply wells in Federal Way. If either the Full Excavation or Hybrid subsurface construction design option is chosen for the Midway Landfill Alternative, leachate and/or local groundwater would need to be managed during the excavation process.

If dewatering is required, the water would likely need to be treated on site or disposed of at an approved facility. For the Midway Landfill Alternative, removal of leachate or locally impacted groundwater from the vicinity of the project area would improve overall groundwater quality in the region. Any dewatering during excavation may impact groundwater flow direction in the vicinity of the study area for all build alternatives. In the case of the Midway Landfill Alternative, pumping water and/or leachate from the landfill itself would draw surrounding groundwater (and associated contaminants) toward the landfill, which would not be likely to negatively affect groundwater quality in the vicinity of the landfill.

Aside from the potential need to address groundwater and leachate during excavation and to import fill for the Midway Landfill Alternative Full Excavation and Hybrid subsurface construction design options, there would be no appreciable differences in construction impacts to geology and soils between the build alternatives.

3.12.2.4 Avoidance and Minimization of Impacts

Construction specifications would include the following BMPs to address the potential short-term erosion of soils within the construction area:

- Minimizing areas cleared of vegetation
- Providing temporary cover or mulch for exposed soil stockpiles
- Using erosion control blankets on exposed slopes

The fugitive dust control plan described above in Section 3.8, Air Quality and Greenhouse Gas Emissions, would also address these concerns.

Short-term impacts to shallow groundwater quality from construction activities would be minimized by identifying the following BMPs in construction specifications:

- Containing and controlling waste and hazardous materials on site
- Confining maintenance and refueling activities to areas where excavations would not be impacted
- Preventing downward migration of contaminants in groundwater during shaft drilling using seals and reduced casing size at the Midway Landfill

In addition to the geotechnical borings that were installed during the preliminary engineering phase, Sound Transit would conduct additional geotechnical studies during final design. These studies would include borings and other exploration methods, laboratory testing of soil, and detailed foundation design for the project. This work would inform and refine the project design, construction techniques, and potential mitigation measures. The project design would meet state and federal design and construction codes for transportation projects.

Depending on final design, dewatering and groundwater management may be needed due to areas of shallow groundwater in the vicinity of the Preferred and South 344th Street alternatives. For all build alternatives, methods could include localized dewatering and groundwater injection, using sheet-pile walls, or freeze-shoring for horizontal groundwater containment.

If dewatering is required for construction of the Midway Landfill Alternative, contaminated groundwater concerns would be considered during design in compliance with future amendments to the Ecology Cleanup Action Plan or EPA Record of Decision. The current Cleanup Action Plan and Record of Decision requirements include continued operations and maintenance of site remedial actions, including the low permeability cap, the landfill gas extraction and monitoring system, and the surface water management system. Institutional controls implemented as part of the Record of Decision require the city of Seattle to continue operating and maintaining these remedial actions and provide an annual review of groundwater quality downgradient of the landfill.

Additionally, excavation of the Midway Landfill is expected to be restricted so as not to allow work during the wet season, which in western Washington is considered to be October 1 through April 30. This would reduce the amount of precipitation that could come in contact with the exposed refuse, which then could become contaminated water that could contribute to the contaminated groundwater at the site. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection of groundwater.

3.12.2.5 Indirect Impacts

No indirect impacts related to geology and soils would result from construction and operation of the proposed project.

3.12.3 Mitigation Measures

With appropriate use of engineering design standards and BMPs, geological and soils impacts are not expected, and additional mitigation is not anticipated.

3.13 Hazardous Materials

This section summarizes the hazardous materials analysis, which identifies properties near the OMF South project alternatives recognized to have hazardous materials issues associated with current or historical site activities or that have a documented release to the environment. A hazardous material is any substance that — because of its quantity, concentration, or physical or chemical properties — may pose a hazard to human health and the environment, either by itself or through interaction with other factors. Types and locations of sites were identified to evaluate potential impacts to construction, property ownership, and general public health and safety.

The study area for the hazardous materials analysis includes the area within a 1/8-mile radius of the construction limits for each build alternative. Properties farther than 1/8 mile were not considered for further analysis because they present a low probability of having hazardous materials releases that could affect the study area. Within the study area, the hazardous materials analysis included review of data from the Environmental Data Resources Inc. (EDR) database, review of historical land use, and a visual windshield survey to confirm the results of the database review. The EDR reports summarize federal, state, and local database information, and this information — along with the Ecology Cleanup Site Search database — was used to evaluate the three build alternatives, with an emphasis on known sites on, adjacent to, or near each alternative.

3.13.1 Affected Environment

The affected environment in the project study area was assessed by reviewing the state and federal regulatory database records as described above. The identified sites were ranked based on the proximity to the study area, the type and number of databases in which the site was found, known releases of hazardous materials or petroleum products, and the status of remediation or cleanup efforts at sites with known releases. One of three risk categories was assigned to sites within the study area: high, medium, and low.

- **High Risk.** Sites that involve substantial contamination of large areas, including soil, groundwater, and multiple contaminants, and might represent higher risk of further releases of hazardous materials to human health or the environment; that would be likely to involve high levels of regulatory approvals or extensive or lengthy remediation activities that may create other impacts to the environment; or that could pose major delays to the development of the project.
- **Medium Risk.** Sites where the nature of potential contamination is known based on existing investigation data, the potential contaminants are not extremely toxic or difficult to treat, and probable remediation approaches are straightforward.
- **Low Risk.** Sites where the nature of potential contamination is known based on existing investigation data and the sites are not expected to have notable impacts on the project due to their location, or sites where hazardous materials were used but had no or only very small, reported releases.

Table 3.13-1 lists the risk categories assigned to properties found during the regulatory records search within the 1/8-mile study area for each build alternative. These sites are also shown in Figures 3.13-1 and 3.13-2.

Table 3.13-1 Number of Hazardous Material Sites within Study Areas

Alternative	High Risk	Medium Risk	Low Risk	Total
Preferred	0	5	53	58
South 344th Street	0	5	59	64
Midway Landfill	1	4	43	48

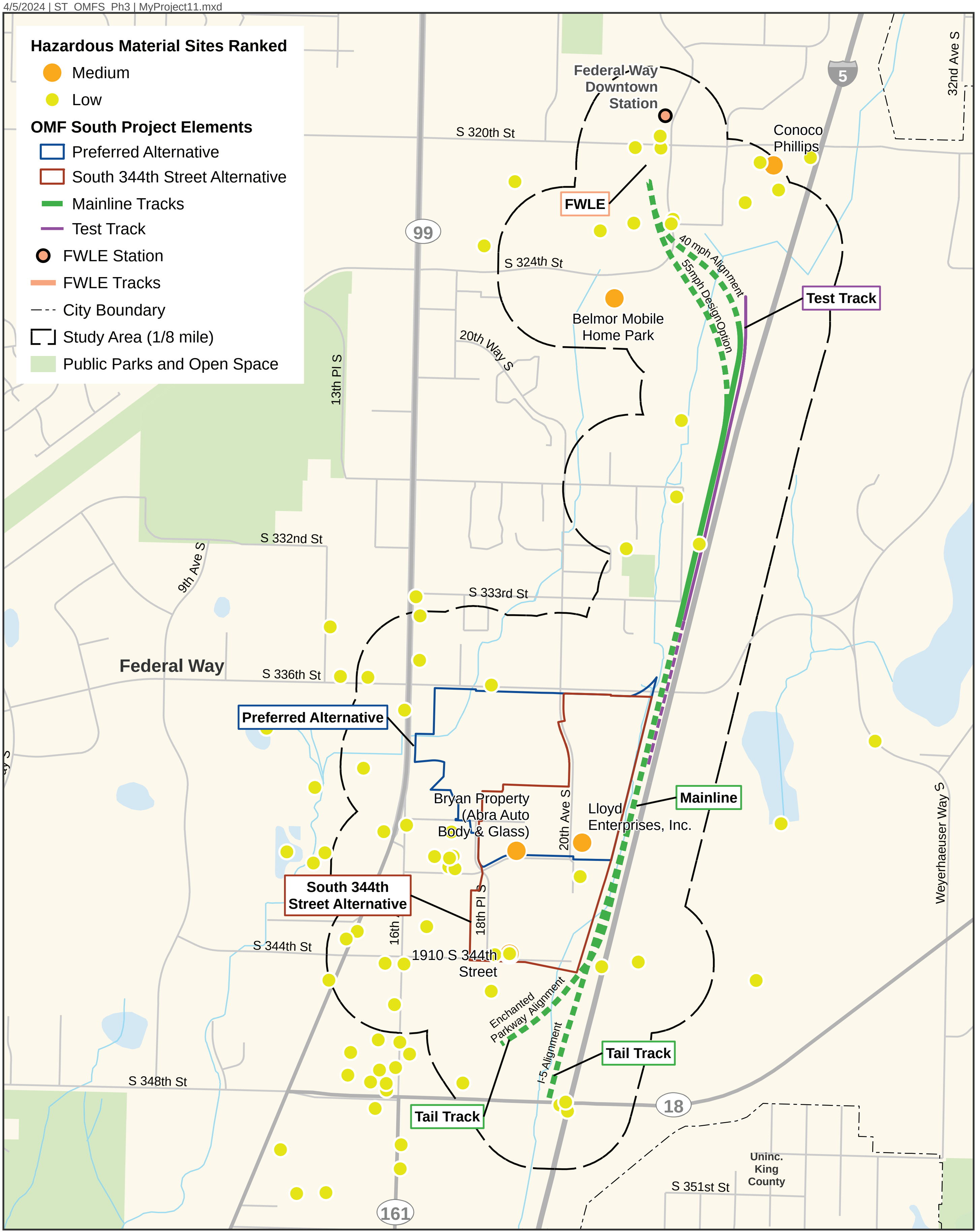
3.13.1.1 Preferred Alternative

Regulatory Database Review

There were no high-risk hazardous materials sites identified for the Preferred Alternative. Five medium-risk hazardous materials sites were identified in the Preferred Alternative study area. Two of these sites are not properties that would be acquired, so are not discussed further:

- Belmor Mobile Home Park (2101 S 324th Street) is located at the northern portion of the mainline tracks. Gasoline-contaminated soil associated with a leaking underground storage tank was remediated, and the site was issued a No Further Action determination by Ecology.
- The Bryan Property (1908 S 341st Place), also listed as Abra Auto Body & Glass Federal Way, has been operating as an automotive repair shop since at least 2001. After numerous violations during environmental inspections, surface water, soil, and sediment samples were taken, and elevated levels of petroleum hydrocarbons and metals were found. The site entered the Ecology Voluntary Cleanup Program in 2013. Ecology has stated that there is no soil-to-groundwater pathway. Remedial activities on the property have been ongoing and a request for a No Further Action Determination was made by the property owner in 2019. Ecology issued a No Further Action letter in April 2021.
- The Lloyd Enterprises, Inc. site (2102 S 341st Place) was a former composting facility with several underground storage tanks on site and is a full acquisition for this alternative. All underground storage tanks have been removed, and the facility has been closed. No indication of release from the underground storage tanks was found. A small lube/motor oil spill (approximately 10 gallons) was reported in 2016; however, this incident has been closed and did not require listing in a large cleanup database.

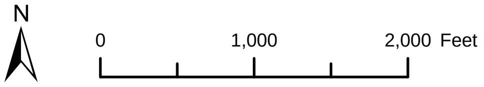
4/5/2024 | ST_OMFS_Ph3 | MyProject11.mxd

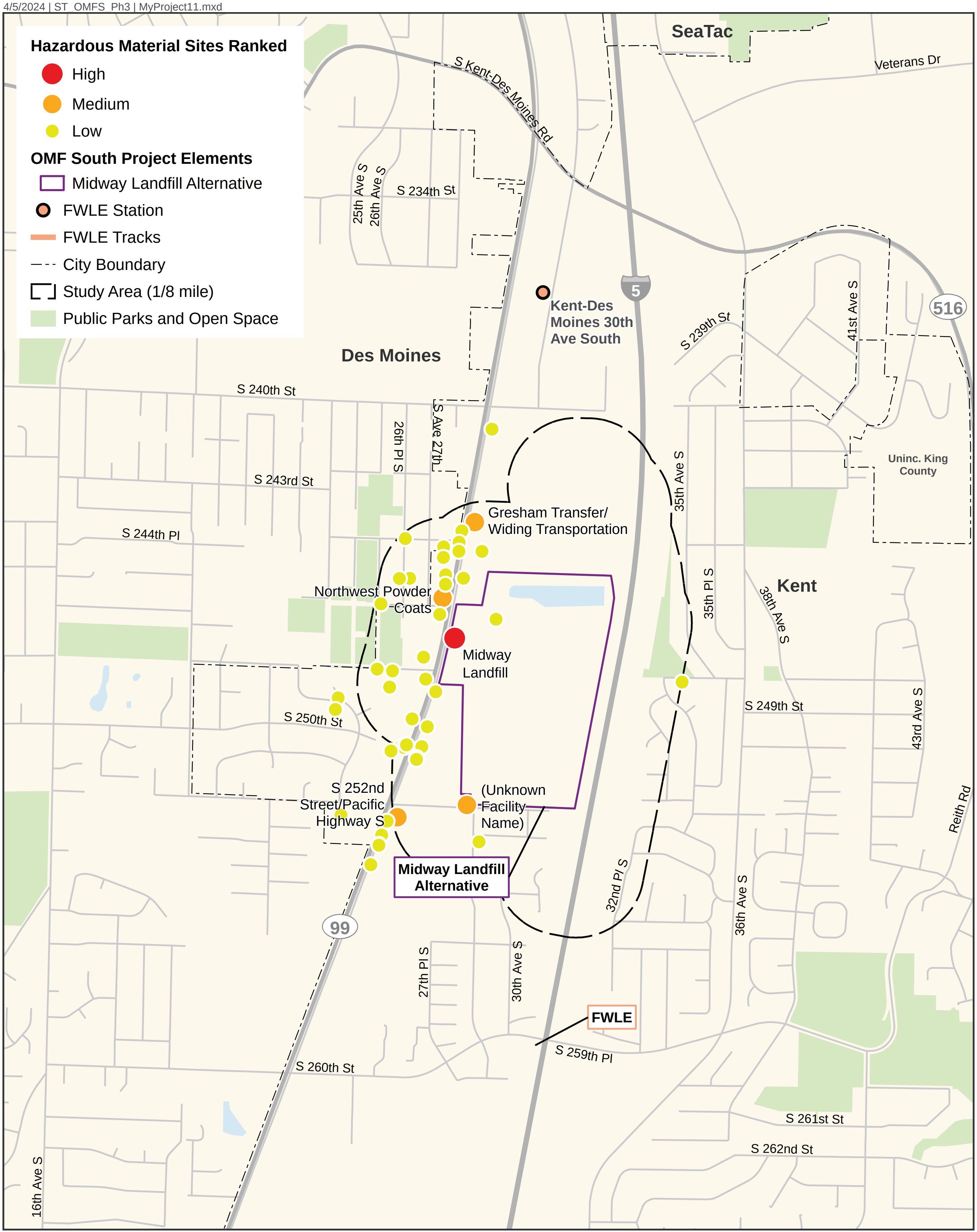

Hazardous Material Sites Ranked
Medium
Low
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
City Boundary
Study Area (1/8 mile)
Public Parks and Open Space
Federal Way Downtown Station
Conoco Phillips
FWLE
S 320th St
S 324th St
99
5
32nd Ave S
40 mph Alignment
55mph Design Option
Test Track
Belmor Mobile Home Park
20th Way S
13th Pl S
S 332nd St
9th Ave S
S 333rd St
Federal Way
S 336th St
Preferred Alternative
Bryan Property (Abra Auto Body & Glass)
20th Ave S
Lloyd Enterprises, Inc.
Mainline
Weyerhaeuser Way S
South 344th Street Alternative
18th Pl S
16th
S 344th St
1910 S 344th Street
Enchanted Parkway Alignment
I-5 Alignment
Tail Track
Tail Track
S 348th St
18
Uninc. King County
S 351st St
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE 3.13-1
Hazardous Material Sites
Preferred and South 344th Street Alternatives

OMF South


N
0
1,000
2,000 Feet


Hazardous Material Sites Ranked
High
Medium
Low
OMF South Project Elements
Midway Landfill Alternative
FWLE Station
FWLE Tracks
City Boundary
Study Area (1/8 mile)
Public Parks and Open Space
SeaTac
Des Moines
Kent
Uninc. King County
Kent-Des Moines 30th Ave South
Gresham Transfer/ Widing Transportation
Northwest Powder Coats
Midway Landfill
S 252nd Street/Pacific Highway S
(Unknown Facility Name)
Midway Landfill Alternative
FWLE
S Kent-Des Moines Rd
Veterans Dr
S 234th St
25th Ave S
26th Ave S
S 239th St
41st Ave S
S 240th St
26th Pl S
S Ave 27th
S 243rd St
S 244th Pl
35th Ave S
35th Pl S
38th Ave S
S 249th St
43rd Ave S
S 250th St
Reith Rd
32nd Pl S
36th Ave S
27th Pl S
30th Ave S
S 259th Pl
S 260th St
S 261st St
S 262nd St
16th Ave S
5
516
99

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
1,000
2,000 Feet

FIGURE 3.13-2
Hazardous Material Sites
Midway Landfill Alternative

Historical Aerial Review

Historical aerial photographs of the Preferred Alternative area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1941, 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1941–1943: The area appears to be mostly undeveloped, wooded land surrounded in all directions by undeveloped, partially wooded land. North Lake is visible to the far northeast of the site. Some rural residential properties are visible in the area. SR 99 is developed to the west, S 344th Street is developed to the south, and S 336th Street is developed to the north.
- 1957: A small residence or commercial building is located immediately to the southwest of the site. SR 18 is visible to the south of the site.
- 1968–1972: Some commercial and industrial development is visible to the north and west of the site. I-5 is visible to the east of the site. Development immediately to the southwest is visible. Residential and commercial development is visible in all directions from the site. Botanical gardens are visible to the far east of the site.
- 1980–1990: The site remains undeveloped, wooded land. Commercial development is visible immediately to the north, west, and south of the site.
- 2006–2017: The Christian Faith Center and associated parking lots are developed on the site. The surrounding area appears to be developed similarly to current conditions, with commercial, industrial, and residential development to the east, south, west, and north of the site.

3.13.1.2 South 344th Street Alternative

Regulatory Database Review

There were no high-risk hazardous materials sites identified for the South 344th Street Alternative.

The study area for the South 344th Street Alternative has the same five medium-risk hazardous materials sites as the Preferred Alternative, plus one additional site:

- 1910 S 344th Street has one operational underground storage tank and some violations of compliance. A surface petroleum spill is listed in 2003, though it is not related to the underground storage tank. Formal administrative compliance violations have been listed for the property.

Historical Aerial Review

Historical aerial photographs of the South 344th Street Alternative area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1941, 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1941–1957: The site appears to be rural residential property on the southern portion and undeveloped, wooded land on the northern portion, surrounded in all directions by undeveloped, partially wooded land. North Lake is visible to the far northeast of the site. Some rural residential properties are visible in the area. SR 99 is developed to the west, S 344th Street is developed to the south, and S 336th Street is developed to the north.

- 1968–1972: Additional residential development is visible on the site. Some commercial and industrial development is visible to the north and west of the site. I-5 is visible to the east of the site. Development immediately to the northwest is visible. Residential and commercial development is visible in all directions from the site. Botanical gardens are visible to the far east of the site.
- 1980: The eastern portion of the site appears to be cleared and primed for development. Commercial development is visible immediately to the west and northwest of the site. The surrounding area to the far north, west, and south is developed with commercial, industrial, and residential properties.
- 1990: Commercial development is visible on the site, with several buildings and associated parking lots as well as land cleared for development.
- 2006–2017: The site appears to be developed similarly to current conditions, with multiple commercial buildings and parking lots, including a sports center, an RV storage center, and a church. The adjacent property to the north is developed with the Christian Faith Center and associated parking lot. The surrounding area appears to be developed similar to current conditions, as well, with commercial, industrial, and residential development to the east, south, west, and north of the site.

3.13.1.3 Midway Landfill Alternative

Background

The Midway Landfill is a Superfund site owned by the city of Seattle and managed by SPU. It is regulated by the Ecology and EPA under an existing Ecology Consent Decree and Cleanup Action Plan and EPA Record of Decision. The Midway Landfill was originally a gravel pit, which operated from 1945 to 1966. SPU began landfill operations at the site in 1966, accepting primarily demolition-type wastes. The landfill closed in 1983. Approximately 3,000,000 cubic yards of solid waste, reported to include demolition materials and wood waste as well as two million gallons of industrial liquids, were deposited at the unlined landfill facility (EPA 2015). Refuse depths in some areas are up to 130 feet.

When the landfill closed, concerns were raised regarding negative impacts to human health and the environment. Testing indicated landfill gas outside the landfill's boundary, and organic and inorganic contaminants were found in groundwater. An active landfill gas management system was installed in 1985, and in 1986 the Midway Landfill was placed on the National Priorities List due to groundwater contamination. With the listing, EPA assumed responsibility for facility oversight. Pursuant to Washington State's Model Toxics Control Act, SPU entered into a Consent Decree with Ecology in 1990 to initiate cleanup work.

The basis of action is groundwater contamination above federal drinking water standards. Original contaminants of concern include 1,2-dichloroethane, vinyl chloride, and manganese. During the 2010 to 2020 Five-Year Review periods, 1,4-dioxane was detected above Model Toxics Control Act Method B levels and is also considered a potential contaminate of concern. A final remedy for the site was identified in a Record of Decision by EPA, with Ecology's concurrence, on September 6, 2000. The identified remedy's aim was to ensure refuse containment is effective and maintained, groundwater quality is restored beyond the landfill boundary, and that no residential exposure to groundwater occurs until standards have been met.

The site is covered with a landfill cap. The cap layers from bottom to top, are a 12-inch-thick layer of low permeability (1×10^{-7} cm/sec) soil/clay material; a 50-millimeter-thick, high-density polyethylene geomembrane; drainage geonet; geotextile; a 12-inch-thick drainage layer; and a minimum 12-inch-thick topsoil layer. The cap is designed to keep precipitation from reaching the buried refuse, where it could interact with the refuse and contaminate groundwater. SPU completed installation of the landfill cap, methane collection system, and surface water management system in 1992; however, construction completion was not officially recognized until the Record of Decision was signed in September 2000. SPU has continued to manage and maintain the site with regular environmental reporting, including required Five-Year Review Reports by the EPA completed in 2005, 2010, 2015, and 2020.

Regulatory Database Review

The Midway Landfill is classified as a high-risk hazardous materials site. As described above, the property was added to the National Priorities List in 1986 for known groundwater and air contamination that remains at the site. A 2005 Restrictive Covenant restricts any activity that may interfere with cleanup actions, removal, or use of groundwater from any well on the property and has deed transfer and lease restrictions (EPA 2019). In March of 2020, Ecology and Sound Transit signed a Prospective Purchaser Consent Decree (PPCD) for the Midway Landfill to facilitate redevelopment of a portion of the site for the extension of light rail as part of the FWLE project. The PPCD requires Sound Transit’s work at the site to conform to Ecology’s Cleanup Action Plan Amendment (King County Superior Court 2020).

Several medium-risk hazardous materials sites were identified in the study area for the Midway Landfill Alternative. None of these sites would be acquired for this alternative, so they are not discussed further.

Historical Aerial Review

Historical aerial photographs of the Midway Landfill Alternative study area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1943: The area appears to be mostly undeveloped, surrounded in all directions by undeveloped, partially wooded land. Some rural residential properties are visible in the area. SR 99 is apparent to the west, Military Road is partially developed to the east, S 259th Place is developed to the south, and S 240th Street is developed to the north.
- 1957: The site appears to be an active gravel quarry. Commercial development is visible to the north, south, and west. Some residential development is visible to the far northeast.
- 1968–1980: The Midway Landfill appears to be operational (landfill operations began in 1966). I-5 is visible to the east. Development immediately to the southwest is visible. Residential and commercial development is apparent in all directions from the site.
- 1990: Landfill operations ceased in 1983, and the site was listed as an EPA Superfund site. The 1990 aerial photograph shows remedial efforts underway, including a stormwater detention pond to the north of the landfill to collect surface runoff. The surrounding area appears relatively unchanged since the 1980 aerial photograph.
- 2006–2017: The Midway Landfill appears to be filled and capped according to reported remedial efforts. The surrounding area appears to be developed similar to current conditions, with commercial, industrial, and residential development to the east, south, west, and north of the landfill.

3.13.2 Environmental Impacts

Potential impacts discussed in the following sections are from known contaminated sites and are based on the hazardous materials site's location relative to the build alternatives, focusing on hazardous materials sites within the 1/8-mile study areas. Hazardous material sites within this distance to the build alternatives have a higher probability of affecting implementation of the proposed project. Sites that pose a high risk to the build alternatives could also have long-term impacts if remediation actions are necessary after project construction.

3.13.2.1 No-Build Alternative

Under the No-Build Alternative, there would be no project-related removal or cleanup of potentially hazardous materials in the study area. However, other planned projects in the area could have hazardous materials impacts, depending on their location and past use of their respective properties. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.13.2.2 Long-Term Impacts

The operation of OMF South would follow all regulations concerning the proper use and disposal of hazardous materials. However, an OMF could cause long-term impacts to the environment if an accidental release of hazardous materials, such as a fuel spill, occurs. Light rail trains operate on electricity and not fuel; however, it is likely that hazardous materials, such as lubricants, solvents, cleaning agents, and paints, would be stored at the OMF, and minor accidental releases could result during maintenance activities. The proposed OMF South would have a painting area for the trains and would need to register as an applicator with the Puget Sound Clean Air Agency.

Preferred Alternative

There are no known long-term impacts associated with hazardous materials unique to the Preferred Alternative.

South 344th Street Alternative

There are no known long-term impacts associated with hazardous materials unique to the South 344th Street Alternative.

Midway Landfill Alternative

Vapor intrusion testing would continue to be required to ensure that any occupant of the OMF South facility would not be exposed to harmful gases associated with the former landfill. Long-term exposure to even low levels of certain gases can increase the risk of chronic health issues; in extreme cases, the buildup of gases from sources such as landfills can cause acute health effects and may pose immediate risks of fire or explosion (EPA 2008).

The Midway Landfill Human Health Risk Assessment (Appendix D4) details the risks to human health associated with the Midway Landfill Alternative. The report describes the contaminants of interest and the scenarios of potential exposure to these contaminants for OMF South employees. Exposure to vapor from landfill gas would be a complete route of exposure to workers under the worst-case scenario; in other words, if engineering controls fail, vapor could intrude into indoor air. Vapor intrusion from contaminants in groundwater is not expected to adversely impact OMF South employees.

There is a high level of uncertainty regarding risks of landfill gases at the site based on the lack of sufficient data to fully characterize human health risks. The Human Health Risk Assessment recommends that additional testing of landfill gases, based on probable paths of occupational exposure, be completed to fill in these data gaps and identify other potential routes of exposure. In addition to toxicological considerations, uncontrolled release of methane gas from the landfill could pose an explosion hazard risk because the OMF South building (including below-grade pits) would have electrical equipment and live electrical overhead catenary wires that could spark or emit stray currents. Subsurface design options with greater amounts of excavation would produce lesser amounts of landfill gases. Also, a gas collection system would be required to help minimize the concern.

3.13.2.3 Construction Impacts

The hazardous materials analysis also considered direct impacts of activities associated with the construction of OMF South. The analysis considered the impacts to human health and the environment as a result of possible release of contaminants or alteration of contaminant migration pathways during construction activities and considered the effects of existing contaminated sites. Due diligence will be conducted prior to property acquisition, which will provide information about any necessary remedial actions required on the identified hazardous materials sites.

Preferred Alternative

No high-risk hazardous materials sites are within the Preferred Alternative. Based on regulatory status, acquisition level (full, partial, or no impact), or distance from the parcels being acquired, low- and medium-risk sites would not likely affect this alternative during construction. If acquired, one medium-risk site (the Bryan Property) could require additional remedial action, depending on the extent of project construction; however, based on the cleanup already conducted at the site, the amount of additional remedial action needed is expected to be little to none.

South 344th Street Alternative

No high-risk hazardous materials sites are within the South 344th Street Alternative. Based on regulatory status, acquisition level (full, partial, or no impact), or distance from the parcels being acquired, low- and medium-risk sites would not likely affect this alternative during construction. The same impact identified for the medium-risk site (the Bryan Property) would apply to this alternative.

Midway Landfill Alternative

The Midway Landfill is a high-risk hazardous materials site listed and managed as a Superfund site. Redevelopment of a property formerly used as a landfill and subject to ongoing Cleanup Action Plan and Record of Decision requirements is considered high risk for several reasons. There are potential structural challenges (foundation design and alignment of underground utilities) and environmental challenges (hazardous materials disposal; air, soil, and groundwater contamination; and rebuilding a vapor extraction system to manage risk of gas intrusion into human-occupied spaces).

Temporary impacts from construction on the Midway Landfill could include the potential release of contaminated air, soil, and groundwater. Substantial remediation, cleanup, and proper disposal of any excavated materials during construction, as well as air and groundwater monitoring in the surrounding area would be necessary. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including handling and disposal of excavated materials, worker health and safety, and related monitoring.

Subsurface Construction Design Options

The three subsurface construction design options for the Midway Landfill Alternative range from a structural platform with minimal excavation to a full excavation of the landfill with backfilling of competent soils. The Hybrid Subsurface Design Option would use a process called deep dynamic compaction to prepare the site for construction. In areas of the landfill containing liquid waste, compaction could cause mobilization of the contaminants.

All excavation (and installation of drilled shafts) would require the modification of the landfill gas management system and could include the exposure of workers to methane and other compounds generated by breakdown of landfill materials. The shaft drilling also presents the possibility for creating additional pathways for the downward migration of contaminants contained in leachate to the aquifer below. Section 3.11, Water Resources, considers the potential impacts to groundwater and the need for substantial remediation during construction. Remediation measures include cleanup and proper disposal of excavated materials to minimize contamination as well as groundwater monitoring in the surrounding area, with the possibility of replacing or rehabilitating the landfill membrane.

The excavation of landfill materials also has the potential to expose construction workers to contaminated materials and contaminated groundwater as well as the potential to encounter characteristic hazardous wastes. The subsurface construction design options with more substantial excavation would prolong and presumably increase these exposure risks. Additionally, the excavated material could potentially be flammable. Construction crews would need to be equipped with fire extinguishing tools and equipment. The transport of these contaminated landfill materials (and potentially hazardous wastes) via roadway and rail also presents a risk to the public in the case of a spill. These risks would increase with the volume of materials excavated and transported. Loads of landfill materials leaving the project area would be required to be covered per a project-specific contaminated media management plan.

From a beneficial impact standpoint, excavation of contaminated landfill materials from the Midway Landfill has the potential to improve local groundwater quality through reduced contact with contaminants and the potential for reduced infiltration. Any removal of the cap portion of the landfill presents the opportunity to potentially improve the cap and membrane and the landfill gas management system. The Midway Landfill is not lined and therefore there is no barrier to prevent mixing of leachate and groundwater. The benefit of fully excavating and hauling contaminated residuals from the Midway Landfill to a lined landfill located elsewhere would be the reduced potential for groundwater contamination.

3.13.2.4 Avoidance and Minimization of Impacts

A spill response program and hazardous material handling plan has been created by Sound Transit for existing maintenance locations and would be implemented during operations of the OMF South. OMF South activities that would generate hazardous materials would be managed according to all applicable regulatory requirements, which would minimize the exposure risk to all personnel and the surrounding environment.

Unexpected residual soil and groundwater contamination may be encountered during construction activities in portions of the Preferred or South 344th Street alternatives. To mitigate potential impacts from all potential hazardous material sites, Sound Transit would perform a level of environmental due diligence appropriate to the size and presumed past use at any properties in the study area before they are acquired. Sound Transit may seek certain legal protections as part of the real property acquisition process to reduce its legal and financial risk.

Construction of the Midway Landfill Alternative would encounter known areas of contamination and affect portions of the remedy currently in place for the site, including a low permeability cap, landfill gas collection system, surface water management system, and groundwater monitoring system. As a result, any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection against short-term impacts during construction and long-term impacts after construction. For example, this would include BMPs for the construction of drilled shafts to prevent the potential downward migration of contaminants and to prevent vapor intrusion.

If excavation of landfill materials is required, safety precautions, including personal protective equipment, air monitoring, and other best practices, would be employed to ensure the safety of workers on site. An Environmental Protection Plan would likely be required to establish procedures to manage and monitor the waste excavation and handling process, including management of stormwater and landfill gas. In addition to continuous landfill gas management, measures would need to be established to prevent air intrusion into the landfill that could result in a landfill fire. Sound Transit would prepare a Hazardous Materials Response and Sampling Plan, similar to the one prepared by SPU for FWLE construction on the western edge of the landfill (SPU 2020). The plan’s objective would be to provide an approved approach on how to identify and handle any potentially dangerous waste that could be encountered. The plan would be prepared to meet the requirements of the Cleanup Action Plan.

A project-specific Health and Safety Plan would also be required and would include stipulations that construction workers who may be exposed to potentially hazardous substances would be required to obtain the appropriate level of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training.

The medium-risk sites identified for the three alternatives have been well characterized and would likely require no additional investigation and little or no remediation expected in addition to what has been completed. To the extent practicable, Sound Transit would limit construction activities that might encounter contaminated groundwater or soil at these sites.

Based on the due diligence process, plans for the mitigation, handling, and disposal of contaminated media and hazardous construction debris would be developed on a site-by-site basis in conjunction with the appropriate regulatory agencies. Hauling out of excavated material and construction debris would comply with regulations concerning the transport of hazardous and contaminated material, as applicable. A project-wide contaminated media management plan may also be developed and implemented.

Additionally, hazardous substances and petroleum products used during construction, such as fuels, paints, solvents, and other chemicals, would be managed and stored per the contractor's pollution control plan. BMPs would be followed in order to reduce the risk of spills, leaks, or other releases during construction activities. Construction plans and specifications developed during final design could include the following BMPs:

- Keep fueling, maintenance, and cleaning fluids in contained areas (berms, etc.)
- Minimize the production or generation of hazardous materials
- Appropriately label and store hazardous waste, per federal regulations
- Designate hazardous waste storage away from storm drains or surface water
- Recycle materials (used oil- and water-based paint) as appropriate
- Handle any potential spills of hazardous materials in conformance with applicable Material Safety Data Sheets

BMPs that address hazardous substances would be required as part of several plans that are prepared by the contractor, including the Contaminated Substances Health and Safety Plan, the Unknown Hazardous Screening and Handling Plan, the Contaminated Substances Handling Plan, and the Spill Prevention, Control, Contingency and Countermeasure Plan.

The current construction schedule assumes restrictions on excavation into the Midway Landfill during the wet season — October 1 through April 30. This would reduce the amount of precipitation that could come in contact with the exposed refuse, which then could become contaminated water that could contribute to the contaminated groundwater at the site.

3.13.2.5 Indirect Impacts

No indirect impacts related to hazardous materials are anticipated to result from construction and operation of the proposed project.

3.13.3 Mitigation Measures

Mitigation measures for the three subsurface construction design options for the Midway Landfill Alternative would vary depending on the option chosen. Common to the subsurface construction design options (except for the Full Excavation subsurface construction design option) would be the replacement of the landfill cap to prevent surface water and stormwater from entering any remaining portion of landfill. Replacement or upgrade of the landfill gas extraction system and the continuation of the landfill gas monitoring system would be required for the Platform and Hybrid options and may be required for the Full Excavation option. Additional mitigation measures would be determined in coordination with EPA and Ecology.

3.14 Public Services

This section discusses how public services could be affected by the OMF South project alternatives, such as through changes in response times for emergency services (fire, medical, and police), travel times for school bus and solid waste collection routes, and overall demand for public services. Public service providers that have facilities in the study area were also identified to determine if the facility would be displaced or emergency access would be interrupted. Analyses completed for other elements of the environment for the OMF South project were reviewed to assess potential impacts to public services, including those in Section 3.2, Transportation; Section 3.3, Acquisitions, Displacements, and Relocations; and Section 3.15, Utilities, Energy, and Electromagnetic Fields.

The study area is the area 0.5 mile from the construction limits of each build alternative. The study areas are within the jurisdictions of Des Moines, Kent, and Federal Way and include portions of unincorporated King County. There are no relevant regulatory requirements related to public services.

3.14.1 Affected Environment

3.14.1.1 Preferred and South 344th Street Alternatives

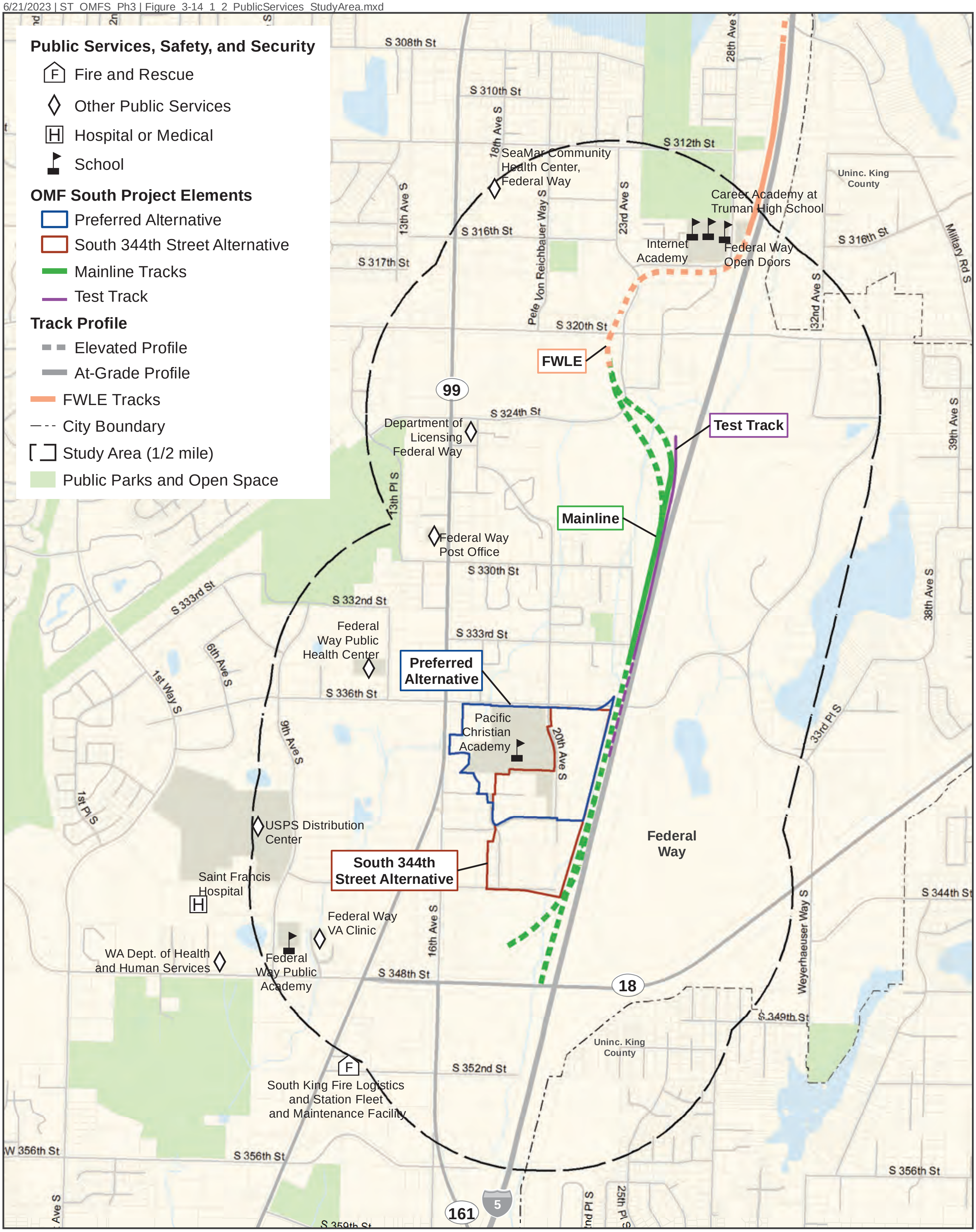
Public services within the Preferred and South 344th Street alternatives study area are shown in Figure 3.14-1. The public services are primarily the same for these two build alternatives, except for the Federal Way Public Academy, the United States Postal Service distribution center, and the Federal Way Veterans Affairs Clinic (Valor Healthcare), which are only in the South 344th Street Alternative study area.

Fire and Emergency Medical

South King Fire and Rescue (South King Fire) provides emergency management services covering approximately 41 square miles, including Des Moines, Federal Way, and a portion of unincorporated King County. Facilities include seven fire stations and one training and maintenance station. The department employs 180 personnel, of whom 157 are uniformed officers, with a minimum of 27 firefighters and emergency medical technicians on duty 24 hours a day, 7 days a week (South King Fire 2022). In the southern portion of the study area, South King Fire completed the construction of a station fleet facility at 1351 S 351st Street. In 2021, they completed the construction of a logistics building at 35100 Pacific Highway S, just outside the study area, directly west of the new station fleet facility. Future facilities expansion includes the construction of a response station at the same location of the recently constructed logistics building (South King Fire 2022).

No existing fire stations are in the study area. Fire Stations 61, 62, and 64 are the closest facilities, all less than 2 miles from the site. South King Fire is also teamed with King County's Medic One Program, and Valley Communications Center provides 9-1-1 dispatch services. According to South King Fire's 2020 Performance Report, they met their response performance goal for the first emergency medical services to be on the scene in 6 minutes about 80 percent of the time. They met their response performance goal for the first fire unit to be on the scene in 5 minutes and 30 seconds approximately 88 percent of the time (South King Fire 2020a). South King Fire is also partnered with Federal Way Emergency Management for emergency response to larger-scale emergency alerts, such as earthquakes or floods.

6/21/2023 | ST OMFS Ph3 | Figure 3-14 1 2 PublicServices StudyArea.mxd


Public Services, Safety, and Security
F Fire and Rescue
◇ Other Public Services
H Hospital or Medical
School
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
S 308th St
S 310th St
18th Ave S
S 312th St
28th Ave S
SeaMar Community Health Center, Federal Way
Unic. King County
Career Academy at Truman High School
13th Ave S
S 316th St
23rd Ave S
Internet Academy
Federal Way Open Doors
S 316th St
Military Rd S
S 317th St
Pete Von Reichbauer Way S
32nd Ave S
S 320th St
FWLE
99
S 324th St
Department of Licensing Federal Way
Test Track
39th Ave S
13th Pl S
Mainline
Federal Way Post Office
S 330th St
S 333rd St
S 332nd St
38th Ave S
Federal Way Public Health Center
S 333rd St
Preferred Alternative
6th Ave S
1st Way S
S 336th St
Pacific Christian Academy
20th Ave S
9th Ave S
33rd Pl S
1st Pl S
USPS Distribution Center
Federal Way
South 344th Street Alternative
Saint Francis Hospital
H
S 344th St
Federal Way VA Clinic
16th Ave S
Weyerhaeuser Way S
WA Dept. of Health and Human Services
Federal Way Public Academy
S 348th St
18
S 349th St
Unic. King County
F
S 352nd St
South King Fire Logistics and Station Fleet and Maintenance Facility
W 356th St
S 356th St
S 356th St
161
5
S 359th St
25th Pl S

N

0 1,000 2,000 Feet

FIGURE 3.14-1
Public Services
Preferred and South 344th Street Alternatives

OMF South

Saint Francis Hospital is outside of the study areas to the southwest of both alternatives. It is a full-service hospital that provides diagnostic imaging and radiology; emergency services; a full range of women's health services, including a birth center; and radiation oncology. Although it is outside the build alternative study areas, it is the closest emergency room.

Police

The Federal Way Police Department provides law enforcement within the city limits. The department has 150 uniformed personnel and 36 civilian staff. In 2021, the average response time for Priority E emergencies (confirmed emergency — extensive loss of life and/or property) was 5 minutes and 49 seconds, and the average response time for Priority 1 emergencies (potential emergency — could result in loss of life and/or property) was 5 minutes and 43 seconds (City of Federal Way 2022). The closest police station is located at 33325 8th Avenue S, just outside the study area.

Federal Way is served by the Washington State Patrol Field Operations Bureau District 2, which comprises all of King County. District 2 patrols interstate and state highways within the county, including I-5 and SR 99. The Field Operations Bureau is responsible for traffic law enforcement, collision investigation, criminal interdiction, terrorism prevention, and motorist assistance (WSP 2019).

Solid Waste and Recycling

Garbage collection in the study area is provided by a city-authorized contracted hauler for occupied commercial and residential properties. All nonhazardous solid waste collected in the study area is taken directly to King County's Cedar Hills Landfill in Maple Valley or a nearby solid waste transfer station (the nearest is the Algona Transfer Station). The closest facility that accepts household hazardous waste is the South Transfer Station in Seattle, managed by SPU. A King County-operated "Wastemobile" travels to many communities in King County to provide residents a place to take their household hazardous waste periodically. The closest depository for household hazardous waste is approximately 3 miles from the study area in the parking lot of the Outlet Collection in Auburn at the intersection of SR 167 and SR 18.

School Districts/Schools

The study area includes five schools, shown on Figure 3.14-1 above and listed below. The elementary school enrollment is provided by the Washington Office of Superintendent of Public Instruction (OSPI 2022).

- Federal Way Open Doors (31455 28th Avenue S): Federal Way School District; 146 students enrolled in 2021/2022
- Federal Way Public Academy (34620 9th Avenue S): Federal Way School District; 308 students enrolled in 2021/2022 (South 344th Street Alternative only)
- Internet Academy (31455 28th Avenue S): Federal Way School District; 895 students enrolled in 2021/2022
- Pacific Christian Academy (33645 20th Avenue S): private school associated with the Christian Faith Center; 312 students enrolled in 2017/2018
- Career Academy at Truman High School (31455 28th Avenue S); Federal Way School District; 58 students enrolled in 2021/2022

Other Public Services

Other public services within the study area (Figure 3.14-1) include:

- Federal Way Department of Licensing (1617 S 324th Street)
- Federal Way Public Health Center (33431 13th Place S): The center provides health care for children with special needs, family planning, health insurance enrollment, HIV screening, pregnancy testing, teen services, and Women, Infants, and Children services
- Sea Mar Community Health Center (31405 18th Avenue S): The center provides family medicine and dentistry, behavioral health, maternity support, and a pharmacy; it is a community-based organization focused on health and social services to underserved communities
- Valor Healthcare (34617 11th Place S): The Federal Way VA Clinic provides primary care, mental health services, nursing, and social work to veterans of the armed services (South 344th Street Alternative only)
- United States Postal Service distribution center (34301 9th Avenue S) and Federal Way Post Office (32829 Pacific Highway S; South 344th Street Alternative only)

3.14.1.2 Midway Landfill Alternative

Public services in the Midway Landfill Alternative study area are shown in Figure 3.14-2.

Fire and Emergency Medical

The Puget Sound Regional Fire Authority (Puget Sound Fire) provides emergency management services covering approximately 109 square miles, including Kent, Covington, Maple Valley, and SeaTac, as well as portions of unincorporated King County. The coverage area within the Kent is 34 square miles, the entire jurisdictional boundary.

Puget Sound Fire provides emergency response service from 13 fire stations, none of which are within the project study area. The department employs a total of 350 personnel, of whom 271 are uniformed, with a minimum of 54 firefighters and emergency medical technicians on duty 24 hours a day, 7 days a week (Puget Sound Fire 2022). The study area is within the response area for Fire Station 73, used as both a fire station and police substation. Fire Station 73 is approximately 1 mile to the southeast on Military Road S in Kent. In 2021, the average response time for Priority E emergencies was 6 minutes and 18 seconds, and the average response time for Priority 1 emergencies was 6 minutes and 29 seconds (Valley Communications Center 2021).

King County's Medic One program provides advanced life-support services, and Valley Communications Center provides 9-1-1 dispatch services. Puget Sound Fire is also partnered with King County Emergency Management for emergency response to larger-scale emergency alerts, such as earthquakes or floods. There are no hospitals or emergency medical facilities in the study area.

Although the public services study area includes a portion of Des Moines, the Midway Landfill Alternative itself is outside the city limits. Puget Sound Fire would respond to incidents at OMF South if it were constructed at the Midway Landfill.

6/21/2023 | ST_OMFS_Ph3 | Figure_3-14_1_2_PublicServices_StudyArea.mxd

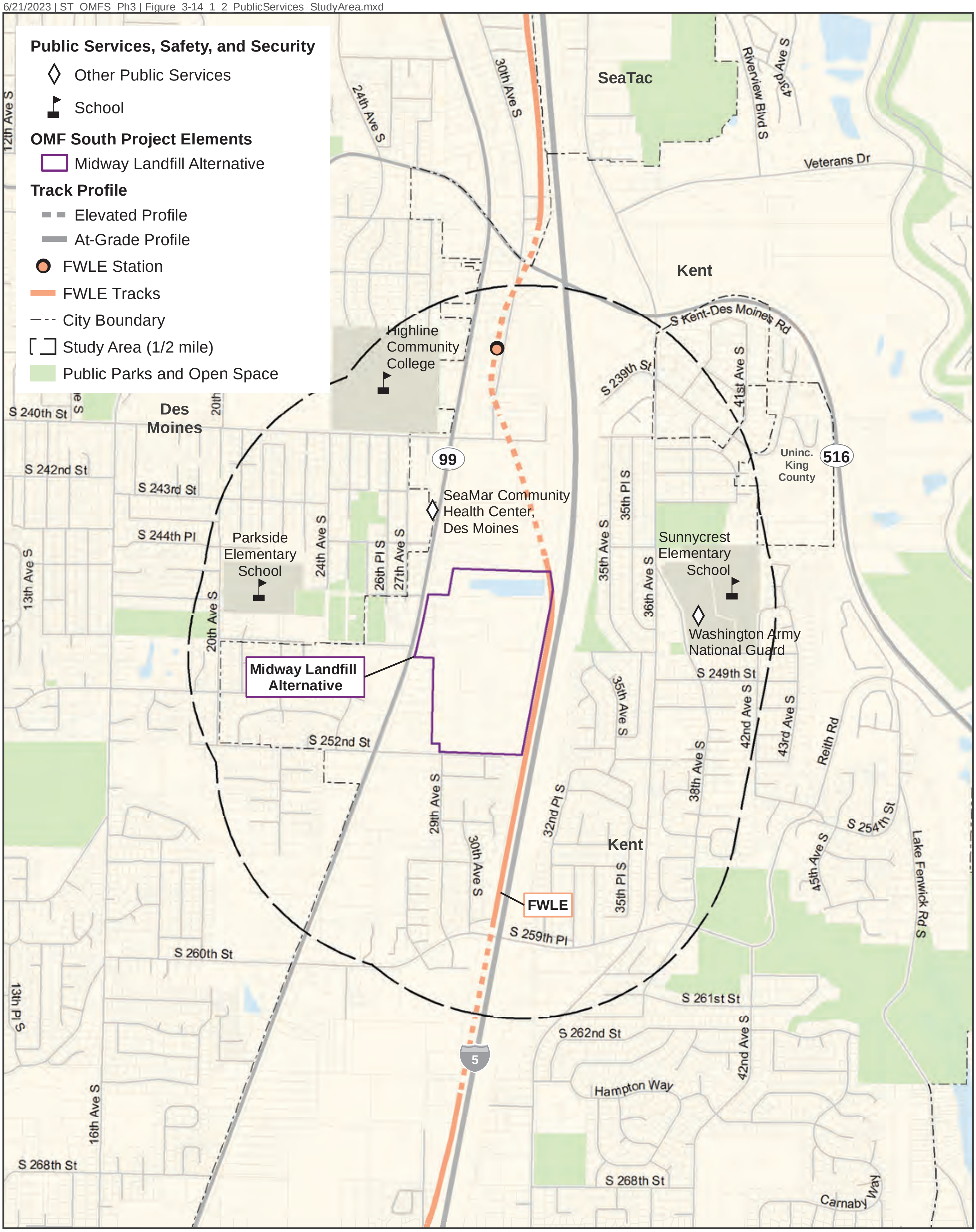

Public Services, Safety, and Security
Other Public Services
School
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
SeaTac
Kent
Des Moines
Uninc. King County
Highline Community College
SeaMar Community Health Center, Des Moines
Parkside Elementary School
Sunnycrest Elementary School
Washington Army National Guard
Midway Landfill Alternative
FWLE
99
516
5
12th Ave S
24th Ave S
30th Ave S
Riverview Blvd S
43rd Ave S
Veterans Dr
S Kent-Des Moines Rd
S 239th St
41st Ave S
S 240th St
20th
S 242nd St
S 243rd St
S 244th Pl
13th Ave S
24th Ave S
26th Pl S
27th Ave S
35th Pl S
35th Ave S
36th Ave S
20th Ave S
S 249th St
35th Ave S
42nd Ave S
43rd Ave S
Reith Rd
S 252nd St
29th Ave S
30th Ave S
32nd Pl S
38th Ave S
S 254th St
45th Ave S
Lake Fenwick Rd S
35th Pl S
S 259th Pl
S 260th St
S 261st St
S 262nd St
42nd Ave S
13th Pl S
Hampton Way
16th Ave S
S 268th St
S 268th St
Carnaby Way
N
0
1,000
2,000 Feet

FIGURE 3.14-2
Public Services
Midway Landfill Alternative

OMF South

Police

The Kent Police Department provides law enforcement within the city limits of Kent. The department has 172 uniformed police and corrections officers and 42 support staff (City of Kent 2022). In 2021, the average response time for Priority E emergencies was 8 minutes and 50 seconds, and the average response time for Priority 1 emergencies was 7 minutes and 6 seconds (Valley Communications Center 2021). No police stations are within the project study area.

The Kent Police Department would respond to incidents at OMF South if the Midway Landfill Alternative were selected to be built. However, a multi-jurisdictional interlocal agreement is in place for law enforcement to join forces to handle specific serious criminal confrontations. This agreement includes the Port of Seattle and the municipalities of Auburn, Kent, Renton, Tukwila, and Des Moines.

Kent and Des Moines are also served by the Washington State Patrol Field Operations Bureau District 2, described previously.

Solid Waste and Recycling

Garbage collection in the study area is largely provided by a city-authorized contracted hauler, as mandated for occupied commercial and residential properties. All nonhazardous solid waste is taken directly to King County’s Cedar Hills Landfill in Maple Valley or to a solid waste transfer station (the nearest transfer station is the Bow Lake Transfer Station in Tukwila). The closest facility that accepts household hazardous waste is the South Transfer Station in Seattle, managed by SPU. A King County-operated “Wastemobile” travels to many communities to provide residents a place to take their household hazardous waste periodically. Kent Fire Station 75, approximately 10 miles from the study area, is the closest household hazardous waste depository.

School Districts/Schools

The Midway Landfill Alternative study area includes four schools, shown on Figure 3.14-2 and listed below. The elementary school enrollment is provided by the Washington Office of Superintendent of Public Instruction (OSPI 2022). Highline College enrollment information was found on the college website (Highline College 2022).

- Sunnycrest Elementary School (24629 42nd Avenue S): Federal Way School District; 505 students enrolled in 2021/2022
- Parkside Elementary (2104 S 247th Street): Highline School District; 415 students enrolled in 2021/2022
- George T. Daniel Elementary School (11310 SE 248th Street): Kent School District; 490 students enrolled in 2021/2022
- Highline College (2400 S 240th Street): approximately 13,196 students enrolled in 2020/2021

Other Public Services

The study area also includes a Washington Army National Guard location and the Sea Mar Community Health Center (Figure 3.14-1). The Washington Army National Guard is located east of I-5 at (24410 Military Road S in Kent) and serves as an armory. Sea Mar Community Health

Center (2781 S 242nd Street in Des Moines) provides family medicine and dentistry, behavioral health, maternity support, and a pharmacy. It is a community-based organization focused on health and social services to underserved communities.

3.14.2 Environmental Impacts

3.14.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to public services from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.14.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

The build alternatives would not increase the population of workers or residents within the study areas in such a way that would create an increased demand for public services. Therefore, impacts related to access interruption and increased public services demand during operation would not occur.

Increased demand for police services would not occur. Security measures for each alternative would be similar to other Sound Transit OMFs. Measures would include on-site security personnel, perimeter fencing, electronically controlled gates, and security patrol in the evenings, from 5 p.m. to 5 a.m., 7 days a week. Emergency access to the mainline tracks (as applicable) and OMF site for fire, emergency medical, and police personnel would be provided.

No long-term impacts on school bus and solid waste/recycling collection routes would occur under any of the build alternatives. OMF South operations would produce solid waste and recycling. Maintenance operations would also produce hazardous waste due to the use of lubricants, solvents, and the like. Both waste streams would be managed according to all applicable regulations and requirements.

Preferred Alternative

Construction and operation of the Preferred Alternative would require the full acquisition of the Christian Faith Center campus, which houses the Pacific Christian Academy. If the facility is relocated, some students would likely have to travel farther to school. If the school discontinues operations, the approximately 312 students would either need to enroll in another private school or enter the public school system. No parcels containing public service facilities would be acquired for the mainline and lead tracks, and the tracks are designed to be elevated above all roadway intersections.

This alternative would close 20th Avenue S from S 336th Street to S 341st Place. A new roadway would be constructed on the west side of the OMF site that would extend 18th Place S to S 336th Street. It is expected that emergency vehicles would use the 18th Place S extension to access properties to the south of the site because they currently use 20th Avenue S. There would be no need for emergency services to change their operations. Therefore, there would be no adverse effects on travel or response times for public service vehicles, including fire, emergency medical, and police.

South 344th Street Alternative

There would be no anticipated adverse impacts to public services associated with the South 344th Street Alternative. No parcels containing public service facilities would be acquired for the construction or operation of the mainline and lead tracks, and these components of the alternative are elevated above all roadway intersections. Therefore, there would be minimal effects on travel or response times for public service vehicles, including fire, emergency medical, and police.

Approximately 19 acres of the Christian Faith Center's property east of 20th Avenue S would be acquired for the South 344th Street Alternative. Permanent acquisition would reduce parking and limit recreational opportunities on the campus. In addition, the presence of OMF South would be visible from portions of the school property, but at about 1,000 feet from the school building. This would not affect school uses or school operations.

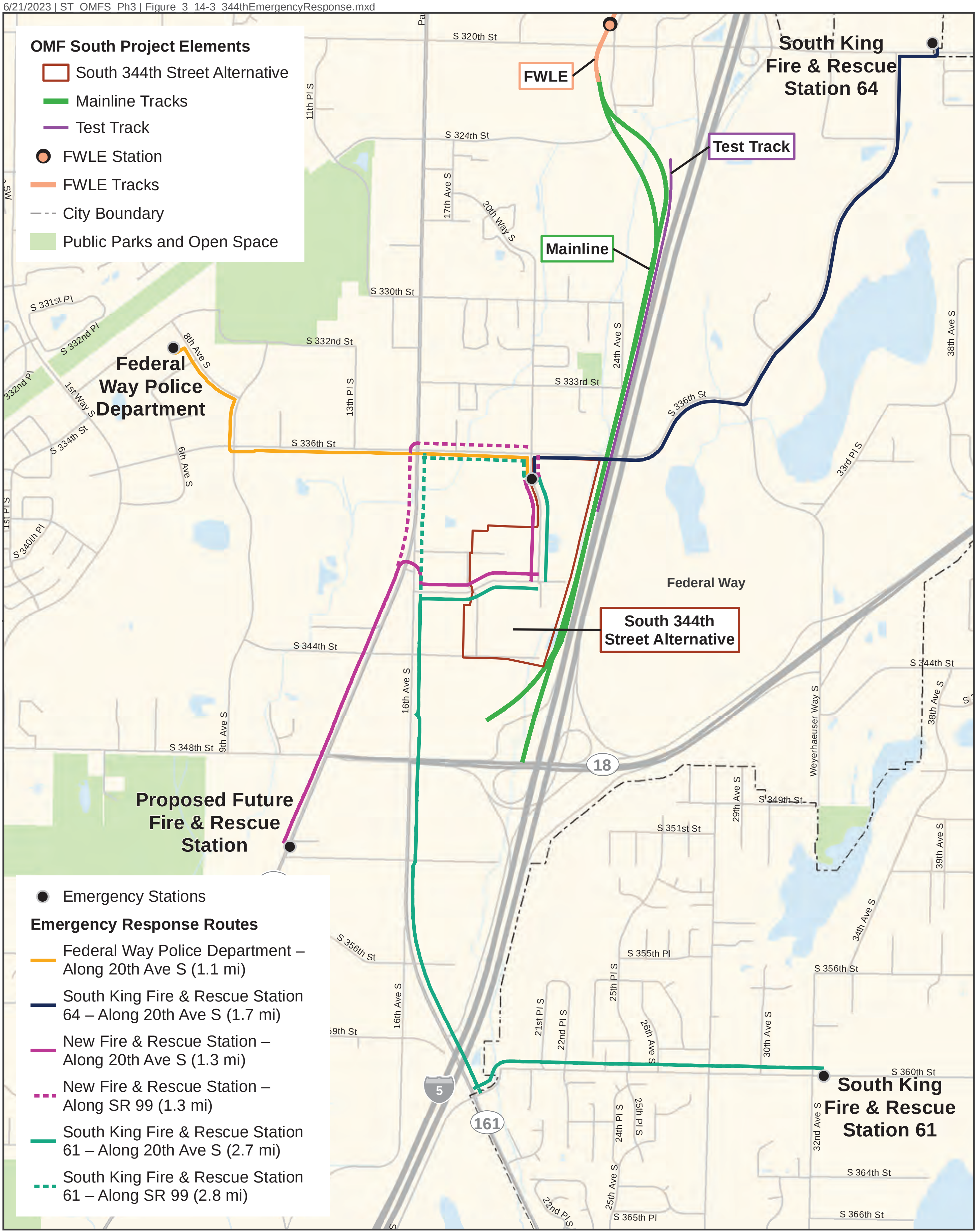
This alternative would require the closure of 20th Avenue S starting 300 feet south of S 336th Street. Of all the properties that are currently served by 20th Avenue S, only the Christian Faith Center would remain after the construction of the South 344th Street Alternative. Because 20th Avenue S is used as an alternative route for by-passing traffic on SR 99, fire, police, and emergency response access would be changed.

Travel times were estimated for emergency service vehicles traveling from four emergency response origins to the Christian Faith Center property, as shown in Figure 3.14-3. The four emergency response origins include:

1. Federal Way Police Department, located near S 334th Street and 8th Avenue S
2. South King Fire and Rescue Station 64, located near S 320th Street and Military Road S
3. Proposed future Fire and Rescue Station, located near the new logistics building at 35100 Pacific Highway S
4. South King Fire and Rescue Station 61, located near S 360th Street and 32nd Avenue S

The Federal Way Police Department was used to represent travel from the northwest quadrant of the South 344th Street Alternative study area. The three fire and rescue stations represent travel from the northeast, southwest, and southeast quadrants of the South 344th Street Alternative study area.

6/21/2023 | ST_OMFS_Ph3 | Figure_3_14-3_344thEmergencyResponse.mxd


OMF South Project Elements
South 344th Street Alternative
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
Emergency Stations
Emergency Response Routes
Federal Way Police Department – Along 20th Ave S (1.1 mi)
South King Fire & Rescue Station 64 – Along 20th Ave S (1.7 mi)
New Fire & Rescue Station – Along 20th Ave S (1.3 mi)
New Fire & Rescue Station – Along SR 99 (1.3 mi)
South King Fire & Rescue Station 61 – Along 20th Ave S (2.7 mi)
South King Fire & Rescue Station 61 – Along SR 99 (2.8 mi)
FWLE
Test Track
Mainline
South 344th Street Alternative
South King Fire & Rescue Station 64
Federal Way Police Department
Proposed Future Fire & Rescue Station
South King Fire & Rescue Station 61
Federal Way
S 320th St
S 324th St
S 330th St
S 331st Pl
S 332nd Pl
S 332nd St
S 333rd St
S 334th St
S 336th St
S 340th Pl
S 344th St
S 348th St
S 349th St
S 351st St
S 355th Pl
S 356th St
S 359th St
S 360th St
S 364th St
S 365th Pl
S 366th St
1st Way S
1st Pl S
6th Ave S
8th Ave S
9th Ave S
11th Pl S
13th Pl S
16th Ave S
17th Ave S
20th Way S
21st Pl S
22nd Pl S
24th Ave S
24th Pl S
25th Pl S
25th Ave S
26th Ave S
29th Ave S
30th Ave S
32nd Ave S
33rd Pl S
34th Ave S
38th Ave S
39th Ave S
Weyerhaeuser Way S
18
5
161

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.14-3
Emergency Response Routes
South 344th Street Alternative

OMF South

Emergency response travel times were estimated between each of the four emergency response origin points and the Christian Faith Center property. For each emergency response origin point, travel times were estimated for a route along 20th Avenue S and a route along SR 99, as applicable. Emergency response travel times were calculated by estimating the time to travel along the roadway segments and the delay at signalized intersections. For both off-peak and peak periods, the time to travel along the roadway segments was estimated based on posted speed limit and length of the segment. For off-peak periods, it was assumed that emergency response vehicles would travel through without delay. For peak periods, it was assumed that emergency response vehicles would experience approximately 15 seconds of delay at each signalized intersection.

Table 3.14-1 summarizes the estimated emergency response travel times between the four emergency response origins and the Christian Faith Center property.

Table 3.14-1 Emergency Response Travel Times: South 344th Street Alternative

Emergency Response Route	Study Area Quadrant	Route Type	Route Length (miles)	Off Peak Period Travel Time (minutes)	Peak Period Travel Time (minutes)
Federal Way Police Department	NW	20th Ave S	1.1	1.9	2.9
		SR 99	N/A	N/A	N/A
South King Fire and Rescue Station 64	NE	20th Ave S	1.7	2.9	3.4
		SR 99	N/A	N/A	N/A
Proposed future South King Fire and Rescue Station	SW	20th Ave S	1.3	2.4	3.2
		SR 99	1.3	2.2	3.5
South King Fire and Rescue Station 61	SE	20th Ave S	2.7	4.9	6.4
		SR 99	2.8	4.8	7.0

Emergency vehicles traveling from the proposed future Fire and Rescue Station and South King Fire and Rescue Station 61 would be required to use the routes along SR 99 with the closure of 20th Avenue S. For the proposed future Fire and Rescue Station, using SR 99 instead of 20th Avenue S would decrease travel time by 0.2 minutes (12 seconds) during off-peak periods and increase travel time by 0.3 minutes (18 seconds) during peak periods. For the South King Fire and Rescue Station 61, using SR 99 instead of 20th Avenue S would decrease travel time by 0.1 minutes (6 seconds) during off-peak periods and increase travel time by 0.6 minutes (36 seconds) during peak periods.

Emergency vehicles traveling from the Federal Way Police Department and South King Fire and Rescue Station 64, both located north of the South 344th Street Alternative, would use the existing street network to access the Christian Faith Center property. Areas south of the South 344th Street Alternative are expected to be served by the proposed future Fire and Rescue Station and South King Fire and Rescue Station 61.

With suitable options for emergency access, the ability to shift first-response service boundaries, and a planned future fire station, South King Fire considers the closure of 20th Avenue S to have minimal impact on fire and emergency medical services (South King Fire 2020).

Federal Way reported that all parcels surrounding 20th Avenue S are served by their police department and expressed concern over the potential effects that the closure of 20th Avenue S could have on police response time. According to data provided by the city, Federal Way police patrolled 20th Avenue S between S 336th Street and S 341st Place an average of two to three times per day from March through September 2022 (City of Federal Way 2023).

Because police officers are often traveling on patrol and not dispatching from a central location to respond to calls, it is not possible to accurately determine how the road closure would affect their response time. The majority of Federal Way is located west of the project site. With the South 344th Street Alternative located toward the eastern edge of the city limits, police patrol vehicles would likely be either north, south, or west of 20th Avenue S most of the day; thus, the closure would likely have very little impact on their response time to the area currently served by 20th Avenue S. Further, some of the businesses and residences served by 20th Avenue S would be acquired for the project, reducing the number of properties needing emergency services in the immediate area.

The closest hospital to the South 344th Street Alternative is St. Francis Hospital, at S 345th Street and 9th Avenue S. Because the hospital is southwest of the project site, emergency vehicle response times would not be affected by the closure of 20th Avenue S.

Midway Landfill Alternative

Impacts under the Midway Landfill Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives. There would be no anticipated adverse impacts to public services.

3.14.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Implementation of any of the build alternatives would temporarily affect the roadways in the study area and vicinity, resulting in short-term impacts on emergency services. Construction vehicles would temporarily increase traffic congestion. The Midway Landfill Alternative, with its relatively long construction schedule and large number of truck trips, would potentially have the largest effect on emergency service response times and public service delivery. Sound Transit would coordinate with potentially affected public service providers before and during construction to minimize delays in emergency response times and disturbance to school bus and solid waste collection routes.

3.14.2.4 Avoidance and Minimization of Impacts

The OMF South alternatives would be designed within a framework of standards that address emergency, safety, and security at each facility. Operations at OMF South would be performed in accordance with a facility operations plan that would ensure safety and security at the site. Sound Transit would also work with the local jurisdictions to develop an emergency response, safety, and security plan.

As discussed in Section 3.2, Transportation, construction-related traffic impacts would be addressed with implementation of a construction transportation management plan prepared through coordination with the affected jurisdiction prior to construction. Sound Transit would coordinate with potentially affected public service providers before and during construction to minimize delays in emergency response times and minimize disturbance to school bus and solid waste collection routes.

For the South 344th Street Alternative, due to the closure of 20th Avenue S, police and fire services would likely use SR 99 to access areas north and south of the OMF site. The use of

SR 99 as an alternate route would not substantially affect response times. Sound Transit would work with Federal Way during final design to develop measures to address this concern, which could include constructing a new roadway connection between S 336th Street and S 341st Place.

3.14.2.5 Indirect Impacts

The OMF South build alternatives could have indirect impacts to their respective study areas, including changes in development patterns which could affect the need for public services. Section 3.4, Land Use, contains a more detailed description of direct and indirect land use changes in addition to development potential consistent with local and regional policies and plans.

3.14.3 Mitigation Measures

No mitigation is anticipated for impacts to public services as a result of construction or operation of OMF South. Section 3.3, Acquisitions, Displacements, and Relocations, provides details regarding acquisition and relocation assistance for property owners and businesses, including those that provide public services.

3.15 Utilities, Energy, and Electromagnetic Fields

Utilities

The study area for the utility analysis is the area in the construction limits of the build alternatives. Information on relocated or protected utility lines was compiled from several sources, including GIS data from Sound Transit, Federal Way, and Kent; utility maps; and as-built drawings obtained from private and public utility companies. A field survey was also completed to confirm and map many of the utilities for the Preferred and South 344th Street alternatives.

Sound Transit inventoried major utility lines to identify potential conflicts that might require utility relocation. Major utilities were defined as:

- Water mains of 16-inch diameter or greater
- Stormwater drains and sanitary sewers of 36-inch diameter or greater
- Sanitary sewer force mains of 24-inch diameter or greater
- 115 kilovolt (kV) and greater electrical transmission lines
- High-pressure gas mains of any diameter
- Intermediate-pressure gas lines with an 8-inch diameter or greater
- Telephone and fiber-optic duct banks with three or more conduits
- Petroleum product pipelines

Utilities within the study area are regulated by Federal Way and Kent, as well as Lakehaven Water and Sewer, Highline Water, and Midway Sewer districts.

Energy

The study area for the energy analysis is the area in the construction limits of the build alternatives. The energy analysis evaluated operational energy used by the build alternatives and the demand on energy supply and energy consumption during construction.

Many federal, state, and local plans and policies identify goals for the efficient use of energy. Sound Transit's Sustainability Plan commits Sound Transit to integrating efficient operating practices at existing and new facilities, using energy-saving equipment to reduce energy demand, and maximizing intermodal transit connections to reduce automobile travel (Sound Transit 2019d). It includes goals focused on sustainable building and infrastructure and opportunities for transit-oriented development.

Electromagnetic Fields

The electromagnetic field (EMF) study area is the area immediately adjacent (300 feet) to the construction limits of the build alternatives. The EMF analysis discusses potential for electromagnetic fields from the build alternatives to interfere with the operation and function of sensitive equipment. Facilities with equipment potentially sensitive to electromagnetic interference were identified in the study area using a review of existing facilities, buildings, and land uses.

Electromagnetic fields are created by the generation, transmission, distribution, and use of electricity. Electromagnetic fields surround all electrical equipment, appliances, and facilities, including light rail trains. Additionally, metal objects, such as trucks and buses, move through the earth's static magnetic field creating electromagnetic fields. Electromagnetic fields can result in electromagnetic interference, which can cause disruption and possibly malfunction in sensitive equipment, such as magnetic resonance imaging (MRI) equipment, electron microscopes, mass spectrometers, and magnetic devices such as heart pacemakers.

In certain situations, with sufficiently high exposure, EMFs can affect human health by causing, for example, shocks or burns when objects that conduct electricity are touched. The World Health Organization, however, has concluded that "current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields" (World Health Organization 2019). The impact discussion, therefore, focuses on the potential interreference with sensitive equipment as well as the potential impact of stray currents.

In electrical systems such as Sound Transit's Link light rail system, current can flow from the system into nearby ground or concrete structures, resulting in "stray current." Stray currents can occur when part of an electric current finds an alternative conducting path, such as metal, water, or a buried pipe or cable. Over time, a stray current can cause corrosion, which in turn can cause pipes to leak or wires to break.

3.15.1 Affected Environment

3.15.1.1 Utilities

Utility providers include municipal agencies, public utility districts, and private franchise utility companies. Table 3.15-1 summarizes the utility providers in the study area.

Table 3.15-1 Utility Providers in Study Area

Utility	Provider
Preferred and South 344th Street Alternatives	
Gas	Puget Sound Energy
Electricity	Puget Sound Energy
Water, Sewer	Lakehaven Water and Sewer District
Stormwater	Federal Way Public Works
Cable	Comcast
Communications	Lumen, Zayo, Verizon/MCI
Midway Landfill Alternative	
Gas	Puget Sound Energy
Electricity	Puget Sound Energy
Water	Highline Water District
Sewer	Midway Sewer District
Stormwater	Kent Public Works
Cable	Comcast
Communications	Lumen, Zayo

3.15.1.2 Energy

In 2019, Washington consumed 2,076 trillion British thermal units (Btu) of energy. Transportation accounts for 32 percent of energy consumption in Washington, followed by the industrial (26 percent), residential (24 percent), and commercial sectors (18 percent) (EIA 2022).

Per capita energy consumption, in general, is declining due to improvements in energy efficiency and design as well as the decline in industrial energy consumption (Washington State Department of Commerce 2018). Despite this reduction in per capita energy use, the state's overall energy consumption is expected to increase over the next several decades due to growth in population, jobs, and demand for vehicle travel (Washington State Department of Commerce 2020). However, meeting the state's GHG emission limits may result in lower overall energy demand by increasing energy efficiency and electrification to replace GHG-emitting fuels (Washington State Department of Commerce 2020a). Increased demand for energy is closely tied to energy prices; if prices remain high, the growth in energy demand may be moderated by consumers who purchase fuel-efficient vehicles or change personal consumption habits (Washington State Department of Commerce 2018).

Puget Sound Energy (PSE) provides both power and natural gas to the study area. Table 3.15-2 lists the number of customers and sales by energy type for PSE's service area, which is approximately 6,000 square miles (PSE 2022).

Table 3.15-2 2019 Utility Data for Puget Sound Energy

Utility Data	Electricity	Natural Gas
Number of Customers	1,173,909	841,197
Energy Sales	20,014,275 MWh	95,104 billion Btu[1]

Sources: PSE 2019a, 2020

Note:

(1) Reported by PSE (2019) as 951,042,707 therms and converted using the relationship 10 therms = 1 million British thermal units (Btu).

In addition to its own generation sources, PSE purchases additional energy through short-, medium-, and long-term contracts with other energy producers and suppliers. In 2019, coal represented 32 percent of PSE's electricity fuel mix, followed by natural gas (28 percent), hydropower (17 percent), unspecified (13 percent), wind (8 percent), nuclear (< 1 percent), and other (< 1 percent) (Washington State Department of Commerce 2020b). However, as stated in Section 3.8, Air Quality and Greenhouse Gas Emissions, Sound Transit and PSE have entered into an agreement that all electricity accounts related to the operations of Link light rail be sourced solely from renewable wind power via PSE's Green Direct program.

Natural gas is purchased by PSE for both electricity generation and delivery to customers. Future increases in electricity and natural gas sales are expected in the Puget Sound region. PSE's 2019 base forecast for the next 20 years includes a 1.4 percent average annual growth rate for electricity and a 0.7 percent rate for natural gas (PSE 2019b).

3.15.1.3 Electromagnetic Fields

Communities in the study area are served by a combination of overhead and buried electric distribution lines providing power to the existing commercial, industrial, and residential uses in the areas. There are also BPA 500 and 230 kV high-voltage transmission lines located just south of The Commons at Federal Way shopping mall.

All electrical equipment and electronic devices generate EMFs. The widespread use of electricity in homes and businesses means that EMFs are present almost everywhere. Electric fields in the home, on average, range from 0 to 10 volts per meter, and electric fields directly beneath power lines may vary from a few volts per meter for some overhead distribution lines to several thousand volts per meter for extra-high-voltage power lines (NIEHS and NIH 2002).

Sound Transit did not identify any EMF-sensitive facilities, buildings, or land uses within the study areas of the build alternatives.

3.15.2 Environmental Impacts

3.15.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to utilities and energy and from construction or operation of OMF South would not occur. However, other planned projects would have impacts in the OMF South study areas. FWLE required utility relocations in the Midway study area, but additional electrical system capacity was not required. Additionally, there were no EMF impacts from the construction of FWLE. Other planned projects could require utility relocation, depending on their design. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

3.15.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Utilities

Operation of OMF South would result in a negligible increased demand for natural gas and for cable and communications systems.

Each build alternative would include an on-site traction power substation to power the LRVs for movement around the yard and transporting them back to the mainline tracks. The daily power demand for tools and machinery in the vehicle maintenance shops, along with the storage yard lighting and other on-site electricity needs, would be supplied from the site’s power service feed off the main local grid. The on-site traction power substation would be powered by 12.5 kV electric lines connecting to the nearest power pole. Increased electricity demand at OMF South may require additional distribution lines to be constructed and maintained by PSE. The Energy discussion below contains more information.

For each of the build alternatives, water demand would increase slightly, most of it for LRV washing. A high percentage of this wash water would be recycled on site. The additional water demand would not greatly affect the water providers’ existing and projected water supplies and would not likely compromise flow for fire protection. Water demand would be coordinated with fire departments and water suppliers to avoid impacts. The OMF South drainage system would be designed to filter and recycle a high percentage of the wash and rinse water. Solids, oils, soaps, and other contaminants would be filtered, settled into a sludge tank, and periodically removed for disposal in accordance with applicable regulations.

Some disposal to the local sanitary sewer system would be expected from the recycled, filtered wash water. The water discharged to the sanitary sewer system would be disposed in accordance with local and state regulations. For each of the build alternatives, existing sewer lines on adjacent streets are available for sewer connections. Nonrecycled vehicle wash water disposal volumes would be compared with conveyance capacity of the existing system. On-site filtering and recycling capacity would be developed in more detail during the final design to ensure compatibility with the existing system.

Any required stormwater detention facilities and infrastructure to collect storm and wastewater would connect to both the existing sewer system and the stormwater conveyances. Operational impacts on stormwater are discussed in Section 3.11, Water Resources.

Energy

Table 3.15-3 shows the estimated aggregate annual operational and maintenance energy consumption for the build alternatives.

Table 3.15-3 Estimated Aggregate Annual Operational and Maintenance Energy Consumption for OMF South Build Alternatives

Alternative	Estimated Aggregate Annual Energy Consumption (million Btus)	Megawatt hours
Preferred	16,235	4,758
South 344th Street	16,249	4,762
Midway Landfill	16,139	4,730

OMF South operations would increase energy consumption equivalent to the requirement for up to 211 homes for the Preferred and South 344th Street alternatives and up to 209 homes for the Midway Landfill Alternative. Given that these increases represent a small fraction of PSE’s total energy resources (less than 0.03 percent of PSE’s annual sales of more than 20.0 million megawatt hours), the utility should have sufficient capacity and energy resources to accommodate the increases.

EMF

There are no properties with sensitive equipment in the study area, so no long-term EMF impacts on sensitive equipment are expected from any of the build alternatives.

The build alternatives would increase EMF levels from existing conditions due to the increase of EMF-generating sources, including the LRVs; overhead catenary wires used to provide power to the mainline, test tracks, and tracks within the OMF site; equipment to operate the facility and maintain the LRVs; and an on-site traction power substation facility.

Stray currents could result if electrical current traveling through the LRVs or overhead wires were to jump to nearby cables that are buried in the ground. Control measures preventing stray currents would be developed by Sound Transit, if necessary, in coordination with the operators of electric and other utility lines.

The build alternatives would not result in any health impacts on facility employees, visitors, or the surrounding public. Even when drawing full power, data from similar rail systems show that light rail operation is unlikely to generate health impacts for people along the tracks from EMF exposure (Sound Transit 2016). The ranges of EMF exposure to track maintenance workers and train operators are below the guidelines established by the International Commission on Non-Ionizing Radiation Protection. Because maintenance workers and operators would be in the immediate vicinity of electrical equipment generating EMFs, the EMF exposure to the public in surrounding land uses from the build alternative sites would be lower than train-worker exposure.

The magnetic field from light rail operations on the mainline and test tracks would not exceed 10 gauss, which is a unit of magnetic induction that measures the intensity of a magnetic field. This level is less than 1/100th of the exposure considered safe for human health by the Institute of Electrical and Electronics Engineers (2019).

Preferred Alternative

Utilities

In addition to the on-site traction power substation described above under Impacts Common to All Alternatives, the Preferred Alternative would require an additional traction power substation to power the mainline tracks. Like the on-site traction power substation, it would be powered by 12.5 kV electric lines connecting to the nearest power pole. Increased electricity demand at this traction power substation site may require additional distribution lines to be constructed and maintained by PSE.

To accommodate the mainline tracks, BPA's existing 500 and 230 kV high-voltage transmissions lines that are just south of The Commons in Federal Way would be modified to avoid potential effects on light rail operations. These modifications would include the installation of new towers to raise and shift the lines.

Energy

Operational impacts on energy resulting from the Preferred Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

EMF

Operational impacts from EMF for the OMF site are the same as those described previously under Impacts Common to All Build Alternatives.

As noted above, the BPA 500 and 230 kV high-voltage transmission lines just south of The Commons in Federal Way would be modified. These modifications would include installation of new towers to raise and shift the location of each line. Both electric and magnetic field levels are expected to be well below threshold limits at the approximate edge of the BPA right-of-way for the modified portion.

LRVs approaching the OMF on the mainline tracks or running on the test track under the Preferred Alternative could be traveling up to the maximum operating speed of 55 mph. A report prepared by LTK Engineering Services (2006) describes extensive measurements and magnetic field modeling performed for the North Link line in Sound Transit's Link light rail system to evaluate magnetic fields that could be produced by operation of four-car trains. Even with the higher speeds, EMF levels expected within and adjacent to the LRVs along the mainline or test tracks would be considerably lower than exposure guidelines. It is important to note that, because these trains are moving, the resulting magnetic fields are transient in nature, typically lasting from a fraction of a second to a few seconds.

South 344th Street Alternative

Utilities

Operational impacts to utilities are the same as those described under Impacts Common to All Build Alternatives and the Preferred Alternative.

Energy

Operational impacts on energy resulting from the South 344th Street Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

EMF

Operational impacts from EMF are the same as those described previously under Impacts Common to All Build Alternatives and the Preferred Alternative.

Midway Landfill Alternative

Long-term impacts to utilities, energy, and EMF from the Midway Landfill Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

3.15.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Utilities

Potential construction impacts common to all build alternatives would include:

- Relocating utility poles that support overhead lines; relocating aerial utility lines to taller or different types of poles (including the BPA 500 and 230 kV high-voltage transmission lines for the Preferred and South 344th Street alternatives); constructing new distribution lines to provide power to substations
- Relocating underground utilities out from under future OMF South site facilities
- Inspecting, repairing, and encasing underground utilities at yard track crossings

The effect on utilities is dependent on their depth and material as well as excavation and fill limits of the build alternative sites. Underground utilities would be relocated or protected to allow for excavation and/or fill and to minimize load impacts on existing utilities from the weight of the LRVs and building foundations.

Disruptions to service during utility relocations would be minimal, as temporary connections to customers would typically be established before starting relocation. Inadvertent damage to underground utilities could occur during construction if utility locations are uncertain or misidentified. Such accidents could temporarily affect service to the utilities' customers. Preconstruction surveys, and outreach measures to inform customers of potential disruptions would be used to minimize these impacts.

Construction of distribution systems within the site boundaries for electric, natural gas, water, communications, sanitary sewer, and stormwater would be achieved through relocation and reuse of existing systems as well as installation of new systems. Specific requirements for the on-site distribution systems would be determined during final design.

Table 3.15-4 summarizes the potential impacts to utilities from construction of OMF South for each build alternative. Utilities designated as "relocated" would need to be replaced to maintain the current level of service. "Removed" utilities are ones that could possibly be removed but may not need to be replaced due to the change in land use or required service. "Protected" utilities could be left in place and not affected by construction.

The full extent of utility relocations would be determined during final design. Relocations may require work outside the proposed project limits to complete connections back to existing systems and maintain levels of service as required for a successful utility relocation.

Table 3.15-4 Summary of Utility Impacts for OMF South Build Alternatives

Utility Type	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
Water Main Distribution	5,150 feet relocated 3,360 feet removed	5,450 feet relocated 3,930 feet removed	None
Sanitary Sewer Conveyance	2,376 feet relocated 200 feet removed	4,980 feet relocated 1,060 feet removed	None
Stormwater Collection	14,866 feet relocated 260 feet removed	14,570 feet relocated 1,800 feet removed	None
Electricity	3,450 feet of underground electrical relocated 2,000 feet of underground electrical removed 560 feet of overhead electrical removed	2,420 feet of underground electrical relocated 1,560 feet of underground electrical removed 2,140 feet of overhead electrical relocated 520 feet of overhead electrical removed	None
Natural Gas	2,100 feet relocated	3,290 feet relocated 390 feet removed	None
Cable/Telecommunications	1,950 feet of underground telecom protected[1] 3,880 feet of underground telecom relocated 560 feet of overhead telecom relocated 4,710 feet of underground telecom removed	9,440 feet of underground telecom relocated 1,720 feet of underground telecom removed 4,240 feet of overhead telecom relocated 370 feet of overhead telecom removed	None
Petroleum/Fuel	None	None	None
Other Utilities	None	None	Up to 15,740 feet of the landfill gas extraction system removed and replaced[2]

Notes: All lengths are approximate and will be determined during final design.

(1) Existing telecom ducts can likely be protected in place but may need to be relocated, depending on construction means and methods.

(2) Existing waste produced gaseous ventilation system; length of system modification depends on the subsurface construction design option.

Energy

Energy-related impacts during construction of the OMF South would be short term in nature and are not anticipated to be adverse. During project construction, energy would be consumed when construction materials are produced and transported to the project construction site. Operating and maintaining construction equipment would also consume energy. Table 3.15-5 summarizes estimated total energy consumption (i.e., construction equipment fuel consumption; material and fuel extraction, production, and transport; and soil import/export) associated with construction of the build alternatives. Total energy consumption estimates were calculated based on amortized construction GHG emission estimates. See Section 3.8, Air Quality and Greenhouse Gas Emissions, for details.

Table 3.15-5 Total Construction-Related Energy Consumption

Build Alternative	Gallons of Diesel Fuel[1]	Million Btu[2]
Preferred Alternative		
OMF Site	6,196,714	851,311
Mainline	556,115	76,400
Total	**6,752,829**	**927,710**
South 344th Street Alternative		
OMF Site	6,271,193	861,543
Mainline	665,352	91,407
Total	**6,936,545**	**952,950**
Midway Landfill Alternative		
Platform	7,308,944	1,004,110
Hybrid	9,295,070	1,276,966
Full Excavation	9,652,573	1,326,080

Notes:

(1) Upstream, downstream, and haul truck GHG emissions from the air quality analysis (Table 3.8-4) were used to estimate energy consumption.

(2) 1 U.S. gallon of diesel fuel = 137,381 Btu (EIA 2019).

EMF

During construction, EMFs would be generated by equipment use and movement of construction vehicles. However, EMFs would not be substantially higher than those generated at a typical construction site. Additionally, because there are no facilities with EMF-sensitive equipment in the study area, no impacts from EMF are anticipated during construction.

Preferred Alternative

Utilities

This build alternative would require a portion of 24th Avenue S near its intersection with S 330th Street to be realigned and rebuilt to make room for the proposed mainline track alignment for either design option. The realignment of the road would have impacts on an existing 30-inch sewer main between the street and I-5 while also impacting the existing overhead electrical poles, wiring, and associated telecom lines along the east side of the street. For impacts of this magnitude, Federal Way requires existing overhead utilities to be converted to underground. The new mainline and test tracks would also have minor impacts on several other utilities along its proposed alignment until it reaches the OMF site. Table 3.15-6 summarizes those impacts and provides additional information about the existing utilities that would potentially conflict with the mainline tracks.

Table 3.15-6 Preferred and South 344th Street Alternatives Mainline Utility Impacts Summary

Utility Type	Length	Utility Owner	Utility Size	Utility Material	Mainline Impact[1]	Relocate/ Protect
Underground Electrical Distribution	Crossing	PSE	Unknown	PVC conduit	Column	R
Water Main	31	Lakehaven Water and Sewer District	16 inches	DI	Column	R
Sanitary Sewer Main	36	Lakehaven Water and Sewer District	12 inches	CI	Column	R
Sanitary Sewer Main	240	Lakehaven Water and Sewer District	30 inches	PVC	Column	R
Gas Main	31	PSE	2 inches	MDPE	Column	R
Underground Electrical Distribution	223	PSE	Unknown	PVC conduit	Column	R
Sanitary Sewer Main	Crossing	Lakehaven Water and Sewer District	8 inches	PVC	Column	R
Overhead Electrical Transmission	Crossing	BPA	500 kVA and 230 kVA	Wires	Mainline	R
Overhead Electrical Transmission	Crossing	BPA	230 kVA and 230 kVA	Wires	Mainline	R
Water Main	2,730	Lakehaven Water and Sewer District	2 inches	Poly	Test Track, Drainage Pond and Fill Walls	R
Sanitary Sewer Main	675	Lakehaven Water and Sewer District	Private	Unknown	Test Track and Fill Walls	R
Telecom Duct Bank	622	Lumen (formerly) CenturyLink)	1 duct	PVC conduit	Test Track and Fill Walls	R
Underground Electrical Distribution	492	PSE	100 kVA	PVC conduit	Test Track and Fill Walls	R
Gas Main	482	PSE	2 inches	Steel	Test Track and Fill Walls	R
Underground Electrical Distribution	185	PSE	75 kVA	PVC conduit	Drainage Pond	R
Water Main	287	Lakehaven Water and Sewer District	2 inches	Poly	Drainage pond and Column	R
Telecom Duct Bank	2,123	Lumen	1 duct	PVC conduit	Test Track, Fill Walls & Drainage Pond	R
Water Main	Crossing	Lakehaven Water and Sewer District	2 inches	Poly	Test Track and Fill Walls	R
Telecom Duct Bank	1,027	Lumen	1 duct	PVC conduit	Drainage Pond	R
Gas Main	188	PSE	2 inches	Steel	Drainage Pond	R
Underground Electrical Distribution	265	PSE	50 kVA	PVC conduit	Drainage pond	R
Underground Electrical Distribution	290	PSE	50 kVA	PVC conduit	Drainage pond	R

Table 3.15-6 Preferred and South 344th Street Alternatives Mainline Utility Impacts Summary (continued)

Utility Type	Length	Utility Owner	Utility Size	Utility Material	Mainline Impact[1]	Relocate/ Protect
Overhead Electrical Distribution	1,100	PSE	25 kVA	Wires	At grade	R
Overhead Telecom Lines	1,100	Lumen	1 aerial	Wires	At grade	R
Cell Tower	Crossing	Seattle SMSA LP	1 tower	N/A	Obstruction	R
Telecom Service[2]	Crossing	Lumen	1 service	Buried	At grade	R
Sanitary Sewer Main	Crossing	Lakehaven Water and Sewer District	30 inches	Concrete	Retained fill	R
Water Main	Crossing	Lakehaven Water and Sewer District	6 inches	Cast iron	Retained fill	R
Overhead Telecom Lines	Crossing	Comcast	Aerial	Wires	Mainline	R
Overhead Electrical Distribution	Crossing	PSE	25 kVA	Wires	Mainline	R
Telecom Duct Bank	Crossing	Lumen	3 ducts	PVC conduit	Column	P
South 344th Street Alternative, Enchanted Parkway Tail Track Option						
Overhead Telecom Lines	Crossing	Comcast	Aerial	Wires	Mainline	R
Overhead Electrical Distribution	Crossing	PSE	25 kVA	Wires	Mainline	R
Telecom Duct Bank	Crossing	Lumen	3 ducts	PVC conduit	Column	P
Water Main	Crossing	Lakehaven Water and Sewer District	8 inches	DI	Column	R
Underground Electrical Distribution	Crossing	PSE	25 kVA	PVC conduit	Column	R
Gas Main	Crossing	PSE	2 inches	MDPE	Column	R
Telecom Duct Bank	Crossing	Comcast	unknown	PVC conduit	Column	R
South 344th Street Alternative, I-5 Tail Track Option						
Overhead Electrical Distribution	Crossing	PSE	25 kVA	Wires	Mainline	R
Overhead Telecom Distribution	Crossing	Comcast	Aerial	Wires	Mainline	R
Telecom Duct Bank	Crossing	Lumen	3 ducts	PVC conduit	Column	P

Notes: All lengths are approximate; CI = cast iron; DI = ductile iron; kVA = kilovolt-amp; MDPE = medium-density polyethylene; Poly = polyethylene; PVC = polyvinyl chloride; R = Relocate, P = Protect.

(1) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(2) Existing service to a building that would be demolished for project; new service/replacement is not anticipated due to building removal.

The mainline tracks would also intersect with the location of the existing BPA electrical transmission corridor and would have to cross under the existing lines. This intersection creates a vertical conflict between the proposed mainline tracks and the existing power line elevations. The transmission lines would need to be raised by approximately 50 feet. BPA has determined that the existing towers are unable to accommodate this change and four new towers are needed. Sound Transit and BPA are working together to address this conflict. BPA estimates the work would take two construction seasons and would require planned power interruptions to allow crews to safely make improvements to the lines. BPA would work with the local utility to select a time with as minimal an impact on the community as possible (BPA 2023).

The mainline tracks would be located near an existing cell tower adjacent to I-5, 24th Avenue S, and Oakland Hills Boulevard. The completed mainline tracks could block or interfere with cell tower transmission waves, which would cause a service disruption. The tower would likely be relocated to available open property further to the west of the project rather than next to I-5.

Energy

As shown in Table 3.15-5, the Preferred Alternative is anticipated to have similar level of fuel consumption relative to all the build alternatives.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

South 344th Street Alternative

Utilities

Potential impacts related to construction of the mainline tracks would be the same as those described above for the Preferred Alternative.

Both the Enchanted Parkway and the I-5 mainline tail track alignments would impact electrical utilities. At the end of S 344th Street on the east side of I-5, overhead distribution electrical power and telecom lines are in vertical conflict with the tracks. Taller poles would be necessary to raise the lines clear of the elevated mainline tracks.

Energy

As shown in Table 3.15-5, the South 344th Street Alternative is anticipated to result in a similar level of fuel consumption relative to all the build alternatives.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

Midway Landfill Alternative

Utilities

No conflicts associated with natural gas were identified for the Midway Landfill Alternative site. New gas distribution piping would be constructed within the site boundary to service the OMF South buildings.

The Midway Landfill has approximately 15,740 feet of 6-inch-diameter PVC pipe in a landfill gas ventilation piping system. Located underneath the landfill cap, the system is designed to capture methane and other decay gases that are produced as the buried waste breaks down. After the gas is collected, it is mixed with natural gas to allow combustion and then flared off at an on-site facility. If the Midway Landfill Alternative is selected, this system would be modified or removed. Depending on the subsurface construction design option, the site preparation work would remove some or all of the landfill. Replacement or upgrade of the landfill gas extraction system and the continuation of the landfill gas monitoring system would be required for the Platform and Hybrid subsurface construction design options and may be required for the Full Excavation option.

No conflicts associated with underground or overhead electrical infrastructure, water main piping, sanitary sewer piping, storm drain piping, or telecommunication infrastructure were identified for the Midway Landfill Alternative. New piping and infrastructure for these utilities would be constructed within the site boundary to service the OMF South buildings.

Energy

As shown in Table 3.15-5, the subsurface construction design options associated with the Midway Landfill Alternative are anticipated to result in higher levels of fuel consumption relative to the other build alternatives.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

3.15.2.4 Avoidance and Minimization of Impacts

Sound Transit used several design measures to avoid and minimize potential utility impacts. For example, where feasible, columns for elevated mainline tracks would be placed to avoid impacts to underground utilities. Sound Transit would also design the mainline tracks to maintain access to utilities for maintenance and repair per the utility owner’s requirements. In some cases, that would require Sound Transit to relocate sewer manholes, pipes, vaults, or other access points as part of mainline track construction. Sound Transit would work closely with utility providers to maintain required access to these utilities and any relocated sewer manholes and vaults, utility mains, fire hydrants, and other features. To minimize potential impacts due to service disruptions during construction, Sound Transit would perform preconstruction surveys to identify utility locations as well as communicate with customers to inform them of planned or potential service disruptions.

To avoid or minimize potential corrosion impacts, Sound Transit would coordinate with utility providers during final design to identify appropriate control measures. Typical design measures include:

- Installing cathodic protection systems
- Installing insulating unions to break the electrical conductivity of the utility
- Isolating electrical rails from the ground
- Installing stray-current-control track fastening systems, where appropriate

To avoid or minimize consumption and demand on utilities, such as energy and water, Sound Transit would integrate efficient operating practices at existing and new facilities that require the use of energy- and water-saving equipment and related design strategies.

Sound Transit's commitment to sustainability practices includes minimizing GHG emissions, which could be achieved by conserving energy during construction. Such measures could include, but would not be limited to, conserving fuel through reductions in construction vehicle idling, setting minimum EPA-tier requirements for construction vehicles, and providing for pre-demolition extraction of salvageable, reusable, and recyclable materials. Sound Transit would confirm which sustainability measures are feasible during final design and work with the contractor to implement them during construction.

3.15.2.5 Indirect Impacts

No indirect impacts related to utilities, energy, and EMF would result from construction and operation of the proposed project.

3.15.3 Mitigation Measures

With planning and coordination with utility owners, none of the build alternatives would result in adverse impacts to utilities. There would be no impacts to energy resources or EMFs. As a result, no mitigation is anticipated.

3.16 Historic and Archaeological Resources

This section analyzes potential impacts associated with the OMF South project alternatives to built-environment resources and archaeological resources that are eligible for or listed in local, state, or national historic preservation registers. Historic-period, built-environment resources are buildings, structures, and objects that meet the minimum age criteria for consideration under a particular local, state, or national register. Archaeological resources are locations including objects that are in disuse and can be attributed to past human activities and that meet the minimum age criteria for consideration under particular local, state, or national guidelines and regulations. Collectively, historic-period, built-environment resources and archaeological resources that are listed in or eligible for the National Register of Historic Places (NRHP) are referred to as "historic properties."[5]

Within the area of potential effect (APE) for the OMF South alternatives, project archaeologists conducted archaeological assessment and inventory, including surface and subsurface survey. The APE defined by FTA for OMF South is the same as the area of impacts identified by Sound Transit for the 2021 SEPA Draft EIS. The surface and subsurface survey for the 2021 SEPA Draft EIS identified two additional archaeological sites and one additional archaeological isolate within the APE in addition to the two previously documented archaeological resources.

Project architectural historians also conducted built-environment survey and inventory. Resources that were constructed in 1985 or earlier were considered historic-period built environment resources for the purposes of this analysis and included in the built-environment survey and inventory, as they would be 40 years old by the construction start date of 2025 and meet the age criteria for listing in the King County Register of Historic Places (KCRHP), though not for the WHR or NRHP. For the 2021 SEPA Draft EIS, Sound Transit evaluated 86 historic-period built environment resources for NRHP eligibility and coordinated with staff from the Washington State Department of Archaeology and Historic Preservation (DAHP) to assess NRHP eligibility of the built environment resources. Through this coordination it was determined that none of the resources evaluated by Sound Transit were eligible for listing in the NRHP.

The only built resources within the APE previously determined eligible or listed in the NRHP were the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. Under a separate evaluation, BPA determined that the OMF South project would have no adverse effect to the transmission lines, a finding with which the State Historic Preservation Office (SHPO) has concurred.

For the 2021 SEPA Draft EIS, Sound Transit coordinated with DAHP and Tribes in a fashion similar to a Section 106 consultation. No comments were received from Tribes that were coordinated with under SEPA. Sound Transit and DAHP staff worked closely to establish NRHP eligibility of archaeological and built environment resources for the 2021 SEPA Draft EIS. Sound Transit distributed the OMF South Cultural Resources Survey and Testing Methodology plan for review by Tribes and DAHP on January 13, 2020. The 2021 SEPA Draft EIS was distributed to Tribes and DAHP on March 5, 2021, via email. This transmittal included leadership at Tribes as well as technical staff.

On July 20, 2023, FTA initiated Section 106 consultation and requested comments on the APE in letters to the Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of the Puyallup

---

[5] Historic built-environment properties are differentiated from historic-period, built-environment resources, the former being eligible for the NRHP (and/or other historic registers) while the latter term is used to refer solely to those buildings, structures, and objects that meet minimum age criteria for historic register consideration.

Reservation, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Confederated Tribes and Bands of the Yakama Nation, and SHPO. SHPO concurred with the APE on July 24, 2023. In October 2023, FTA determined, and SHPO concurred, that the project would have no adverse effect on resources listed on or eligible for the NRHP.

Appendix G4, Historic and Archaeological Resources Technical Report, contains additional information about state and local regulations affecting historic properties and describes in more detail the environmental and cultural context of the OMF South study area and the resources inventoried as part of the archaeological and historic-period, built-environment surveys.

3.16.1 Regulatory Context

The two main federal laws pertaining to archaeological and built-environment resources are the National Historic Preservation Act (NHPA; 54 U.S.C. § 300101 et seq.) and NEPA. Section 106 of the NHPA requires federal agencies to identify historic properties within the APE and to consider a project's potential effects on those historic properties. Implementing regulations for Section 106 compliance are found in 36 CFR § 800. The APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties" (36 CFR § 800.16(d)). Historic properties are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" and can also include traditional cultural properties (36 CFR § 800.16(I)(1)). Under Section 106 of the NHPA, historic properties (those listed or eligible for listing in the NRHP) are identified and evaluated by the lead federal agency in consultation with Tribes with jurisdiction or interest, SHPO at the Washington State Department of Archaeology and Historic Preservation (DAHP), local jurisdictions, and other consulting parties, as appropriate. Archaeological and built-environment resources must also be given consideration under NEPA. In NEPA, "cultural resources" encompass a wide range of resources including, but not limited to, sacred sites, archaeological and built-environment resources not eligible for the NRHP, archaeological and built-environment resources eligible for the NRHP, and archaeological collections (CEQ and ACHP 2013:4). In addition, for U.S. Department of Transportation (including FTA) projects, Section 4(f) of the U.S. Department of Transportation Act includes protections for historic sites that are NRHP-eligible properties.

Applicable state laws and authorities include SEPA and regulations relating to archaeological and built-environment resources guiding the Washington Heritage Register (WHR) program administered by DAHP. Under state law, RCW 27.53, Archaeological Sites and Resources, any alteration to an archaeological site requires a permit from DAHP. State law, RCW 27.44 Indian Graves and Records, also protects Native American burial sites.

In addition to federal and state laws, ordinances and regulations are in place at county and municipal levels. King County has a designated Historic Preservation Program under the guidance of a landmarks commission. Kent and Federal Way have joined these programs and adopted appropriate ordinances and regulations for their jurisdictions. Each of these programs has individual guidelines and criteria that are discussed in Appendix G4, Historical and Archaeological Resources Technical Report.

3.16.2 Affected Environment

The APE includes all project elements and areas extending from the project elements (e.g., the OMF site and mainline, lead, and tail tracks) to the nearest parcel, or a maximum distance of 200 feet where large tax parcels are adjacent to project elements. The Preferred and South 344th Street alternatives include up to approximately 1.8 miles of new mainline tracks that would connect either of the sites to the Federal Way Link Extension terminus at the Federal Way Downtown Station. Figure 3.16-1 shows the APE for the three build alternatives. The depth of anticipated impacts has not been finalized but is expected to range from near-surface impacts to up to 180 feet below ground surface, depending on the alternative.

The study area used for the background and literature review was a 1-mile radius centered on each of the alignments included in the APE. A file search of the DAHP Washington Information System for Architectural and Archaeological Records Data (WISAARD) along with Government Land Office records and maps, ethnographic reports, historical maps, and aerial photographs were used to evaluate the archaeological sensitivity within the APE.

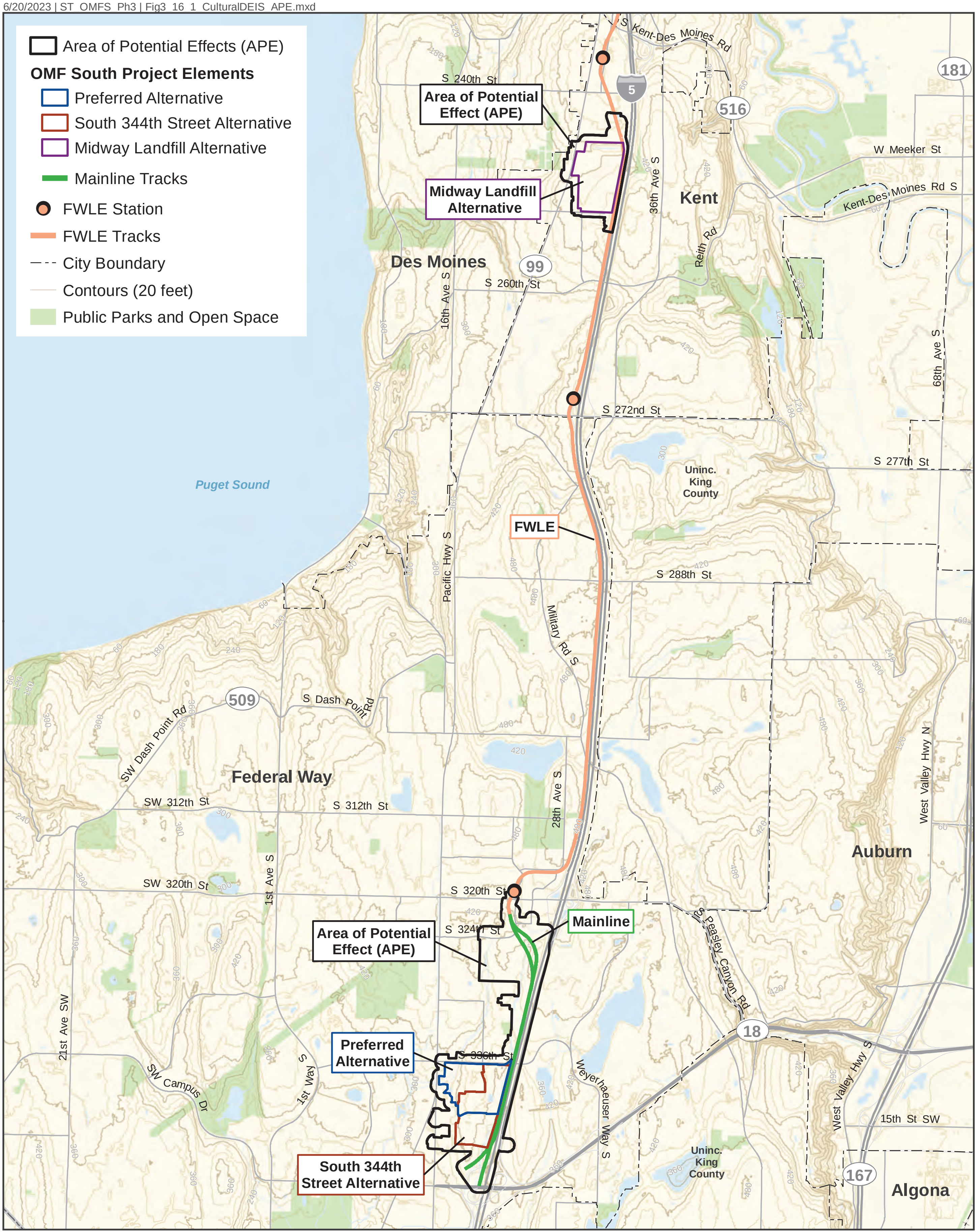
Fourteen previous cultural resource investigations have been undertaken within the 1-mile study area encompassing the Preferred Alternative, 15 previous investigations have been undertaken within the 1-mile study area encompassing the South 344th Street Alternative, and 14 previous investigations have been undertaken within the 1-mile study area of the Midway Landfill Alternative. No previously documented precontact archaeological sites or historic built-environment properties are known within the APE.

Two previously recorded historic-period archaeological sites are within the APE. Site 45KI719 was located within the potential construction limits of the South 344th Street Alternative but was determined not eligible for listing in the NRHP and subsequently removed by WSDOT during construction associated with I-5 improvements. Site 45KI1476 is the historic Midway Landfill, which has been determined not eligible for the NRHP by FTA, with SHPO concurrence (Chidley 2020).

Field Survey and Evaluation Methods

Prior to the commencement of the field surveys for the 2021 SEPA Draft EIS, a Cultural Resources Survey Plan was prepared for review by the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, the Confederated Tribes and Bands of the Yakama Nation, and SHPO. This plan was distributed to the aforementioned Tribes by Sound Transit under its authority as lead agency for SEPA. No formal comments were received from Tribes or SHPO.

The field survey included a historic-period, built-environment resources survey and inventory for previously undocumented or unevaluated buildings, structures, and objects constructed in 1985 or earlier, as well as an archaeological survey that included pedestrian transects and subsurface archaeological investigations (shovel probes and hand auger cores).


Area of Potential Effects (APE)
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Midway Landfill Alternative
Mainline Tracks
FWLE Station
FWLE Tracks
City Boundary
Contours (20 feet)
Public Parks and Open Space
Area of Potential Effect (APE)
Midway Landfill Alternative
FWLE
Mainline
Preferred Alternative
South 344th Street Alternative
Puget Sound
Des Moines
Kent
Federal Way
Auburn
Algona
Uninc. King County
Uninc. King County
S Kent-Des Moines Rd
S 240th St
W Meeker St
Kent-Des Moines Rd S
36th Ave S
Reith Rd
S 260th St
16th Ave S
S 272nd St
68th Ave S
S 277th St
Pacific Hwy S
S 288th St
Military Rd S
S Dash Point Rd
SW Dash Point Rd
28th Ave S
West Valley Hwy N
SW 312th St
S 312th St
SW 320th St
1st Ave S
S 320th St
S 324th St
S Peasley Canyon Rd
21st Ave SW
SW Campus Dr
1st Way S
S 336th St
Weyerhaeuser Way S
West Valley Hwy S
15th St SW
5
516
181
99
509
18
167

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

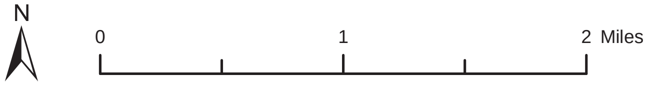


FIGURE 3.16-1
Area of Potential Effects
OMF South Alternatives

Historic-Period, Built-Environment Resources

The built-environment survey for the OMF South project inventoried resources built in or before 1985. The only built-environment resources built in 1985 or earlier that were excluded from survey were the BPA transmission system elements and resources with formal NRHP determinations of eligibility dating to within the last 10 years (per DAHP guidance). In 2020, BPA conducted its own Section 106 consultation with SHPO for the relocation of electrical transmission towers that would be impacted by the OMF South Project. These towers included those along the Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. BPA determined, and SHPO concurred, that the transmission lines were eligible for listing in the NRHP (correspondence with SHPO is found in Appendix G4, Historic and Archaeological Resources Technical Report).

Built-Environment field survey took place between December 2019 and May 2020. Survey staff, who meet the Secretary of the Interior's qualifications for architectural history, collected photos and field notes sufficient to complete physical descriptions, integrity assessments, and evaluations of individual resources for listing in the NRHP, WHR, or KCRHP, as appropriate. All resources were surveyed from the public right-of-way unless otherwise noted.

Field research results combined with archival research provided the background for recommendations regarding whether or not each resource met criteria necessary for NRHP, WHR, or KCRHP eligibility.

Archaeological Resources

Archaeological survey occurred over several field sessions during 2020 and 2021. For the 2021 SEPA Draft EIS, pedestrian and subsurface investigations conducted in 2020 excluded areas of the Preferred and South 344th Street alternatives where they overlapped with the TDLE APE. Sound Transit, in cooperation with FTA, conducted a concurrent but separate analysis of the potential effects to historic and archaeological resources in the overlap areas as part of the TDLE environmental review process. Pedestrian and subsurface archaeological investigations were conducted for this analysis in 2021, and the results for the OMF South and TDLE overlap area are included in this Final EIS.

For both efforts, systematic surface and subsurface survey (shovel probe and auger cores) was conducted within the APE. Shovel probes were spaced at regular 20-meter intervals in areas of high archaeological probability, whereas 30 meters spacing was used in areas of low probability. All sediments in shovel and auger cores were screened through standard 0.25-inch mesh and pertinent information was collected for each shovel probe or auger core.

3.16.2.1 Survey Results

Historic-Period, Built-Environment Resources

Architectural historians surveyed and inventoried a total of 86 historic-period, built-environment resources in the APE, mapped in Figures 3.16-2 and 3.16-3. A total of 58 historic-period built-environment resources were old enough to meet minimum age criteria for NRHP eligibility consideration. Results for those resources old enough to qualify for the NRHP were documented in historic property inventory forms in DAHP's WISAARD database and can be found in Appendix G4, Historic and Archaeological Resources Technical Report. The remaining 28 surveyed resources were old enough to meet minimum age criteria for KCRHP eligibility consideration and were evaluated under King County criteria but were not recorded in WISAARD due to age restrictions, as per consultation with DAHP. Results of this analysis can be found in Appendix G4, Historic and Archaeological Resources Technical Report. In October 2023, FTA determined, and SHPO concurred, that none of the historic-period, built-environment resources surveyed for this project meet criteria necessary for NRHP eligibility, with the exception of the Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines (see Appendix G4, Historic and Archaeological Resources Technical Report, for the correspondence from SHPO).

Archaeological Resources

Table 3.16-1 lists the archaeological resources found within the APE of the OMF South build alternatives. A total of five archaeological resources are within the APE; one of the sites is near multiple alternatives, while others are close to only one alternative (Table 3.16-1).

Table 3.16-1 Summary of Archaeological Resources within the APE

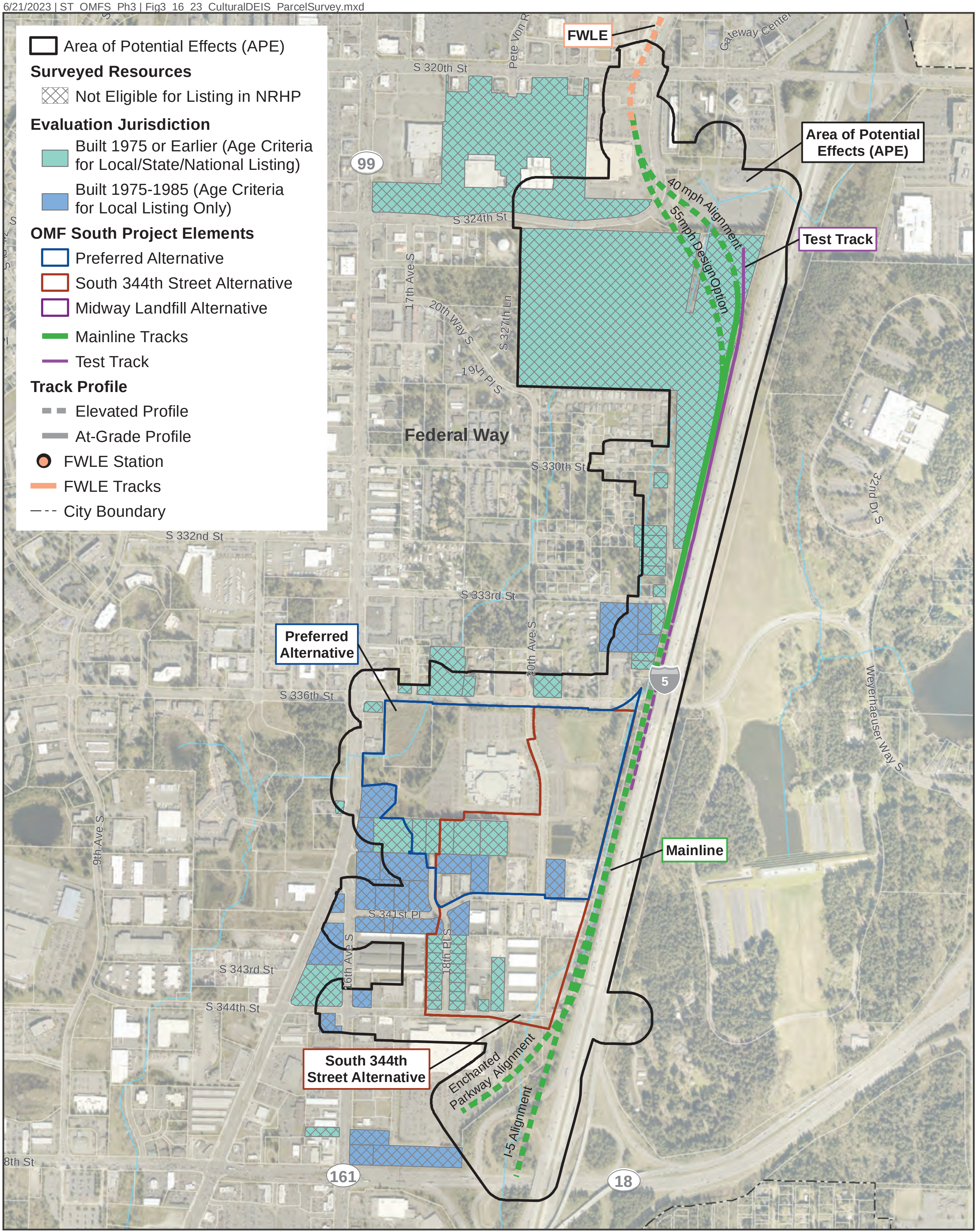
Smithsonian Trinomial	Alternative	Resource Type	Resource Description	Resource Age	NRHP Eligibility and Criteria	Reference
45KI1542	Preferred	Historic period site	Historic period	ca 1930	Not Eligible	Huber 2020a
45KI1543[1]	Preferred, South 344th Street	Historic period site	Debris scatter	historic-period	Not Eligible	Huber 2020b
45KI1583	Preferred	Historic period isolate	Historic period bottle	1966	Not Eligible	Adams 2021
45KI719	South 344th Street	Historic period site	Historic period site	1936	Not Eligible	Lutrell 2005
45KI1476	Midway Landfill	Historic period site	Midway Landfill	1966–1983	Not Eligible	Chidley et al. 2020

Note:

(1) Site overlaps the Preferred and South 344th Street alternatives.

Site 45KI1542 is a concrete slab foundation dated to the 1930s using aerial imagery. The subsurface investigations around the foundation did not identify any additional archaeological deposits. Site 45KI1543 is a historic debris scatter, including brick and glass that appear to be in disturbed context. Isolate 45KI1583 is a historic period glass bottle identified on the surface. Site 45KI719 is a historic period foundation that is no longer present. During development of the 2021 SEPA Draft EIS Sound Transit has recommended, and SHPO has agreed, that none of the archaeological resources identified for this project meet criteria necessary for NRHP, WHR, or KCRHP eligibility (see Appendix G4, Historic and Archaeological Resources Technical Report for the correspondence from SHPO).

For more details on survey results, see Appendix G4, Historic and Archaeological Resources Technical Report.



Area of Potential Effects (APE)
Surveyed Resources
▨ Not Eligible for Listing in NRHP
Evaluation Jurisdiction
Built 1975 or Earlier (Age Criteria for Local/State/National Listing)
Built 1975-1985 (Age Criteria for Local Listing Only)
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Midway Landfill Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
● FWLE Station
FWLE Tracks
City Boundary
FWLE
Gateway Center
Pete Von R
S 320th St
99
Area of Potential Effects (APE)
S 324th St
40 mph Alignment
55mph Design Option
Test Track
17th Ave S
20th Way S
S 327th Ln
19th Pl S
Federal Way
S 330th St
32nd Dr S
S 332nd St
S 333rd St
20th Ave S
Preferred Alternative
5
S 336th St
Weyerhaeuser Way S
Mainline
9th Ave S
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
8th St
161
18

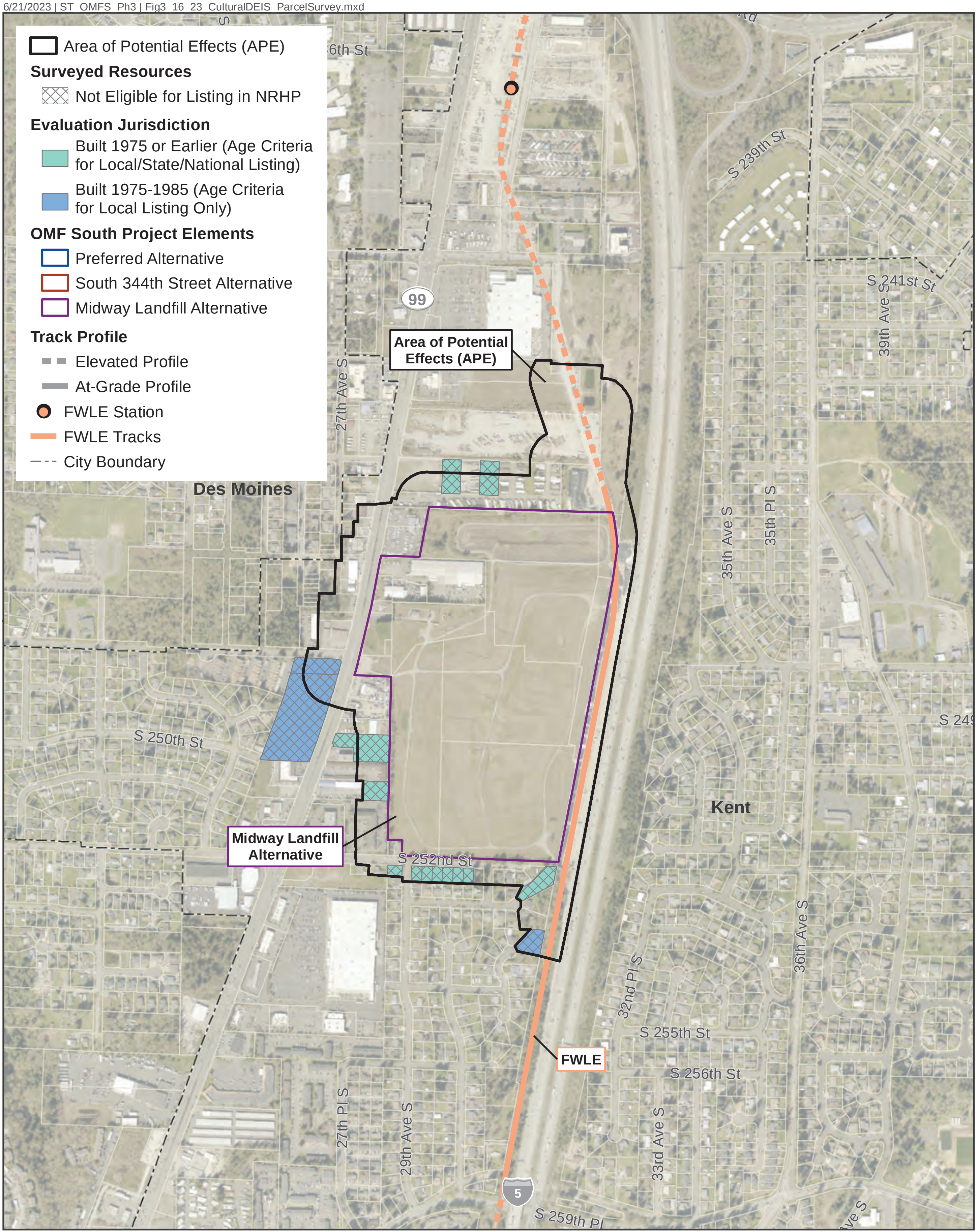
Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

FIGURE 3.16-2
Built Environment Parcel Survey
Preferred and South 344th Street Alternatives

N

0 1,000 2,000 Feet

6/21/2023 | ST_OMFS_Ph3 | Fig3_16_23_CulturalDEIS_ParcelSurvey.mxd


Area of Potential Effects (APE)
Surveyed Resources
▨ Not Eligible for Listing in NRHP
Evaluation Jurisdiction
🟩 Built 1975 or Earlier (Age Criteria for Local/State/National Listing)
🟦 Built 1975-1985 (Age Criteria for Local Listing Only)
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
● FWLE Station
FWLE Tracks
City Boundary
6th St
S 239th St
S 241st St
39th Ave S
99
Area of Potential Effects (APE)
27th Ave S
Des Moines
35th Ave S
35th Pl S
S 249
S 250th St
Kent
Midway Landfill Alternative
S 252nd St
36th Ave S
32nd Pl S
S 255th St
FWLE
S 256th St
27th Pl S
29th Ave S
33rd Ave S
5
S 259th Pl
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

FIGURE 3.16-3
Built Environment Parcel Survey
Midway Landfill Alternative

OMF South

3.16.3 Environmental Impacts

This section discusses long-term operational and short-term construction impacts of the alternatives. These impacts are specifically focused on NRHP-eligible resources.

Section 106 regulations allow three findings for effects on cultural resources:

- No Historic Properties Affected
- No Adverse Effect
- Adverse Effect

As the lead agency, FTA makes the final determination of effect for each NRHP-eligible or listed resource in the APE. FTA also makes an overall finding of effect for the undertaking and requests SHPO's concurrence. The Section 106 process is used to determine a historic site's NRHP eligibility and whether it is a Section 4(f) resource. The Section 4(f) Assessment for OMF South is included in Appendix F of this Final EIS, and summarized in Section 3.18, Section 4(f) and 6(f) Resources.

Impacts or Effects

The terms impact and effect are used purposefully in this Environmental Impact Statement Section 3.16 and Appendix G4, Historic and Archaeological Resources Technical Report. The word "effect" is used when referring to the effects (e.g., adverse effect) the project has on historic properties in a Section 106 framework, following implementing regulations 36 CFR 800.

The word "impact" is used when referring to specific long-term or construction impacts, both direct or indirect, pursuant to NEPA implementing regulations 40 CFR 1502.

3.16.3.1 Impacts Evaluation Methods

After a cultural resource is identified and found NRHP-eligible, the next step is assessing whether the undertaking will adversely affect the resource by applying the Criteria for Adverse Effect (36 CFR § 800.5). An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may include, for instance, the demolition of an NRHP-eligible building or physical encroachment upon an NRHP-eligible archaeological site (36 CFR Part 800).

Of the five archaeological resources within the APE (Table 3.16-1), none were determined eligible for listing in the NRHP. Because these resources have been determined not eligible for listing in the NRHP, the project would result in no adverse effects to archaeological historic properties.

Of the 86 built-environment resources surveyed and inventoried within the APE, none were determined eligible for listing in the NRHP or recommended eligible for the WHR or KCRHP. Therefore, the only NRHP-eligible resources within the APE are the Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. In separate consultations, both BPA and FTA determined that proposed tower relocation and reconstruction for the Preferred and South 344th Street alternatives would not constitute an adverse effect under Section 106. In letters dated August 19, 2021, and October 31, 2023, SHPO concurred with this finding (See Appendix G4, Historic and Archaeological Resources, for copies of this correspondence). Therefore, the project would result in no adverse effect to historic built-environmental properties.

3.16.3.2 Long-Term Impacts

Potential impacts to archaeological resources include, but are not limited to:

- Demolition or alteration of the resource
- Physical encroachment upon a site

Direct long-term impacts can happen during operation or as a result of a construction activity that causes a permanent change. For archaeological resources, long-term impacts are generally initiated when ground-disturbing activities occur; they are characterized as long-term impacts because they permanently affect the archaeological record.

Ground-disturbing activities, specifically those involving excavation or ground clearance, could encounter an unanticipated archaeological site. If the site is determined to be eligible for listing in the NRHP, an adverse effect could occur.

Through the NEPA and the Section 106 process, FTA and Sound Transit will continue to consult with Tribes, SHPO, and other interested parties (as appropriate) to avoid, minimize, or mitigate impacts to archaeological sites, if found.

Potential impacts to historic built-environment resources include, but are not limited to:

- Demolition or alteration of the resource or altering major sections of its historically platted and current tax lot
- Physical changes to the character of the resource’s setting that contribute to its historic significance
- Introduction of visual or noise impacts that diminish the integrity of the property’s significant historic features

The only historic built-environment resources within the APE are BPA's Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, which have been determined eligible for listing in the NRHP. In consultation with SHPO, BPA, and FTA determined that OMF South would have no adverse effect on the NRHP-eligible resources.

No-Build Alternative

Under the No Build Alternative, impacts to historic built-environment and archaeological resources from construction or operation of OMF South would not occur. However, other planned projects in the area could have impacts to historic and archaeological resources, depending on their location. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

Preferred Alternative

Construction of the mainline tracks would require the relocation of BPA powerlines at the north end of the APE. BPA's Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines have been determined eligible for listing in the NRHP. In consultation with SHPO, FTA determined that the Preferred Alternative would have no adverse effects on the NRHP-eligible resources under Section 106. There are no other archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or KCRHP within the Preferred Alternative portion of the APE. As such, this alternative would have no adverse effects to historic or archaeological resources.

South 344th Street Alternative

Similar to the Preferred Alternative, construction of the mainline tracks would require relocation of BPA powerlines at the north end of the site. In consultation with SHPO, FTA determined that the 344th Street Alternative would have no adverse effects on the NRHP-eligible resources under Section 106. There are no other archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or KCRHP within the South 344th Street Alternative portion of the APE. As such, this alternative would have no adverse effects to historic or archaeological resources.

Midway Landfill Alternative

There are no archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or KCRHP within the Midway Landfill Alternative portion of the APE. As such, this alternative would have no effect to historic or archaeological resources.

3.16.3.3 Construction Impacts

Construction impacts are those that occur only during the construction period and are relatively short in duration. These may include effects such as noise, vibration, ground disturbance, and dust. It is unlikely that these kinds of effects will adversely affect archaeological resources. However, through the NEPA review and the Section 106 process, FTA and Sound Transit will continue to consult with Tribes, SHPO, and other interested parties (as appropriate) to minimize effects to archaeological sites, if found.

Construction-related impacts to built-environment resources can be caused by several factors, including, but not limited to, restricted access, increased truck traffic along haul routes, glare, noise, vibration, and temporary changes to setting. These factors can lead to reduced commercial activity and reduced investment in historic resources. Typically, these impacts would not be considered adverse effects under Section 106 of the National Historic Preservation Act unless they diminish the characteristics that contribute to a historic property’s National Register eligibility.

The only historic built-environment resources within the APE are BPA's Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, which have been determined eligible for listing in the NRHP. In consultation with SHPO, FTA determined that OMF South would have no adverse effect on the eligible resources.

Preferred Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within the APE and because it is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources.

The only historic built-environment resources within the APE are BPA's Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, which have been determined eligible for listing in the NRHP. In consultation with SHPO, FTA determined that the Preferred Alternative would have no adverse effects on the eligible resources.

South 344th Street Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within the APE and because it is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources.

The only historic built-environment resources within the APE are BPA's Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, which have been determined eligible for listing in the NRHP. In consultation with SHPO, FTA determined the South 344th Street Alternative would have no adverse effects on the eligible resources.

Midway Landfill Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within the APE and because it is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources. No historic built-environment resources are within the Midway Landfill Alternative portion of the APE.

3.16.3.4 Avoidance and Minimization of Impacts

An Inadvertent Discovery Plan has been developed for the project and would be implemented during construction. The purpose of the Inadvertent Discovery Plan is to minimize the risk of damage to currently unknown archaeological resources by providing appropriate procedures for addressing any inadvertent discoveries of human remains or archaeological resources during ground-disturbing work. Sound Transit would coordinate with SHPO and Tribes to review the plan prior to implementation. A contractor orientation would also be prepared to familiarize construction crews with Inadvertent Discovery Plan procedures and the kinds of resources that may be encountered during construction.

3.16.3.5 Indirect Impacts

No indirect impacts related to historic and archaeological resources would result from construction and operation of the proposed project.

3.16.4 Mitigation Measures

As the project would not result in adverse effects to historic built-environment properties, no mitigation is anticipated. No eligible archaeological sites have been identified. No mitigation measures are anticipated beyond the Inadvertent Discovery Plan to address potential discoveries during construction.

3.17 Parks and Recreational Resources

This section evaluates impacts to parks and recreational resources associated with the OMF South build alternatives, including impacts to the use or enjoyment of existing and planned recreational resources, including potential impacts to resource access, facilities, functions, or character. Parks and recreational resources include the following facilities and land uses:

- Federal, state, and local parks, playgrounds, recreation centers, and other public recreation facilities, such as golf courses and pools
- Designated public open spaces, greenbelts, and open space corridors
- Recreational trails
- Potential recreational properties funded by state and/or federal grants with special provisions

The study area for parks and recreational resources includes facilities and land within 0.25 mile of the potential construction limits for each of the OMF sites. The study areas for the Preferred and South 344th Street alternatives include the mainline tracks and are combined for the purposes of this analysis because of their geographic overlap.

3.17.1 Affected Environment

3.17.1.1 Preferred and South 344th Street Alternatives

Table 3.17-1 describes parks in the combined study area for the Preferred and South 344th Street alternatives, which are shown in Figure 3.17-1.

Table 3.17-1 Parks and Recreational Resources: Preferred and South 344th Street Alternatives

Park Name	Jurisdiction	Description
Cedar Grove Park	Federal Way	Park (2.6 acres) with open lawn picnic areas, a play area, and walking trails bordered by natural areas. Also known on King County maps as Thompson Park.
Town Square Park	Federal Way	Urban community park (3.9 acres) with amenities, including zip lines, a children's play area, a basketball court, parking, a picnic area, restrooms, and a seasonal splash park.
Pacific Rim Bonsai Museum and Rhododendron Botanical Gardens	Federal Way	Both of these visitor attractions are nonprofit membership organizations on the grounds of the Woodbridge Corporate Park (former Weyerhaeuser corporate headquarters site). Both facilities feature public plant collection garden displays with walking tours and events. The Bonsai garden offers free admission, and the Rhododendron Garden charges entry fees or is free with membership.

Sources: King County; City of Federal Way.

Although outside the study area, the 3.8-mile BPA Trail connects many key parts of Federal Way. There is potential for future expansion of the trail into the combined study area of these alternatives.

Belmor includes a private, par-3, nine-hole golf course for residents only.

6/22/2023 | ST_OMFS_Ph3 | OMFS_Parks_Recreation_final.mxd

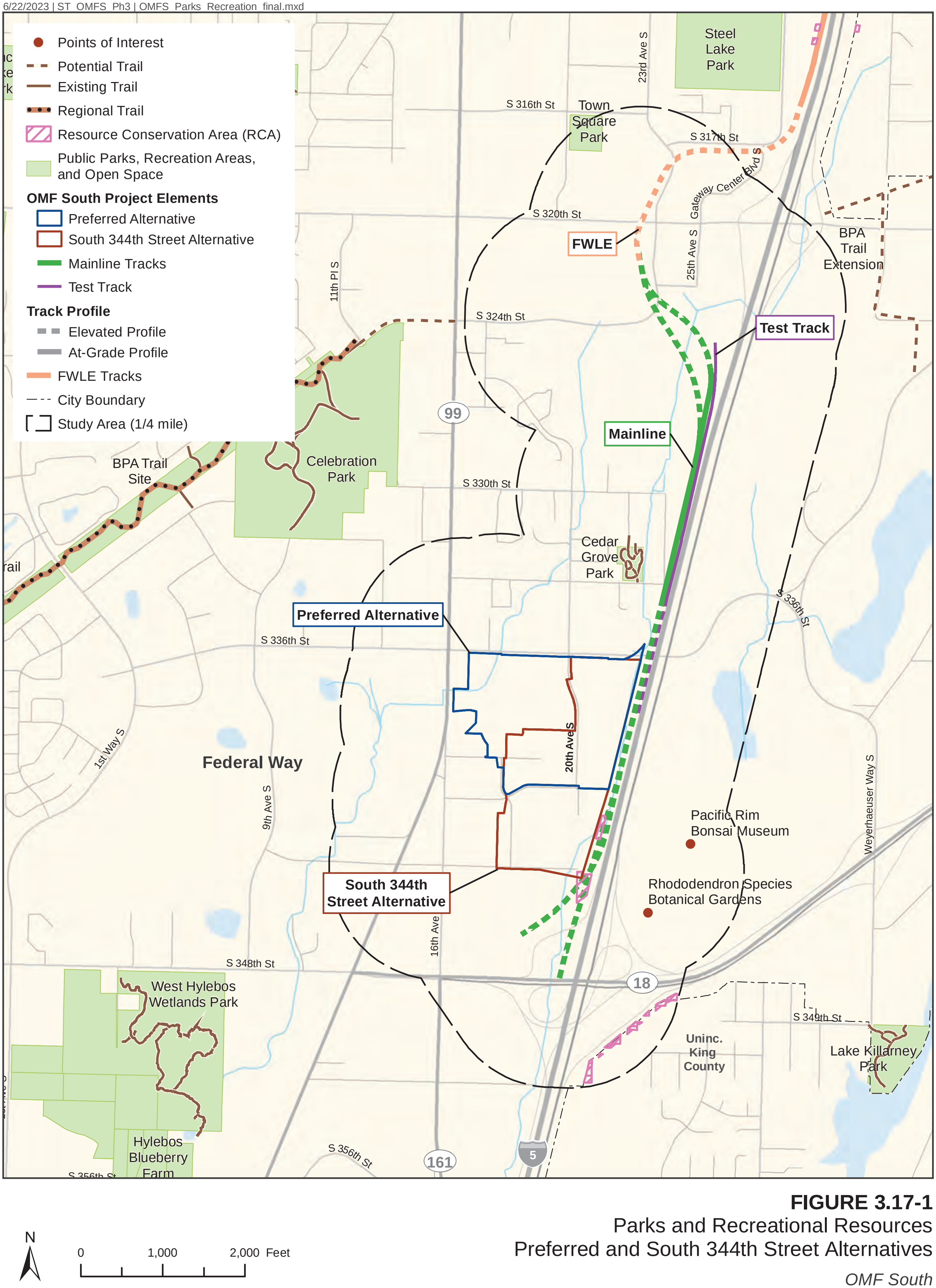

● Points of Interest
Potential Trail
Existing Trail
Regional Trail
▨ Resource Conservation Area (RCA)
🟩 Public Parks, Recreation Areas, and Open Space
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Study Area (1/4 mile)
Steel Lake Park
Town Square Park
23rd Ave S
S 316th St
S 317th St
Gateway Center Blvd S
S 320th St
FWLE
25th Ave S
BPA Trail Extension
11th Pl S
S 324th St
Test Track
99
Mainline
Celebration Park
BPA Trail Site
S 330th St
Cedar Grove Park
S 336th St
Preferred Alternative
S 336th St
1st Way S
Federal Way
9th Ave S
20th Ave S
Pacific Rim Bonsai Museum
Rhododendron Species Botanical Gardens
South 344th Street Alternative
16th Ave
Weyerhaeuser Way S
S 348th St
18
West Hylebos Wetlands Park
S 349th St
Uninc. King County
Lake Killarney Park
Hylebos Blueberry Farm
S 356th St
S 356th St
161
5
N
0
1,000
2,000 Feet

FIGURE 3.17-1

Parks and Recreational Resources
Preferred and South 344th Street Alternatives

OMF South

3.17.1.2 Midway Landfill Alternative

Table 3.17-2 describes parks within the Midway Landfill Alternative study area, which are shown in Figure 3.17-2.

Table 3.17-2 Parks and Recreational Resources: Midway Landfill Alternative

Park Name	Jurisdiction	Description
Parkside Park	Des Moines	Neighborhood park (4.4 acres) with an ADA-accessible paved trail system to all portions of the park, a multiuse paved sport court, fitness equipment, picnic tables, and benches. Mature trees frame the central open lawn and active recreation areas.
Parkside Wetlands	Des Moines	Park (14 acres) with natural areas and trails that are covered with a dense mix of deciduous and coniferous forest and wetlands.
Salt Air Vista Park	Kent	Neighborhood park (2 acres) bordered by the Parkside wetlands on the west. It features play equipment, picnic area, open space, and trails.
Linda Heights Park	Kent	Park (4.2 acres) with half-court basketball, picnic table, play equipment, and public art. The park is adjacent and east of I-5 and is buffered from the freeway by a wide stand of mature mixed forest.
West Hills Park	Kent	Undeveloped park (13 acres) with no facilities. It is adjacent to the Kent Armory and is composed of a grassy field and dense vegetation near the headwaters of Midway Creek.

Sources: King County; Cities of Des Moines and Kent.

3.17.2 Environmental Impacts

3.17.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to parks and recreational resources from construction or operation of OMF South would not occur. However, other planned projects could have impacts in the OMF South study areas, depending on their location. This includes TDLE, which overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Effects Analysis.

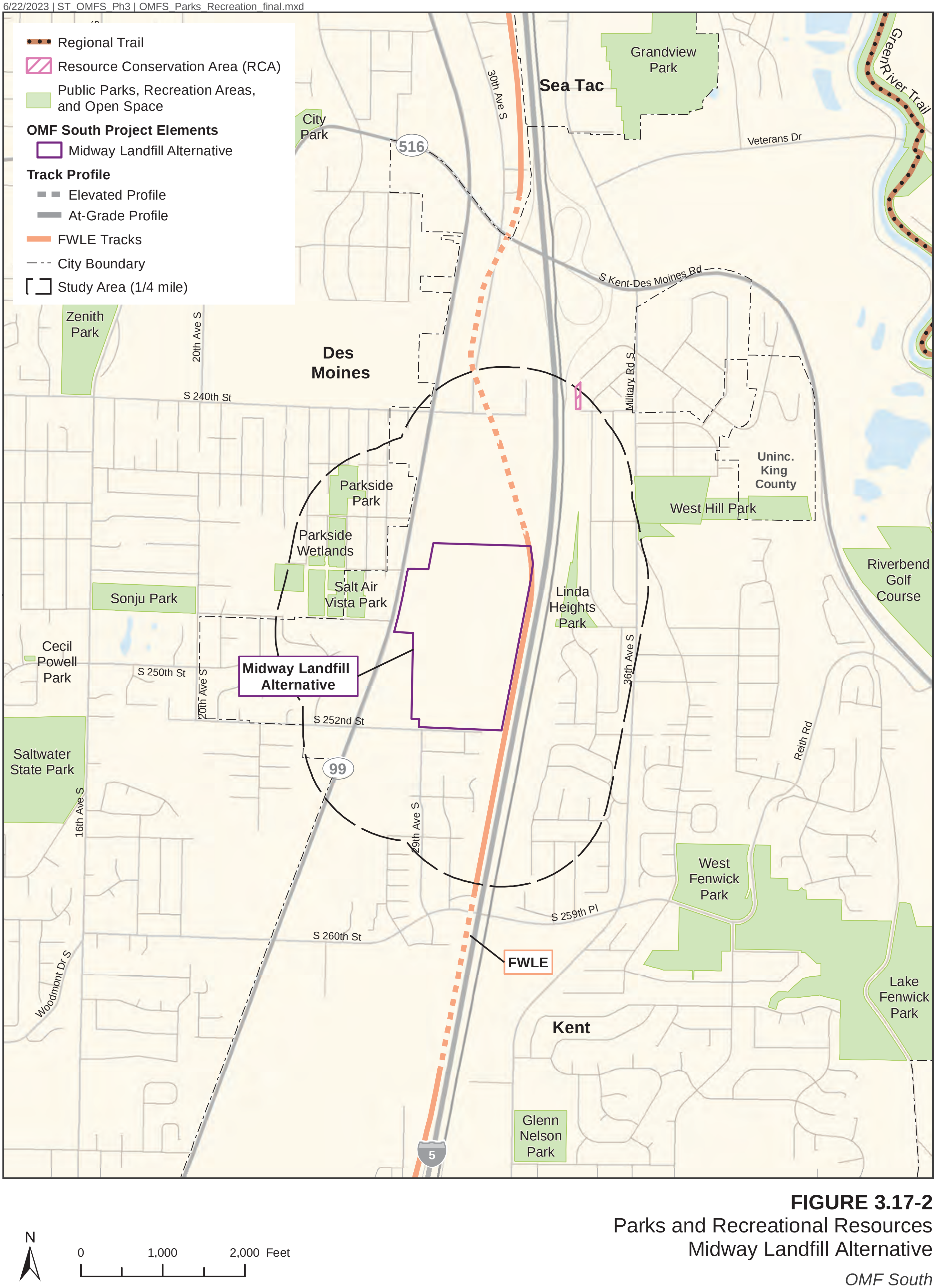

Regional Trail
Resource Conservation Area (RCA)
Public Parks, Recreation Areas, and Open Space
OMF South Project Elements
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Study Area (1/4 mile)
Grandview Park
Sea Tac
30th Ave S
City Park
516
Veterans Dr
Green River Trail
S Kent-Des Moines Rd
Zenith Park
20th Ave S
Des Moines
S 240th St
Military Rd S
Uninc. King County
West Hill Park
Parkside Park
Parkside Wetlands
Riverbend Golf Course
Salt Air Vista Park
Sonju Park
Linda Heights Park
Cecil Powell Park
S 250th St
20th Ave S
Midway Landfill Alternative
36th Ave S
S 252nd St
Saltwater State Park
99
Reith Rd
16th Ave S
29th Ave S
West Fenwick Park
S 259th Pl
S 260th St
FWLE
Woodmont Dr S
Lake Fenwick Park
Kent
Glenn Nelson Park
5
N
0
1,000
2,000 Feet

FIGURE 3.17-2
Parks and Recreational Resources
Midway Landfill Alternative

OMF South

3.17.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Long-term impacts include permanent changes to a resource, such as when a project converts land from a park or recreational resource to another use. While long-term impacts generally refer to permanent changes, some construction impacts can be considered long term if they would have a major effect on the resource and extend for many years. Long-term impacts also potentially include noise, visual, or other impacts from project operations.

None of the build alternatives would cause long-term impacts to parks or recreation facilities within the study area, either by altering those properties or through noise or visual impacts to those facilities.

3.17.2.3 Construction Impacts

Impacts Common to All Build Alternatives

The project alternatives are not expected to have direct construction impacts on any park or other recreational resources. For parks and trails near construction activities, access could be affected by detours and street or lane closures and by increased congestion caused by construction traffic. Visual impacts, light, glare, dust, and noise could also affect users in some of the parks and trails, although most of these impacts would affect only small portions of the parks closest to the OMF site or mainline tracks being constructed. Visual and noise impacts during construction from on-site construction or from construction traffic along haul routes would be temporary and would not inhibit park use. It is possible some parks in the study area would experience emissions and airborne dust during construction; however, with implementation of controls required for construction activities and consistent use of BMPs to minimize on-site emissions, construction activities would not be expected to substantially affect air quality.

Preferred Alternative

Construction of the mainline tracks would require some utility relocations on S 333rd Street in Federal Way, which is the street used to access Cedar Grove Park. During that work, access to Cedar Grove Park from the east may be affected by a detour or lane closure, but access from the west on S 333rd Street and north from 22nd Place S would be maintained.

South 344th Street Alternative

Impacts for the South 344th Street Alternative would be the same as those described above for the Preferred Alternative.

Midway Landfill Alternative

Parks near the Midway Landfill Alternative are separated from the site either by SR 99 on the west or I-5 on the east. Park users are accustomed to noise, vibration, and visual effects from normal operation of these major roadways, which would likely lead to a reduced level of awareness of potential construction impacts at the parks.

3.17.2.4 Avoidance and Minimization of Impacts

Measures to minimize construction impacts would include public outreach to provide information on temporary closures or detours, on-site signage describing the duration and type of temporary impacts, detour signage, temporary ADA improvements (for example, temporary curb ramps for detour routes that do not currently include curb ramps for existing sidewalks), and similar strategies to ensure the continued use and enjoyment of affected park facilities.

BMPs, avoidance and minimization of impacts measures, or mitigation measures identified in this Final EIS for other resources (visual and aesthetics, air quality, water quality, neighborhoods, noise and vibration, and transportation) would also reduce the potential effects on affected parks and recreational resources and their users.

3.17.2.5 Indirect Impacts

No indirect impacts related to parks and recreational resources would result from construction and operation of the proposed project.

3.17.3 Mitigation Measures

No adverse impacts to parks or recreation facilities would occur; therefore, no mitigation is anticipated.

3.18 Section 4(f) and 6(f) Resources

This section summarizes the Section 4(f) analysis completed in compliance with Section 4(f) of the United States Department of Transportation Act of 1966 (49 U.S.C. § 303(c)). The full Section 4(f) analysis can be found in Appendix F, Section 4(f) and Section 6(f) Assessment.

The regulations at 23 CFR § 774 implement 23 U.S.C. § 138 and 49 U.S.C. § 303, which were originally enacted as Section 4(f) of the Department of Transportation Act of 1966 and are still commonly referred to as Section 4(f). Under these laws, FTA and FHWA are generally prohibited from approving projects that would result in a *use* of publicly-owned parks and recreation areas that are open to the public; publicly-owned wildlife and waterfowl refuges; and historic sites of national, state, or local significance.

In addition, Section 6(f) of the 1965 Land and Water Conservation Fund Act of 1965 (54 U.S.C. § 2003), prohibits the conversion of properties developed with funding from the Land and Water Conservation Fund to a nonrecreational purpose without approval of the U.S. Department of the Interior's National Park Service. Washington State law similarly requires documentation and consultation to approve any changes to or conversion of properties directly funded by the Washington State Recreation and Conservation Office (RCO; Title 79A RCW).

The study area for this analysis is the same used for Section 3.17, Parks and Recreational Resources, and includes the APE used in Section 3.16, Historic and Archaeological Resources. The Parks and Recreational Resources study area includes existing parks, trails, recreation sites, dedicated open space areas, and adjacent public rights-of-way used for access to these facilities within 0.25 mile of each OMF South site. The APE extends from the project elements to the nearest tax parcel, or a maximum of 200 feet where large tax parcels are adjacent to project elements.

Under Section 4(f), a use can be permanent, temporary, or constructive. **Permanent use** would acquire or incorporate all or part of a Section 4(f) property as part of the transportation facility. **Temporary use** occurs when the project temporarily occupies and substantially impairs the resource (typically during construction). **Constructive use** can occur when the project is near a Section 4(f) resource and has effects that substantially impair the protected activities, features, or attributes of the property.

Although the use of Section 4(f) property is generally prohibited, a transportation use of a Section 4(f) property can be approved if the use of the property meets the requirements for a regulatory exemption, the use will have a *de minimis* impact on the property (meaning that it does not adversely affect the activities, features, and attributes of a resource), or there is no feasible and prudent avoidance alternative to using the property.

3.18.1 Affected Environment

3.18.1.1 Public Parks and Recreation Areas

Sound Transit identified two parks within the study area for the Preferred and the South 344th Street alternatives that qualify as Section 4(f) properties: Cedar Grove Park and Town Square Park. Sound Transit identified four developed parks and one open space that qualify as Section 4(f) properties in the study area for the Midway Landfill Alternative: Parkside Park and Parkside Wetlands in Des Moines and Salt Air Vista Park, Linda Heights Park, and West Hill Park in Kent. These resources are described in detail in both Section 3.17, Parks and Recreational Resources and Appendix F, Section 4(f) and Section 6(f) Evaluation.

There are no designated 6(f) resources within the study area for any of the alternatives. However, Linda Heights Park in Kent is an RCO-funded park.

3.18.1.2 Wildlife and Waterfowl Refuges

No designated wildlife and waterfowl refuges of national, state, or local significance exist in the Parks and Recreation study areas for any of the alternatives.

3.18.1.3 Historic Sites

Section 3.16, Historic and Archaeological Resources and Appendix G4, Historic and Archaeological Resources Report provide information on historic properties in the OMF South build alternatives APE. The Tacoma-Covington Nos. 2,3,4 and Tacoma-Raver No. 1 electrical transmission lines were determined eligible for listing in the NRHP by both FTA and BPA, a finding with which SHPO has concurred. No other historic-period, built-environment resources were determined to be present within the APE.

3.18.2 Environmental Impacts

The Transportation; Acquisitions, Displacements and Relocations; Visual and Aesthetic Resources; Noise and Vibration; Historic and Archaeological Resources; and Parks and Recreational Resources sections of the Final EIS were considered to determine whether project alternatives would result in a Section 4(f) use. None of the alternatives would require any land from any of the park properties for either construction or operation of OMF South, and no construction activities or operational activities of the project would rise to the level of a permanent, temporary, or constructive use under Section 4(f).

Cedar Grove Park within the Preferred and South 344th Street alternative study area would be within the closest proximity to construction activities, at approximately 300 feet from mainline construction, just beyond the range of noise impacts from pile driving activities, which may be necessary for construction of the elevated mainline. While construction noise and activities would be perceptible from the park, the impacts would be temporary and transitory in nature, and would not prevent use of the amenities that make the park an eligible 4(f) resource. The other parks listed above would be outside the range of impacts or separated from the OMF sites by SR-99 and I-5, which would provide effective buffers from construction activities.

Construction of the mainline for the Preferred and South 344th Street alternatives would require the relocation of BPA powerlines. In separate consultations, BPA and FTA determined, and SHPO concurred, that raising the transmission lines to accommodate the OMF South project would have no adverse effect on historic properties under Section 106. Due to this, FTA has determined that the project would have a *de minimis* impact under Section 4(f).

Please see Appendix F, Section 4(f) and Section 6(f) Evaluation for more detail.

3.18.3 Mitigation Measures

As the Preferred and South 344th Street alternatives would have *de minimis* impacts to Section 4(f) properties and the Midway Landfill Alternative would have no impacts, no mitigation measures are anticipated.

4 CUMULATIVE EFFECTS ANALYSIS

This chapter considers the cumulative effects of OMF South and other past, present, and reasonably foreseeable future actions, regardless of what agency or party undertakes such other actions. A cumulative effects assessment can reveal unintended consequences that might not be apparent when a proposed action is evaluated in isolation. (Note: while NEPA uses the term “effects,” SEPA uses “impacts.” For the purposes of this discussion, the words have the same meaning.)

Cumulative effects are defined as “the effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (40 Code of Federal Regulations 1508.1(g)(3)). Public agencies must analyze cumulative impacts to fully understand how a proposed action and its alternatives interact with past actions, present-day activities, and actions that are planned and reasonably certain to occur in the future. Studying the proposed project in conjunction with other actions can reveal unintended impacts that may not be clear when the proposed project is analyzed by itself.

Sound Transit has considered its planned projects and gathered information from agencies and the public to identify impacts of past and present developments and reasonably foreseeable future actions that could interact with the impacts of OMF South alternatives, including:

- Adopted transportation plans, land use plans, and neighborhood plans from King County, Federal Way, and Kent.
- Lists of known major public and private land use proposals in King County, Federal Way, and Kent.
- Information provided by WSDOT and King County Metro on planned transportation projects and developments.
- PSRC data on population and employment growth projections, travel forecasts, and land use projections.
- Information provided by other organizations and the public on planned private projects, community values, and concerns.

This information was used to identify past and ongoing development trends, characterize reasonably foreseeable future actions, and identify and evaluate expected cumulative impacts to which OMF South could contribute.

4.1 Temporal and Geographic Boundaries of the Cumulative Effects Analysis

Consistent with regulatory guidance for cumulative impact analyses, the development actions that were considered included those that are past, present, and reasonably foreseeable.

- Past actions include non-native settlements dating back to the 1800s through developments up to the present.
- Present actions are those projects just completed or under construction by local, state, or federal agencies.

- Reasonably foreseeable future actions are those that have obtained some local, state, or federal government approval and thus could be under construction at any time between the present and 2042 (OMF South's design year).

The study area for this cumulative impact analysis is generally a combination of the study areas defined in Chapter 3 for the various environmental resources and construction impacts or a broader area for certain elements of the environment, as described below:

- Avian species and other migratory animals or animals with large foraging areas are studied at the wildlife corridor level.
- Fish habitats are considered at the watershed level for impacts on stream quality.
- Transportation, air quality, energy, and, to some degree, economics are studied at the Puget Sound regional level, including Pierce, King, Snohomish, and Kitsap counties.
- GHGs are studied at the Puget Sound regional level, while it is acknowledged that the effects are felt globally.
- Socioeconomic resources that may experience a range of cumulative impacts from new infrastructure projects, such as land use, economics, neighborhoods, public services, visual resources, and parks, were generally analyzed within 0.25 to 1 mile of the project alternatives.

4.2 Past and Present Actions

Ongoing impacts from past actions have shaped the project vicinity since the mid-19th century. The area between Seattle and Tacoma has become increasingly urban, with suburban population growth spreading to surrounding areas, including Federal Way and Kent in the OMF South study areas. Development that has occurred next to I-5 and SR 99 has been predominantly commercial and residential, with some industrial, office, mixed-use, and agricultural uses as well.

Past and present regional and local planning efforts have emphasized an integrated, long-range growth-management, economic, and transportation strategy based on a vision of high-density, urbanized centers linked by a high-quality, multimodal transportation system that includes light rail. The environmental effects of past and ongoing actions are considered in relation to the natural and built environments.

4.2.1 Natural Environment

Much of the OMF South study area is now urbanized but originally contained forest land, wetland, streams, and riparian environments. The topography was substantially modified through urban development as well as through the construction of I-5 and SR 99, where hills were cut or regraded and valleys and lowlands filled to create the highways.

Urbanization has resulted in hydrologic changes, such as decreased baseflow and aquifer recharge during summer months and increased seasonal flow fluctuations and flooding during periods of heavy rain, as compared with predevelopment conditions. The development has also affected water quality by introducing runoff contamination from pollution-generating surfaces and by increasing water temperatures due to the removal of vegetation that previously provided shade along stream banks.

Past actions affecting the natural environment included timber harvesting, natural resource extraction, farming, ranching, and residential development. The wetlands present in the OMF South study area represent fragments of larger historical wetland systems, and some are more recently formed wetlands that have developed because of transportation, land use, and surface water drainage improvements that have altered the landscape. The Hylebos Creek basin contains the largest wetlands in the study area.

Due to the heavily developed nature of the OMF South study area, most of the vegetation present reflects landscaping practices for urban and suburban areas, with remnant tree canopy retained for shade or aesthetics. However, mature forest is within the study area along the riparian corridor of the Hylebos Creek tributaries to the west of I-5.

4.2.2 Built Environment

In the six decades since the completion of I-5 in Washington, industrial and commercial development has grown steadily in the study area. Employment encompasses a variety of industries and business sectors, including retail, food service, and light industrial. The land uses adjacent to the SR 99 and I-5 corridors are primarily commercial and residential, with some industrial, office, mixed-use, and limited amounts of open space.

4.3 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions are future projects that would produce environmental impacts that could add to or interact with the impacts associated with OMF South alternatives and other past and present actions. Reasonably foreseeable future actions are not speculative and are considered regardless of the agency, organization, or person serving as their proponent (CEQ 1997). They must be likely to occur in the reasonably foreseeable future by virtue of being funded, approved, or under consideration for regulatory permitting; being the subject of an environmental review process under NEPA or SEPA; or being part of an officially adopted planning document or publicly available development plan.

Changes to transportation infrastructure are one of the biggest influences on transportation conditions and other environmental topics, such as noise and air quality. Past, present, and reasonably foreseeable future actions are listed in Table 4.3-1 and shown on Figures 4.3-1 and 4.3-2.

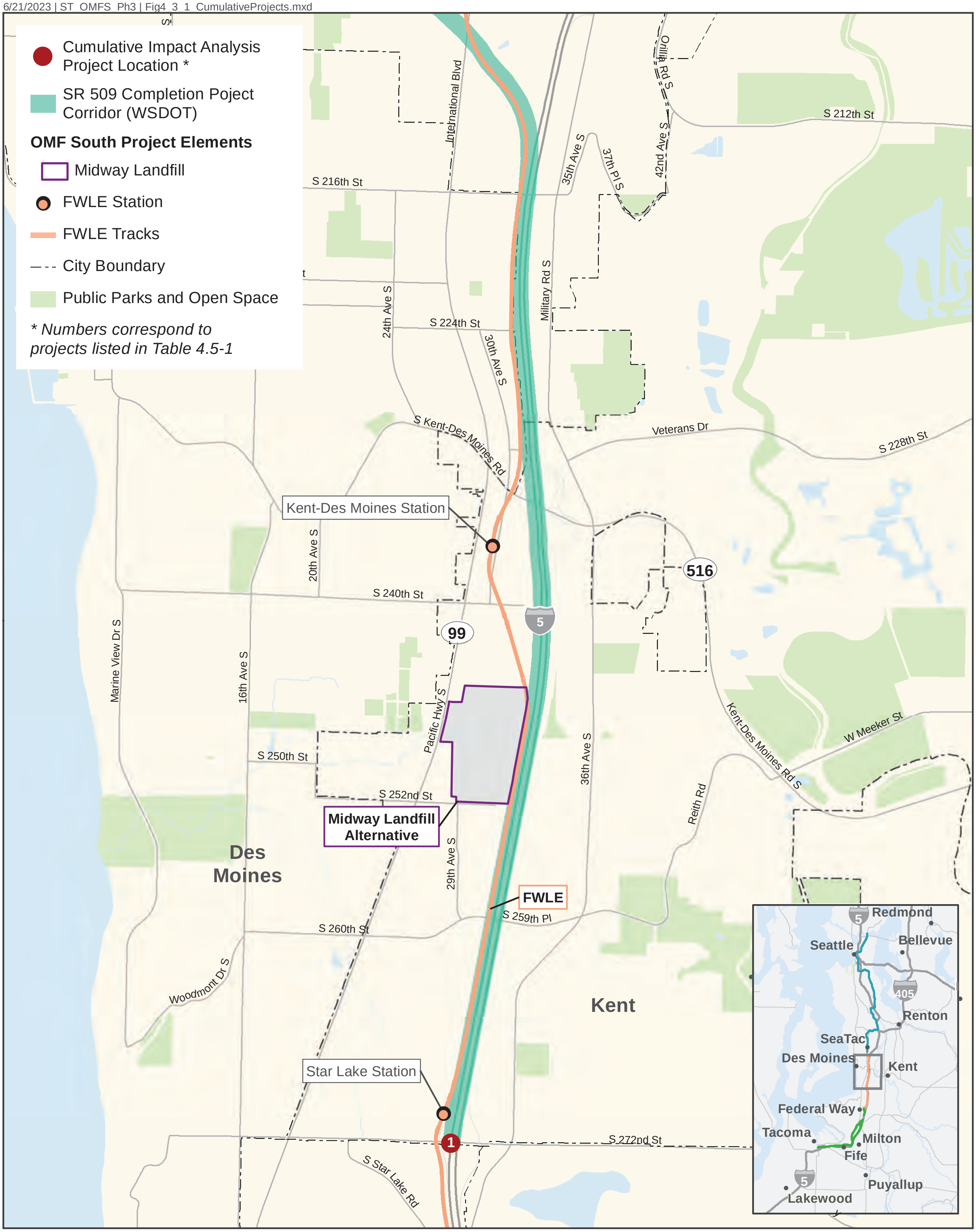
Table 4.3-1 Past, Present, and Reasonably Foreseeable Future Actions

Map ID	Proponent	Actions and Projects in the Vicinity	Project Description	Planned Completion Date
1	WSDOT	SR 509 Completion Project (Part of the Puget Sound Gateway Program)	A new four-lane expressway between S 188th Street and I-5/ S 272nd Street and SR 509, also includes new I-5 ramps, improvements to I-5 interchanges in south King County and constructs new bridges. (WSDOT 2023a). These improvements are part of the Puget Sound Gateway Program, which combines this project with the SR 167 Completion Project in Pierce County to complete critical missing links in the state's highway and freight network.	2029
2	Sound Transit	Federal Way Link Extension (FWLE)	Extends Sound Transit's Link Light Rail from the Angle Lake Station in Sea-Tac south to the Federal Way Downtown Station. This includes three stations in Kent/Des Moines near Highline College, S 272nd Street, and the Federal Way Downtown Station. A total of 3,200 parking spaces will be added along the route. (Sound Transit 2023a)	2026

Table 4.3-1 Past, Present, and Reasonably Foreseeable Future Actions (continued)

Map ID	Proponent	Actions and Projects in the Vicinity	Project Description	Planned Completion Date
3	Private	Pape – Kenworth Development	Two buildings that will include areas for truck maintenance, showroom, office, and warehouse space (City of Federal Way 2020a).	TBD
4	Sound Transit	Tacoma Dome Link Extension (TDLE)	Extends Sound Transit's Link light rail from the Federal Way Downtown Station to the Tacoma Dome Transit Station. Will also include new light rail stations in South Federal Way, Fife, and additional Tacoma locations. (Sound Transit 2023b)	2035
5	Federal Way	Federal Way City Center Access Project	Intended to ease congestion in Federal Way's City Center through a number of projects which will improve access to I-5 and local street projects. This will include but not be limited to road widening and additional roundabouts, HOV lanes, and overcrossings in the City Center area. (City of Federal Way 2022)	Construction currently unfunded.
6	Private	FUSION Family Center Project	An Econo Lodge hotel in the Federal Way area was converted to a 29-room emergency shelter for families experiencing homelessness. (FUSION Federal Way 2023)	Completed December 2020
7	Private	Creekside Commons Townhomes	Approximately 10 acres will be converted to 94 townhome units. (City of Federal Way 2019a)	TBD
8	Private	Woodbridge Corporate Park (Weyerhaeuser Campus) Redevelopment	The former Weyerhaeuser Campus will be restored to a fully operational corporate park, with a focus on learning, workforce training, and economic development. Historic and natural features will be preserved during restoration. Once complete, an estimated 3,100 jobs will be created.(Industrial Realty Group 2022; Nieto 2022)	2025
9	Federal Way	Asphalt Overlay Project – S 336th Street – 10th Place S to 18th Avenue S	Various streets in Federal Way are being repaved within the 2022 Asphalt Overlay Project, including S 336th Street – 10th Place S to 18th Avenue S. Sidewalks will be improved to meet ADA requirements. (City of Federal Way 2021)	2023
10	Federal Way	Widen S 336th Street between SR 99 (Pacific Highway S) and 20th Avenue S	S 336th Street will be widened to five lanes, and second left-turn lanes will be added for eastbound and westbound SR 99. In addition, sidewalks will be added on the north side of S 336th Street. (City of Federal Way 2023)	TBD
11	Federal Way	Asphalt Overlay Project – 16th Avenue S – SR 99 to SR 18	Various streets in Federal Way are being repaved within the 2022 Asphalt Overlay Project, including 16th Avenue S – SR 99 to SR 18. In addition to repaving these streets, sidewalks will be improved in accordance with the ADA, including improvements to wheelchair ramps. (City of Federal Way 2021)	TBD
12	Federal Way	16th Avenue S: S 344th Street – S 348th Street Auxiliary Lane	A third southbound through-lane will be added at the intersection of S 348th Street and 16th Avenue S. (City of Federal Way 2020b)	2026
13	WSDOT	SR 161 – Milton Road S Vicinity to SR 18 – Paving and ADA Compliance	SR 161 was resurfaced in both directions, and ADA ramps were replaced. (WSDOT 2022)	Completed 2022
14	Federal Way	SR 99 HOV Lane Widening, S 340th Street to S 359th Street	SR 99 was widened from a five-lane section to a six-lane section, with two general-purpose lanes, and one HOV lane added in each direction. A landscaped median was added, with left-turn lanes and U-turn accessibility at intersections. (City of Federal Way 2019b)	Completed 2018
15	WSDOT	I-5/SR 16/SR 18 Triangle Interchange Vicinity Improvements	A new southbound exit will be added to S 356th Street, the existing exit for SR 18 will be replaced, and the intersection at SR 161 will be realigned with Milton Road South/20th Avenue South. (WSDOT 2023b)	Project suspended in 2023; no resumption date scheduled.

6/21/2023 | ST OMFS Ph3 | Fig4 3 1 CumulativeProjects.mxd



● Cumulative Impact Analysis Project Location *
🟩 SR 509 Completion Poject Corridor (WSDOT)
OMF South Project Elements
☐ Midway Landfill
● FWLE Station
FWLE Tracks
City Boundary
🟩 Public Parks and Open Space
* Numbers correspond to projects listed in Table 4.5-1
Kent-Des Moines Station
Midway Landfill Alternative
FWLE
Star Lake Station
1
Des Moines
Kent
S 212th St
S 216th St
S 224th St
S 228th St
S 240th St
S 250th St
S 252nd St
S 259th Pl
S 260th St
S 272nd St
International Blvd
35th Ave S
37th Pl S
42nd Ave S
Orillia Rd S
Military Rd S
24th Ave S
30th Ave S
20th Ave S
16th Ave S
29th Ave S
36th Ave S
Marine View Dr S
Woodmont Dr S
Pacific Hwy S
S Kent-Des Moines Rd
Kent-Des Moines Rd S
Veterans Dr
W Meeker St
Reith Rd
S Star Lake Rd
516
5
99
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood
N
0
0.5
1 Miles

FIGURE 4.3-1

Past, Present, and Reasonably Forseeable Future Actions

OMF South

6/21/2023 | ST_OMFS_Ph3 | Fig4_3_1_CumulativeProjects.mxd

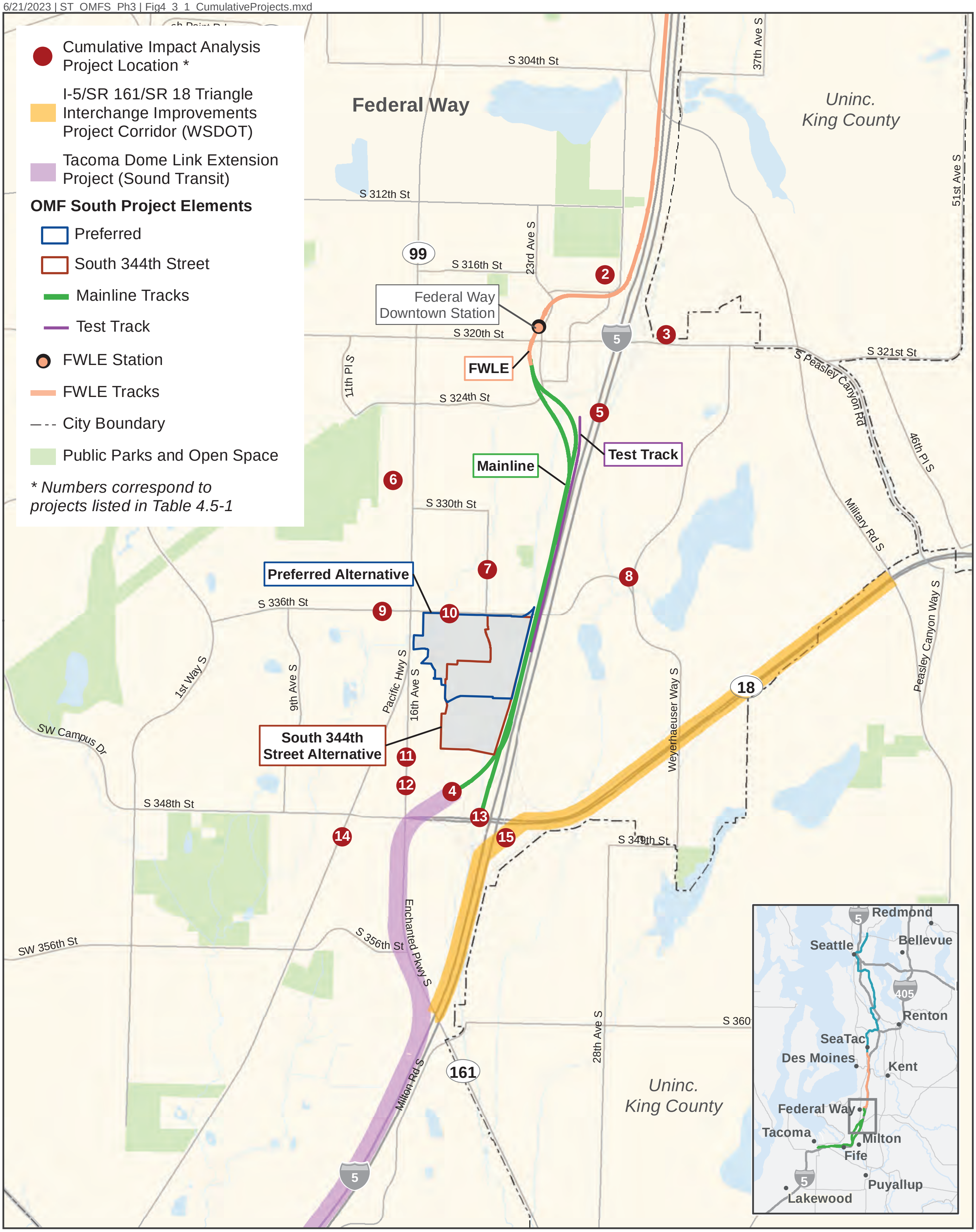

Cumulative Impact Analysis Project Location *
I-5/SR 161/SR 18 Triangle Interchange Improvements Project Corridor (WSDOT)
Tacoma Dome Link Extension Project (Sound Transit)
OMF South Project Elements
Preferred
South 344th Street
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
City Boundary
Public Parks and Open Space
* Numbers correspond to projects listed in Table 4.5-1
Federal Way
Uninc. King County
S 304th St
37th Ave S
51st Ave S
S 312th St
99
S 316th St
23rd Ave S
Federal Way Downtown Station
S 320th St
5
S 321st St
S Peasley Canyon Rd
11th Pl S
FWLE
S 324th St
Test Track
Mainline
46th Pl S
S 330th St
Military Rd S
Preferred Alternative
S 336th St
1st Way S
9th Ave S
Pacific Hwy S
16th Ave S
18
Weyerhaeuser Way S
Peasley Canyon Way S
SW Campus Dr
South 344th Street Alternative
S 348th St
S 349th St
SW 356th St
S 356th St
Enchanted Pkwy S
S 360
28th Ave S
161
Milton Rd S
Uninc. King County
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood
N
0
0.5
1 Miles

FIGURE 4.3-2
Past, Present, and Reasonably Forseeable Future Actions
OMF South

The four reasonably foreseeable future projects that would have the greatest potential for cumulative impacts with OMF South are Sound Transit's TDLE, WSDOT's SR 509 Completion Project and I-5/SR 16/SR 18 Triangle Interchange Vicinity Improvements, and the Federal Way City Center Access Project.

TDLE would extend light rail service nearly 10 miles via mostly elevated tracks between Federal Way and Tacoma. The project includes four new light rail stations in areas near south Federal Way, Fife, Portland Avenue, and the Tacoma Dome. The stations would provide connections to other transit services in the region, such as Sounder, Tacoma Link, Sound Transit Express, King County Metro, Pierce Transit, Intercity Transit, and Amtrak. Additional information is available at Sound Transit's web page focused on system expansion: https://www.soundtransit.org/system-expansion.

As described in Section 2.4, Project Alternatives, TDLE would be constructed and open after OMF South. Impacts associated with constructing the mainline tracks connecting the FWLE terminus to the OMF South for the Preferred or South 344th Street alternatives are addressed in the discussion of the build alternatives in Chapter 3 of this Final EIS. TDLE impacts beyond those associated with the mainline tracks are addressed in this cumulative impacts analysis chapter and will be further detailed in the separate TDLE Draft EIS, expected to be published in mid-2024. If the Midway Landfill Alternative were selected to be built, impacts associated with the mainline tracks of the Preferred and South 344th Street alternative could still occur, but later in time as part of the proposed TDLE construction and operations.

Federal Way's City Center Access Project is intended to ease traffic congestion caused by sustained growth. In November 2019, the Federal Way City Council approved moving forward on designing a modified interchange with an overcrossing at S 324th Street and extended I-5 access ramps serving S 320th Street and S 324th Street. The City Center Access Project overlaps with the northern portion of the mainline for the OMF South Preferred and South 344th Street alternatives near S 324th Street. The project is currently in preliminary design and is undergoing environmental review under NEPA; however, the project is not currently fully funded and construction dates are not known.

WSDOT's SR 509 Completion Project is part of the Puget Sound Gateway Program, which also includes the SR 167 Completion Project in Pierce County. Together, these projects help complete critical freight corridors in the Puget Sound region. The SR 509 Completion Project will build a new four-lane expressway between I-5 and SR 509's current terminus near SeaTac Airport. The project will also build new freeway ramps, improves existing freeway interchanges, and builds new bridges. Construction began in 2020 and is expected to be completed in 2028.

WSDOT's Triangle Interchange Vicinity Improvements would add a new southbound exit to South 356th Street, rebuild the existing exit to SR 18, and realign the SR 161 intersection with Milton Road South/20th Avenue S. The project was suspended in 2023, with no date for resumption scheduled.

4.4 Analysis of Cumulative Effects

Adverse and/or beneficial cumulative impacts could occur over an extended period during project operation, when impacts of OMF South would add to or interact with long-term impacts of other past actions, present actions, and reasonably foreseeable future actions. Adverse cumulative impacts could occur over the short-term during construction when activities necessary to build OMF South would accumulate with impacts from other projects under construction at the same time. The following sections discuss expected cumulative impacts of project construction and operations on elements of the environment. The direct and indirect long-term and construction impacts of the project that could contribute to future cumulative impacts are discussed in Chapter 3.

Operation of OMF South would facilitate operation of regional light rail and contribute to a shift of some vehicle trips to light rail transit, thereby reducing demand on traffic and bus transit movement (Sound Transit 2016a). This in turn would contribute to a reduction in impacts on air quality, noise levels, water quality, and energy consumption compared with future conditions projected under the No-Build Alternative, as described in the corresponding sections below. Therefore, a contribution of OMF South would be to reduce the adverse cumulative impacts on these resources to levels below what they would be without the project.

4.4.1 Transportation

The transportation access analysis presented in Section 3.2 reflects conditions with assumed growth between existing conditions and the design year (2042). The traffic growth assumptions also reflect changes in traffic volumes that are projected in the traffic forecasts prepared for FWLE and TDLE. As a result, the traffic analyses reflect the cumulative impacts of these Link light rail extensions as well as other planned and foreseen developments and associated increases in traffic within the study areas.

FWLE is under construction and is forecasted to begin service in 2026. Design and construction for OMF South is planned from 2024 to 2037, depending on the alternative. Should OMF South be located at the Midway Landfill Alternative, the FWLE construction period may overlap the planned construction period for OMF South; however, this is unlikely as the section of FWLE adjacent to the landfill should be completed before OMF South construction is scheduled to begin. There is also the potential that the construction period for OMF South would overlap with TDLE, if the Midway Landfill Alternative is selected to be built.

Federal Way’s City Center Access project would construct a new I-5 interchange at S 324th Street and improvements to the existing I-5/S 320th Street interchange. Project design continues with a planned construction start as soon as 2027. However, construction is currently unfunded. In conjunction with the City Center Access project, WSDOT is proposing to make fish passage improvements that would remove a portion of parking spaces in the Federal Way/S 320th Street Park & Ride. This work could overlap with OMF South construction. This potential impact to parking availability may be in addition to the 50 parking spaces that would be removed as part of the OMF South Preferred and South 344th Street alternatives. Because the project does not have construction funding and has not yet completed environmental review, the change in traffic patterns due to the City Center Access project were not reflected in the 2042 traffic analyses for OMF South.

In addition to the parking spaces removed by OMF South, further loss of parking spaces at The Commons at Federal Way shopping mall (from FWLE) and Walmart (from TDLE) are not expected to affect access to those properties due to the amount of remaining parking within and adjacent to those properties. Any future development in those areas would need to comply with Federal Way parking requirements.

4.4.2 Acquisitions, Displacements, and Relocations

Several other public projects planned in the vicinity of the OMF South alternatives could acquire property, most notably TDLE would acquire properties to the south of the Preferred or South 344th Street alternatives. In addition, there could also be other smaller public or private projects in the project vicinity that would acquire new properties and displace existing uses.

As part of the City Center Access project in Federal Way, transportation improvements and stream culvert work would displace Belmor residents in the vicinity of the OMF South mainline tracks for the Preferred and South 344th Street alternatives. Some of these mobile home displacements may overlap with OMF South displacements, or there may be additional displacements. Because the City Center Access project does not currently have construction funding, it is likely that OMF South would begin the acquisition and relocation process before Federal Way begins project construction. Therefore, the two projects would not have overlapping construction impacts, but may have adverse long-term cumulative impacts within Belmor, depending on the OMF South mainline track option and the final design for the City Center Access project.

There are no anticipated projects from other public agencies or private development that are anticipated to contribute to adverse impacts within the Midway Landfill Alternative study area.

4.4.3 Land Use

OMF South, in conjunction with other land use actions by local governments and other property owners, could result in cumulative impacts to land uses in the vicinity of the project alternatives. The cumulative impacts of these land use actions are contemplated in the analysis in Section 3.4, Land Use, as it includes a review of anticipated changes based on local and regional plans to accommodate future population and employment growth forecasts.

The purpose of OMF South is to support the expansion of the Link light rail system under Sound Transit 3. Cumulatively, the Sound Transit light rail projects and planned development projects could help achieve goals that encourage and support high-density, mixed-use, transit-oriented development. Although there are reasonably foreseeable future land developments in the study area that would increase density without light rail, the Sound Transit 3 projects supported by OMF South, such as TDLE, would support a greater density of development than would likely occur without light rail, particularly near planned light rail stations in Federal Way. Land use changes are expected to be greatest near stations due to increased transit accessibility and pedestrian activities, which are generally attractive to businesses and residents. Any necessary changes to development regulations to allow higher density and more intense land use would be within the discretion of local governments.

All three build alternatives would displace commercial or light industrial uses to different degrees, which could add to the demand for commercial or industrial land in the region as displaced businesses would have to relocate to other areas that could accommodate their use. However, this concern would be addressed through periodic updates to regional and local comprehensive plans, which include regionally coordinated land capacity analyses. Through these updates, cities and counties must adopt future land use maps to ensure they have the land capacity available to accommodate future population and employment growth.

There are several reasonably foreseeable projects occurring within or near the study area of the Preferred and South 344th Street alternatives, including FWLE, TDLE, Federal Way's City Center Access Project, and WSDOT's SR 509 Completion Project, all of which would convert existing land uses to transportation land uses (Sound Transit 2016b; WSDOT 2003; FHWA/WSDOT 2018). The cumulative land use impacts of these projects would be to reduce traffic congestion and support the expansion of the light rail and high-capacity transit system consistent with the Washington State's Growth Management Act, PSRC's Vision 2050, and local comprehensive plans.

There are no current or future development projects within 0.5 mile of the Midway Landfill Alternative that are anticipated to affect adjacent land uses aside from FWLE.

4.4.4 Economics

The analysis in Section 3.5, Economics, used PSRC data to account for future regional and local activity changes in regional population, employment, and housing. County assessor's data and subarea plans were used to examine existing and future land uses in the local area.

When combined with other foreseeable projects, the OMF South project is anticipated to have a small impact on the regional economy. There are potential additional impacts associated with OMF South when considered with FWLE and TDLE. It is possible that multiple construction projects taking place at the same time may exacerbate the economic effects described in Section 3.5 (including changes related to the potential displacement of employees and businesses), which may result in greater impacts. Sound Transit would minimize this through coordination of construction activities to limit potential disruption, such as through the development of transportation management plans. Construction of TDLE and the WSDOT SR 509 Completion Project could potentially occur at the same time as OMF South but are not currently expected to have substantial adverse impacts on the region when considered in the context of OMF South. Additionally, the combined job-creation impacts would be positive.

In Federal Way, the Woodbridge Corporate Park (Weyerhaeuser Campus) Redevelopment project started construction of two industrial buildings in 2022; once redevelopment is completed the campus is estimated to generate 3,100 new jobs (Industrial Realty Group 2022). Table 4.3-1 lists other reasonably foreseeable projects in Federal Way, some of which do not have an established schedule for completion. Without knowledge of when these projects will be completed or what their business impacts will be, this assessment cannot determine the potential cumulative economic impact in the context of the OMF South project.

Some of the potential cumulative effects from multiple projects may be offset by applying the same mitigation measures identified in Section 3.5, Economics, including coordination with businesses and districts during construction, signage to help patrons find businesses, and other measures.

4.4.5 Environmental Justice, Social Resources, Community Facilities, and Neighborhoods

Actions that occurred in the past, such as the development of the roadway and transit network within the study area, as well as implementation of prior land use plans, have resulted in the development patterns that shape the neighborhoods in the study areas. As a result of OMF South and other reasonably foreseeable future transportation projects, commercial and residential development projects, and land use changes, these neighborhoods could experience benefits. For example, the South Federal Way alternatives being evaluated for TDLE include a new light rail station within the study areas for the Preferred and South 344th Street alternatives. The neighborhoods surrounding a new light rail station would likely experience the greatest changes, including added transportation infrastructure and associated development. Additional benefits could include residential infill, growth in employment base, and greater support of local businesses.

Future private development, particularly around station areas, could increase property values and taxes and may affect the availability of affordable housing opportunities or affordable properties for small businesses. Affordable housing goals and policies of local jurisdictions and Sound Transit could encourage affordable housing options.

If OMF South were constructed at similar times as other large infrastructure projects, such as TDLE, residents and businesses could experience increased short-term construction impacts due to cumulative increases in congestion, noise, access limitations, and construction durations. Mitigation measures identified in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods would be implemented to reduce cumulative construction impacts on neighborhoods or community facilities.

4.4.6 Visual and Aesthetic Resources

Construction of I-5 in the 1960s, along with the associated commercial and residential development, was a major change to the visual environment in the project corridor. The freeway and corresponding development along SR 99 in recent decades also changed other more natural or rural landscapes. The addition of OMF South between SR 99 and I-5, along with several other planned road widenings and interchange improvements, would further increase the visual prominence of the transportation infrastructure.

If constructed at the same time as other reasonably foreseeable future actions, viewers could experience more visual impacts during construction. Cumulative visual impacts in the area could occur with increased private development near station areas associated with FWLE and TDLE. In addition, FWLE and TDLE, combined with OMF South, could have cumulative impacts due to additional elevated track and large structures. There would also be a cumulatively substantial clearing of trees and vegetation, particularly on the track alignments adjacent to I-5. Although most cumulative impacts would occur in previously developed areas or adjacent to other existing large infrastructure, thus making the cumulative nature of these impacts minimal, OMF South and other reasonably foreseeable projects could increase the overall impacts on the surrounding visual environment.

4.4.7 Air Quality and Greenhouse Gas Emissions

The operational air emissions from the build alternatives are inherently cumulative. The analysis found in Section 3.8, Air Quality and Greenhouse Gas Emissions, finds that the build alternatives would not result in an exceedance of the National Ambient Air Quality Standards or the Washington Ambient Air Quality Standards. While there is a potential for construction schedules to overlap with other projects in the area, the temporary nature of air quality construction impacts and the use of standard construction BMPs makes it unlikely that air quality standards would be exceeded. Therefore, the proposed project, combined with past, present, and reasonably foreseeable future actions, would not contribute to a cumulative adverse impact on air quality or GHG emissions. Additionally, because OMF South is necessary for the efficient operation of the Sound Transit 3 light rail system expansion, its construction and operation would support a cumulative regional reduction in vehicle miles traveled that would result in a cumulative decrease in regional auto-related emissions that contribute to GHGs (Sound Transit 2016a).

4.4.8 Noise and Vibration

Cumulative impacts for the OMF South project would be associated with TDLE and Federal Way’s proposed City Center Access Project for the Preferred and South 344th Street alternatives. There would be no cumulative noise impacts associated with the Midway Landfill Alternative.

If TDLE is constructed, approximately 144 LRVs would be needed and stored at OMF South. With the additional vehicles, there would be additional operations within the facility, including additional LRV movements into and out of the facility in the morning and evening, respectively. Additionally, for the Preferred and South 344th Street alternatives, the LRVs leaving and entering would be split between the northern and southern tracks leading to the mainline tracks. The additional LRVs from TDLE operating from within the OMF South alternative sites would increase some noise levels, but they would not be loud enough to cause FTA noise impacts or WAC exceedances (see Appendix G2, Noise and Vibration Technical Report).

The mainline tracks connecting the Preferred and South 344th Street alternatives would become the operational track for TDLE, with higher speeds and additional LRV operations throughout the day. As a result, the operation of TDLE on the mainline tracks is anticipated to cause additional noise impacts to residences near the mainline tracks in Belmor from the 40 mph Alignment and 55 mph Design Option. Impacts would occur where the mainline curves south of S 324th Street and near the mainline north of S 336th Street. The larger number of trains that would be in revenue service along the mainline with TDLE would have a greater impact than the number of trains moving to and from the OMF site with the OMF South project only. There would be no cumulative noise impacts from TDLE for the Midway Landfill Alternative because the mainline tracks adjacent to the site would already be built as part of FWLE and operating as revenue-generating tracks.

There would be no vibration impacts associated with OMF South. With the inclusion of the TDLE project, there would be an increase in vibration levels due to the higher speed of the trains, but no cumulative vibration impacts are anticipated. With the Midway Landfill Alternative, there would be no cumulative vibration impacts from the FWLE project.

Further details regarding TDLE noise and vibration impacts and mitigation will be included in the Tacoma Dome Link Extension Draft Environmental Impact Statement, which is expected to be published in mid-2024.The Draft EIS will include recommended mitigation measures, such as noise barriers, for any noise impacts on sensitive receptors near the mainline tracks needed for operations of TDLE. To improve efficiency and eliminate the impacts of two construction activities in the same location, the OMF South project is anticipated to construct noise mitigation required for TDLE if the Preferred Alternative or South 344th Street Alternative is selected as the project to be built.

The City Center Access Project together with OMF South and TDLE could result in some cumulative noise impacts to a small number of receptors south of S 324th Street without mitigation. The City Center Access Project proposes to extend S 324th Street across I-5 to the east, which may increase motor vehicle traffic noise that would require mitigation.

4.4.9 Ecosystem Resources

Past actions and urban development have changed the ecological landscape in the study area and vicinity, and ongoing and reasonably foreseeable future actions could contribute to additional cumulative impacts. To address the effects of past development, restoration programs and projects (e.g., aquatic and terrestrial habitat improvement projects as well as culvert replacement projects to eliminate barriers to fish passage) are being planned and implemented throughout the region. The potential for any of the build alternatives to result in adverse cumulative impacts would be related to the direct impacts of that alternative. In other words, a build alternative with a greater extent and/or intensity of adverse impacts on ecosystem resources would have a greater risk of adverse cumulative impacts.

Sound Transit's FWLE project is currently in construction. The mitigation report for FWLE identified impacts on 0.9 acre of wetlands, 4.5 acres of wetland buffer, and 0.2 acre of riparian forest buffers. In addition, the Federal Way Link Extension Final Environmental Impact Statement identified impacts on 35 acres of forested habitat (Sound Transit 2016b). That Final EIS also analyzed impacts associated with the relocation of approximately 1,000 linear feet of stream channel. These impacts will be mitigated through the permitting process with regulatory agencies and local jurisdictions. The project was designed to allow WSDOT to implement fish passage improvements on Bingaman Creek in the future, if necessary (FTA 2017). In addition, by complying with WSDOT and local jurisdictional rules concerning tree replacement, FWLE is expected to increase the amount of vegetated area over the long term.

Table 4.4-1 lists other reasonably foreseeable future projects that could affect ecosystem resources in the study area.

Most of these projects are on developed or partially developed parcels. Nevertheless, possible short-term and long-term impacts of these projects include loss or degradation of vegetation, wildlife habitat, streams, wetlands, and associated buffer areas. Between OMF South, FWLE, and TDLE, there would be substantial clearing of trees and vegetation with adverse cumulative effects on forested habitat, particularly on the alignment routes adjacent to I-5.

Coupled with the impacts of the past, present, and future projects described above, the impacts of the build alternatives could contribute cumulatively to reductions in the area and function of ecosystem resources in the study area. Sound Transit commits to meeting or exceeding requirements for mitigation and compensating for project impacts to ecosystem resources during design and permitting. The potential for future projects to adversely affect ecosystem resources in the study area would be limited by meeting regulatory requirements under federal, state, and local regulations. These reviews and permitting processes would ensure the implementation of measures to avoid or minimize both short-term and long-term impacts on ecosystem resources as well as compensatory mitigation for unavoidable impacts on wetlands, streams, and their buffers. It may take several years for the forested vegetation communities or decades for mature forested communities to return to their preconstruction habitat function.

Table 4.4-1 Ecosystem Resource Impacts from Reasonably Foreseeable Future Projects in the Study Area

Project	OMF South Alternatives Potentially Affected	Potential Ecosystem Impacts
Sound Transit TDLE	Preferred South 344th Street	TDLE is proposed along the west side of I-5 and would impact East Fork Hylebos Tributary, associated wetlands, and riparian buffers.
Federal Way City Center Access Project	Preferred South 344th Street	The project design includes the replacement of three state-owned culverts where East Fork Hylebos Tributary crosses I-5 (WDFW Site ID numbers 995300, 995299, and 992364), plus a privately owned culvert at Winged Foot Way (WDFW Site ID number 420614) that is directly connected to culvert 992364.
The Creekside Commons Townhome Development	Preferred	Proposed on about 10 acres of forested land north of the Preferred Alternative, clearing and site development will reduce the width of the forested buffer on West Fork Hylebos Tributary in that area.
WSDOT I-5/SR 161/SR 18 Triangle	Preferred South 344th Street	Vegetation clearing and ground-disturbing work for this project could affect East Fork Hylebos Tributary south of the OMF

Table 4.4-1 Ecosystem Resource Impacts from Reasonably Foreseeable Future Projects in the Study Area (continued)

Project	OMF South Alternatives Potentially Affected	Potential Ecosystem Impacts
Interchange Vicinity Improvements (project suspended with no resumption date set)		South alternatives in Federal Way. WSDOT plans to replace an approximately 370-foot-long culvert with approximately 560 linear feet of open channel, removing an existing, partial barrier to fish passage and increasing the amount of functioning aquatic and riparian habitat available in the stream system. This project would also remove several other partial or complete barriers to fish passage on this stream downstream of the study area
WSDOT SR 509 Completion Project (part of the Puget Sound Gateway Program)	Midway Landfill	The only proposed project element near the site is an auxiliary lane on southbound I-5. Construction of an auxiliary lane in that area would be unlikely to adversely affect ecosystem resources at or near the Midway Landfill Alternative. WSDOT will be expanding the wetland and stream habitat complex as part of the Program's Riparian Restoration Plan. This entails enhancing over 153 acres of wetland, riparian, and forested habitat, forming a critical link to previously established mitigation sites located downstream of the two Federal Way OMF proposed alternative sites. The proposed site is in Fife, adjacent to I-5 in the area known locally as the Fife curve.

4.4.10 Water Resources

Development throughout the Puget Sound region has substantially altered the hydrology of drainage basins, including substantial changes in water quality and flow in the Hylebos Creek basin. Population growth and the accompanying substantial urbanization and associated increase in pollution-generating impervious surfaces have increased runoff volumes and contaminant loading to surface water bodies and have decreased groundwater infiltration and recharge, which plays a critical role in dry-season baseflow contributions.

The proposed project would be required to manage runoff in compliance with federal, state, and local regulations, which would avoid and minimize impacts on surface and groundwater. The mitigation would include providing flow control and water quality treatment for runoff from some existing impervious and pollution-generating surfaces that may either be currently uncontrolled or not manage to current standards. Updating infrastructure to comply with current regulations can prevent further harm to water resources and could lead to gradual improvements to water quality over time. Advances in flow control methods aim to simulate predevelopment conditions but are typically not able to completely reproduce them.

Over time, other regional new development and redevelopment are expected to bring many existing impervious and pollution-generating surfaces up to current standards of flow control and water quality treatment for stormwater runoff. Improvements in stormwater runoff control and water quality would occur over time, with or without this project, meaning the changes could be expected to be smaller and more gradual. This retrofit through redevelopment would avoid additional impacts to water resources in the area and could result in modest improvements in the hydrology and water quality of the streams within the OMF South study area.

Additionally, the expanded Link light rail system, which the OMF South project would support, would slow the increase in vehicle miles traveled as population in the area increases. This slowing of the increased vehicle use would mean slower increase in polluted runoff and future impacts to water quality.

4.4.11 Geology and Soils

OMF South would be entirely within a highly urbanized area. In general, surface geology and soil conditions have already been substantially altered, particularly for the Midway Landfill Alternative. The proposed earthwork for the Preferred and South 344th Street alternatives would have little or no meaningful impact on existing, long-term geologic, hydrogeologic, or soil conditions in the study area. Similarly, even though the Midway Landfill Alternative could result in a substantial amount of earthwork, depending on the subsurface construction design option, it is not expected to contribute to substantial cumulative impacts when added to potential impacts for other reasonably foreseeable actions expected within the study area.

4.4.12 Hazardous Materials

Similar to other projects in the vicinity, Sound Transit would adhere to applicable regulations regarding the handling and treatment of contaminated materials during construction and long-term operation of the projects. While construction and operation of OMF South at the Midway Landfill Alternative site would have the potential to result in the release of hazardous materials or contamination of air or groundwater, plans for the mitigation, handling, and disposal of contaminated media and hazardous construction debris would be developed in conjunction with the appropriate regulatory agencies. As a result, the proposed project is not anticipated to have an adverse effect and could have a net beneficial impact on the environment. Similarly, all other related projects’ development would require the remediation of any contaminated sites encountered in compliance with state and federal environmental regulations, consequently improving overall environmental quality. Therefore, there would be no cumulative impacts of the related projects when combined with the proposed projects, on hazardous materials in the build alternative sites.

4.4.13 Public Services

The OMF South project would not increase demand for public services; however, planned growth in population, employment, and general urban activity in the study area would affect public service demand, including emergency and public safety services. The FWLE and TDLE projects, supported by OMF South, would support a greater density of development, particularly near planned light rail stations which are generally attractive to businesses and residents. The FWLE Kent/Des Moines Station is within the Midway Landfill Alternative study area, and a new light rail station proposed in South Federal Way for TDLE is within the study area for the Preferred and South 344th Street alternatives. Therefore, the cumulative impacts associated with increased development could lead to additional demand for public services, such as emergency services, within the OMF South study area. These incremental increases are anticipated to be minor.

4.4.14 Utilities, Energy, and Electromagnetic Fields

Utilities

Development near the project would be consistent with what is allowed in the adopted land use plans and current local development regulations. Therefore, the cumulative impacts on utilities would be negligible and in accordance with planned growth.

Energy

The proposed OMF South project would result in net increases in electricity and natural gas consumption and demand under all build alternatives. It is anticipated that PSE would have sufficient capacity and energy resources to accommodate any increase in energy consumption. When considered together with the reasonably foreseeable future projects, as well as ongoing local, regional, and statewide efforts to increase energy efficiency and conservation, the proposed OMF South project would not contribute to a cumulative adverse energy impact. Additionally, the expanded Link light rail system, which the OMF South project would support, would lead to a regional reduction in vehicle miles traveled, which would lead to a reduction in the use of oil, gasoline, and diesel fuels (Sound Transit 2016a).

Electromagnetic Fields

The FWLE Final EIS notes that there are no potentially EMF-sensitive receptors close to the FWLE alignment (Sound Transit 2016b). Similarly, there are also no potentially EMF-sensitive receptors close to the proposed TDLE alignment or OMF South alternatives. No areas were identified where EMFs would combine with past, present, or future actions to result in human health effects or effects on facilities with EMF-sensitive equipment. Therefore, no EMF cumulative impacts would result from the proposed project.

4.4.15 Historic and Archaeological Resources

OMF South is not expected to result in significant impacts to cultural resources. All build alternatives have the potential to affect unidentified archaeological resources within the study area, but the only known historic properties are the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, which OMF South would not adversely effect. The project has an Inadvertent Discovery Plan to address the potential discovery of archaeological resources during construction. Appendix G4, Historic and Archaeological Resources Technical Report includes the plan.

The reasonably foreseeable future actions in the project vicinity, including the Link system expansion projects that OMF South would support, may have direct impacts on historic or archaeological resources in the study areas. The settings surrounding these resources have been altered by past and present redevelopment and general changes in uses surrounding them. If OMF South encounters unidentified archaeological resources during construction, it could contribute to a cumulative impact on historic and archaeological resources.

4.4.16 Parks and Recreational Resources

No major changes to parks or recreational resources by OMF South or other reasonably foreseeable future projects or actions are anticipated. Population and employment growth are expected to occur under both the No-Build and the build alternatives and would likely increase the use of parks and recreational facilities throughout the project area.

5 COMMENT SUMMARY

See Appendix L for full comments and responses to both the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS.

5.1 Overview of the 2021 Draft Environmental Impact Statement Comment Period

Sound Transit published the OMF South SEPA Draft Environmental Impact Statement on March 5, 2021. The comment period was from March 5 to April 19, 2021. Sound Transit extended the required 30-day comment period by an additional 15 days to give reviewers more time to consider the document. Opportunity to comment was provided by online comment form, email, phone, U.S. mail, and verbally during online public hearings. Due to COVID-19 restrictions, the two public hearing events were held virtually during the 45-day comment period.

Sound Transit held two online informational meetings/public hearings using Zoom:

- Wednesday, March 24, 2021, 5:30 p.m. – 7:30 p.m.
- Tuesday, March 30, 2021, 11:00 a.m. – 1:00 p.m.

The meetings/public hearings were held a week apart on different days of the week and at different times of day to accommodate varying stakeholders’ ability to attend and participate. Table 5.1-1 summarizes the type of commenters who provided feedback.

Table 5.1-1 Comments Received by Commenter Type

Commenter Type	Number
Federal Agency	0
Tribe	1
State Agency	2
Regional and Local Agency of Jurisdiction	6
Elected Officials	1
Businesses and Community Groups	12
Individual	250
Total	**272**

5.1.1 Comments from Tribes, Agencies, and Jurisdictions

The Puyallup Tribe of Indians, along with several state, regional, and local agencies, provided comments as summarized below.

5.1.1.1 The Puyallup Tribe of Indians

The Puyallup Tribe of Indians Fisheries Department stated that they prefer that OMF South be placed at the Midway Landfill. The Tribe’s comments primarily concerned impacts to ecosystems (streams, riparian buffers, and downstream fish habitat) as well as water resources (water quality and groundwater recharge). The Puyallup Tribe of Indians Fisheries Department noted the significant effort and resources of the Tribe, the Natural Resource Damage Trustees, the city of Tacoma, the Port of Tacoma, and WSDOT that have been applied towards property acquisition, habitat restoration, cleanup, and stream enhancement throughout the Hylebos Creek watershed over the past two decades as well as future planned improvements to Hylebos Creek downstream of Federal Way, which would be affected by the project.

The Puyallup Tribe of Indians Fisheries Department also highlighted the importance of the protection and treatment of stormwater at OMF sites and the potential downstream effects to Hylebos Creek. The Puyallup Tribe of Indians is opposed to any proposal that would place more of the creek or its tributaries in pipes or culverts. The Tribe is also opposed to any proposal that would reduce water treatment opportunities or recharge of the creek.

Tribal data shows that Chinook salmon have been documented as far north as S 356th Street in Federal Way. The Puyallup Tribe of Indians Fisheries Department asked that the description of the distribution of Chinook salmon be revised to reflect tribal fisheries data in the Final Environmental Impact Statement.

5.1.1.2 State Agencies

Washington State Department of Ecology

Ecology’s comments on the 2021 SEPA Draft EIS focused on the Midway Landfill Alternative, and most comments were on the Midway Landfill Support Documents, Appendices D1 through D4. Generally, Ecology asked questions about the assumptions that were made for the amount and suitability of fill material for reuse, cost estimates associated with excavation scenarios, and the allowed acreage of exposed landfill. They asked how the assumptions and analysis might be different based on what Sound Transit has learned from working within the Midway Landfill on FWLE, including reuse percentages, hazards of landfill materials, and observed schedule risk.

Washington State Department of Transportation

The comments from WSDOT were primarily related to potential impacts to visual and aesthetic resources, the planned mitigation for impacts to roadside vegetation, and the two Resource Conservation Areas along I-5. For example, they noted that Resource Conservation Area mitigation requirements — the primary of which is avoidance — are different from vegetation replacement requirements, and the two should be treated differently. In addition, they asked that the impact to high-sensitivity viewers, such as tourists, sightseers, and people driving for pleasure, be included in the analysis.

WSDOT noted that the Midway Landfill Alternative figures show the potential limits of construction to the edge of I-5. They stated that it is not likely that Sound Transit would be allowed to use or cross through that area during WSDOT’s construction of the SR 509 completion project, anticipated to occur between 2024 and 2028.

Last, WSDOT stated that upcoming state legislation (the new HEAL Act) will require consideration of impacts to environmental justice and vulnerable populations. WSDOT asked how the Board will consider the potential impacts of the OMF South project to these populations in their decision-making process.

5.1.1.3 Regional and Local Agencies and Jurisdictions

King County Metro

King County Metro is primarily concerned with impacts to transit for each of the OMF South alternatives, particularly the proposed use of SR 99 as a haul route during site construction. They noted that construction of OMF South at the Midway Landfill Alternative would likely have the greatest impact to their operations.

Metro asked Sound Transit to include transit-specific mitigation in the Final EIS and to include transit in the construction transportation management plan. Their letter suggested specific traffic study revisions to clarify how LOS is measured and defined at intersections under two-way stop control. Metro also asked to clarify truck traffic impacts at S 272nd Street, Kent-Des Moines Road, and the SR 99 northbound HOV lane during construction for the Midway Landfill Alternative, along with the potential traffic impacts of the proposed mitigation measures for the S 246th Street/SR 99 intersection.

City of Des Moines

The city of Des Moines supports light rail expansion as long as it does not adversely affect the surrounding neighborhoods, including Highline College, the Kent-Des Moines station area, and the business district along SR 99, or livability for current residents, workers, and shoppers. Des Moines supports the Midway Landfill Alternative because its use avoids the impacts associated with the two Federal Way alternatives.

As for specific comments, Des Moines suggested an LOS analysis for construction traffic and for additional intersections, called for a more detailed evaluation of potential mitigation for construction haul routes, and asked whether new PM peak hour trips would be added. In addition, Des Moines asked to be included as a reviewing agency for the Drainage Site Plan, Technical Information Report, and the Stormwater Pollution Prevention Plan and as an affected agency for compliance review of the NPDES Stormwater Discharge Requirements.

If the Midway Landfill Alternative is identified by the Board as the preferred alternative, Des Moines states that Sound Transit will need to more fully develop or acknowledge impacts associated with the construction timeline; impacts on community and businesses from the number and duration of truck trips; and risks to human health from potential release of contamination. The city also asks Sound Transit to acknowledge that unknown risks from working in a Superfund site could affect construction schedule and costs.

City of Kent

The city of Kent does not object to the placement of OMF South within its city limits as long as it is placed at the Midway Landfill. The city asked for clarification on the project’s Purpose and Need, how OMF South fits with FWLE, and why the OMF South annual operating cost estimates would be higher for the Midway Landfill Alternative than for the South 336th and South 344th Street alternatives.

Concerning the transportation analysis, the city of Kent had several comments on LOS thresholds and mitigation and construction-related traffic impacts. Kent updated its Transportation Master Plan in March 2021 and asked that LOS standards and the list of anticipated projects in Kent be revised to reflect the new plan. Kent asked that Sound Transit consult with WSDOT regarding direct access to I-5 to minimize truck trips during construction if the Midway Landfill Alternative is selected by the Board, particularly for the Full Excavation and Hybrid subsurface design options. Additionally, Kent stated that a parking study will be required if the Midway Landfill Alternative is chosen to be built. The city also had several comments concerning impacts to land use and economics, such as asking for more detail on the businesses displaced, noting that the facility would be allowed under a conditional use permit, and asking for identification of the actual number of displaced employees.

As a general comment, Kent asked why OMF South is larger than OMF Central and OMF East. The letter also noted that the sizes of the build alternatives have grown since early discussions with Sound Transit and asked for an explanation.

Kent included several comments about the Midway Landfill Support Documents in Appendix D of the 2021 SEPA Draft EIS. These comments concern assumptions about the design and construction of OMF South at the landfill, such as the excavation work window, areas of open excavation allowed, and the diameter and spacing of drilled shafts. These comments generally ask how these assumptions were made and whether these assumptions could change or be revised to decrease construction cost and duration.

Further, Kent asked for a complete list of assumptions made for the analysis of each alternative. Last, the letter closed with a list of potential funding resources for building OMF South at the Midway Landfill.

City of Federal Way (Mayor and City Council)

The letter, signed by Federal Way’s mayor and all seven of its councilmembers, stated support for the Midway Landfill Alternative and opposition to the sites in Federal Way.

The letter questioned the inclusion of cost estimate information in the 2021 SEPA Draft EIS along with assumptions concerning the city of Federal Way’s approval for vacating public roads and modification of development standards to permit OMF South. The letter also questioned whether there are adequate mitigation opportunities for the identified impacts.

City of Federal Way (Public Works and Community Development Directors)

In a separate letter, the city of Federal Way provided technical comments and input on the 2021 SEPA Draft EIS. The letter began with several questions and comments about cost and schedule and stated that estimated project costs and construction schedules are not required to be considered under SEPA. The city suggested that only environmental impacts should be considered in a SEPA EIS.

The letter requested that several corrections and clarifications be made to the Transportation Technical Report. The city noted that Sound Transit will be required to mitigate all vacated public roadways by incorporating roadways of identical functionality in a manner that complies with the city’s block perimeter requirements and comprehensive plan. Federal Way disagrees with the 2021 SEPA Draft EIS data showing that vacating 20th Avenue S would have very little impact to response times for emergency service vehicles. The city asked that a north-south replacement route be provided.

Federal Way had several comments concerning economic and fiscal impacts related to employee and business displacement in addition to taxable valuations. The city hired an outside consultant (FCS Group) to review the economic analysis and attached their report to the letter. Generally, the city does not believe that the 2021 SEPA Draft EIS analysis considered the opportunity cost difference between the three site alternatives, stating that the Midway Landfill Alternative would have a relatively low opportunity cost in terms of re-developable lands as compared to the site alternatives in Federal Way.

The city's comments about land use impacts concerned the compatibility of OMF South with the surrounding uses and with comprehensive plan policies. The city noted that the project design is not advanced enough to determine whether adequate room exists for appropriate compatibility between land uses. Similarly, related to cumulative impacts, the city noted that TDLE and OMF South (should a Federal Way site be chosen) will convert land in the only light industrial zone in Federal Way, which could lead to sprawl or development of previously undeveloped land. The city stated that the 2021 SEPA Draft EIS should have included a comprehensive analysis of the cumulative impacts of this land conversion.

Federal Way stated that mitigation described in the ecosystems and water resources sections of the 2021 SEPA Draft EIS is written in a broad manner and needs to include more specifics to evaluate the feasibility of the South 336th and South 344th Street alternatives. This concern was noted particularly over mitigation and compliance with city regulations. The city also included comments on the noise and visual analyses. Regarding the visual analysis, the city stated that visual impacts to the historic Weyerhaeuser campus were not adequately addressed. The city also asked about assumptions in Appendix G2, Noise and Vibration Technical Report, concerning verification of project noise levels and audible signals at light rail crossings.

Seattle Public Utilities

SPU provided specific comments on the 2021 SEPA Draft EIS, focusing on the Midway Landfill Alternative. SPU notes concerns over the depth and type of fill and the potential for settlement and offers suggestions to mitigating these concerns. SPU disagrees with the 2021 SEPA Draft EIS's assumption that the construction of OMF South at the Midway Landfill would lead to the greatest conversion of pervious surface to impervious surface, noting that the current landfill cap is designed to be impervious, and therefore there would be little to no conversion.

SPU asked how various assumptions or risks identified in the 2021 SEPA Draft EIS compared to what was experienced during FWLE construction, as SPU implied that the assumptions for OMF South are too conservative. These include managing the landfill gas collection system, construction work windows, landfill material reuse, haul truck size, tolerances for settlement, and mitigation of hazardous materials removal. For example, SPU points to the fact that during FWLE construction, excavation within the landfill was not restricted to 22 weeks and that screened waste was transported in 48-foot containers instead of 20-foot containers.

SPU asked how Sound Transit developed estimates for real estate and relocation costs because they believe the estimate for the Midway Landfill Alternative is high. They also noted that there would likely be less chance of delays and costs associated with appeals or lawsuits for the Midway Landfill Alternative and asked whether Sound Transit should include that as a consideration.

5.1.1.4 Elected Officials

Representative Jesse Johnson

At the time of publication of the 2021 SEPA Draft EIS, Jesse Johnson was the Washington State Representative for the 30th Legislative District, which includes the cities of Des Moines and Federal Way. In his comment, Representative Johnson requested that OMF South not be considered in Federal Way, based on input from his constituents.

5.1.2 Comments from Businesses and Community Groups

Sound Transit received 12 communications from the following potentially affected businesses and community groups:

- Christian Faith Center
- Pacific Christian Academy
- Ellenos Yogurt
- Schindler Family Limited Partnership
- GarageTown
- Red Canoe Credit Union
- Federal Way Custom Jewelers
- Northwest Equipment and Sales
- Race King, LLC
- 1910 and 1934 South 344th Street
- Federal Way Chamber of Commerce
- Protect Federal Way

Christian Faith Center

Christian Faith Center submitted a comment letter stating that they would prefer that the Christian Faith Center property was not part of any alternative. The letter explains that the Christian Faith Center entered into a Development Agreement with the city of Federal Way related to property development, which contains commitments related to stormwater management, site access, mitigation, and recreational areas. The agreement — the Concomitant and Development Agreement and Development Plan — is attached to the comment letter.

The letter also states that since Sound Transit identified the site as a potential alternative, campus development has been “stuck” in place and time. The Christian Faith Center has stopped planning and implementing projects, and their members have been anxious about the future of their church. Under the South 336th Street Alternative, Christian Faith Center would be relocated and start a multiyear redevelopment process. Under the South 344th Street Alternative, the church would also need to be relocated because the smaller site would leave them without the physical space necessary to meet the requirements of the Development Agreement with the city of Federal Way.

Pacific Christian Academy

Pacific Christian Academy notes that it is the largest Christian school in the Federal Way area and has a very diverse student body. The school has looked for options for a new site and has been unable to find an available site in the area. Pacific Christian Academy acknowledges Sound Transit's outreach efforts and meetings with their Board of Trustees. They hope to have Sound Transit's assistance in finding a new location, should their site be chosen for OMF South.

Ellenos Yogurt

The co-founders and current CEO of Ellenos Yogurt submitted a comment letter. They state that relocating their yogurt manufacturing facility would be catastrophic to their business. Ellenos Yogurt plans to start national distribution over the next 3 to 5 years and become a 24/7 operation. The nature of the product is such that it has a short shelf life and cannot be stockpiled while the facility is moved.

Also, they state that a new facility will take a minimum of a year to build and test to ensure it meets product safety and quality parameters, and it would have to be fully functioning before they could close their current location. Ellenos Yogurt believes it would cost tens of millions of dollars to duplicate their existing facility and that the opportunity costs to their business would be virtually incalculable. The letter states that relocation costs alone are estimated to be over $25 million, which does not account for tens of millions of dollars of additional opportunity costs. They ask Sound Transit to choose a different alternative.

Schindler Family Limited Partnership

Stephen Causseaux, the managing partner for the Schindler Family Limited Partnership that owns the Ellenos Building, sent a letter under the letterhead of his law firm, McCarthy and Causseaux, expressing concerns similar to those from Ellenos Yogurt. The letter includes comments on the 2021 SEPA Draft EIS concerning the value of and number of properties to be acquired, the nonexempt status of the Christian Faith Center, and impacts to WSDOT's Resource Conservation Areas. Similar to comments from the Ellenos co-founders and CEO, the letter cites concern over Ellenos Yogurt's need to have a second, fully functioning operation prior to relocation, the costs of relocation, and the lost opportunity costs. The letter states that selecting the South 344th Street Alternative would "put an end to Ellenos Yogurt".

GarageTown Condominium Association

Brad Thorson, the president of the GarageTown Federal Way Condominium Association, submitted two emails with comments on the 2021 SEPA Draft EIS. In his first email, Mr. Thorson notes that the document should treat all 67 of the GarageTown tenants as individual property owners rather than GarageTown being treated as one business and that the parcel count should treat each GarageTown unit as separate parcels. Mr. Thorson states that he does not believe that GarageTown could be relocated in King County with the amount of money they would likely receive from Sound Transit and that their "community would be destroyed" as a result. Other comments concerned such things as the difficulty and cost of relocating Ellenos Yogurt, the number of churches impacted by the South 344th Street Alternative, and the fact that roadway improvements would be needed. He also asked that differences in impacts between sites be made clearer.

In his second email, Mr. Thorson again suggests that GarageTown owners be counted as individual commercial or residential owners so as not to distort the number of individuals impacted.

He mentions the fact that the South 336th Street and South 344th Street alternatives would require excess mainline track if TDLE is not constructed and asks whether Sound Transit has sought out any federal or state grant funds to assist with construction of the Midway Landfill Alternative. Mr. Thorson also mentions that the Christian Faith Center may want to sell to Sound Transit.

Several comment letters were sent by owners of GarageTown units and were similar to the first email from Mr. Thorson.

Red Canoe Credit Union

The Red Canoe Credit Union submitted comments on behalf of their branch at S 336th Street and Pacific Highway South. They are concerned that construction of the South 336th Street Alternative may make it difficult for people to access the bank due to construction vehicle traffic and that access to their site would be closed due to roadway or sidewalk construction. They request that construction truck traffic access the freeway from S 336th Street and Weyerhaeuser Way S rather than using SR 99 and that both lanes of S 336th Street never be closed at the same time. The Credit Union supports the Midway Landfill as the best location for OMF South because it has the least impact on community and businesses and repurposes the landfill.

Federal Way Custom Jewelers

The owner of Federal Way Custom Jewelers supports the Midway Landfill Alternative. He expressed concern over the potential loss of clients if either the Christian Faith Center or Ellenos and other businesses are displaced. His comments note that the south Sound region has high levels of low-wage workers, people of color, and commuters who could rely on transit, yet they are getting light rail after other areas to the north and east.

Northwest Equipment Sales and Rentals

The owner of Northwest Equipment Sales and Rentals expressed concern over the potential displacement of his property at 2011 S 341st Place in Federal Way. He stated that there currently is no available property zoned M2 or M3 and therefore the South 344th Street Alternative could have a devastating effect on his business.

Race King LLC

Scott Halverson submitted a comment letter as the owner of the Race King LLC commercial property along Pacific Highway S (SR 99), within the footprint of the Midway Landfill Alternative. His concern is that further condemnation or easements would render his property unusable for the two businesses he currently runs. Mr. Halverson is willing to sell his property to Sound Transit as long as he could find a suitable replacement.

1910 and 1934 South 344th Street

Greg and Donna Olson shared concerns about their commercial properties within the South 344th Street Alternative footprint. Along with listing information about the properties and their surroundings, they express concern about legal costs due to terminating their current lease agreement, recouping the money spent making capital improvements, and the difficulty of finding comparable properties elsewhere that could provide the same income. They invite Sound Transit to contact them for further discussion as needed.

Greater Federal Way Chamber of Commerce

The Greater Federal Way Chamber of Commerce is focused on economic diversity in Federal Way, including the maximum retention of commercial enterprises and what would be most favorable to new and existing economic opportunities. In their comment letter, the Chamber stated that transportation infrastructure is a priority to meet the demands of a growing business community in the South Puget Sound region and that OMF South is a critical component for the southern expansion of light rail. They ask that the Board note the guiding principles important to the Chamber in the evaluation of the three sites: creation of permanent, sustainable living wage jobs; minimum business displacement for existing jobs; enhanced opportunities for transit-adjacent development; impact of economic multipliers in the community; environmental issues, including health concerns and the stewardship of resources such as wetlands and trails; and cost of strategic growth for transportation infrastructure.

Protect Federal Way

Protect Federal Way is a federally registered, nonconnected Political Action Committee opposed to the selection of the South 344th Street Alternative. Their comment letter restates some of the conclusions of the 2021 SEPA Draft EIS and then states some additional concerns regarding the alternative. Protect Federal Way believes that relocation costs will be increased for businesses at the South 344th Street Alternative due to their industrial nature and states that comparable properties are not available in the area. They note that the site includes the last industrial zone in Federal Way, and they believe the selection of the site will “evict all industrial businesses from Federal Way, permanently.” Protect Federal Way believes that the real estate costs associated with the properties necessary for business relocation should be included in the 2021 SEPA Draft EIS.

Protect Federal Way also believes that many small businesses will close rather than relocate and associated jobs will be lost. They state the South 344th Street Alternative has the most painful and highest cost to their community and ask that it be removed from consideration.

5.1.3 General Public Comments

During the OMF South SEPA Draft EIS comment period, Sound Transit received 250 communications from the general public. The most common general themes in the public comments, outside of statements for or against a particular alternative, concerned impacts to the community or neighborhood due to displacements of residents, businesses, and employees as well as impacts to natural resources such as streams, wetlands, and habitat.

5.1.3.1 Alternative Preference

Most of the communications from the public expressed a preference for or against a specific alternative site. In general, most comments supported the Midway Landfill Alternative and/or opposed the South 344th Street Alternative.

Of the approximately 250 public commenters, about 210 people expressed support for a particular site: 160 people for the Midway Landfill Alternative, 40 people for the South 336th Street Alternative, and 10 people for the South 344th Street Alternative. At the same time, approximately 160 people expressed opposition for a particular site: 10 people against the Midway Landfill Alternative, 40 people against the South 336th Street Alternative, and 110 people against the

South 344th Street Alternative. Many people expressed preferences both for and against multiple site alternatives; each preference statement was tallied individually.

Approximately 30 people suggested alternative sites other than those evaluated in the 2021 SEPA Draft EIS. Some of the suggestions, including the former Weyerhaeuser property and the Puyallup-Kits Corner Landfill, were for OMF South locations that were previously analyzed during the alternatives evaluation and not advanced for further consideration.

The reasons for the alternative preferences are described in the sections below, specific to each of the 2021 SEPA Draft EIS build alternatives.

South 336th Street Alternative

Approximately 80 people expressed opinions regarding the South 336th Street Alternative. The preferences were split, with 47 percent of people supporting the site and 53 percent of people opposing the site.

Approximately 60 people mentioned the Christian Faith Center church and school. Some expressed concerns about impacting the Christian Faith Center because it is a place of worship for many, includes a school and daycare, and contributes to the community. Others mentioned the development agreement that Federal Way made with the Christian Faith Center and questioned how that agreement would apply to OMF South. Finally, others felt the South 336th Street Alternative made sense as compared to the Midway Landfill and South 344th Street alternatives, mentioning that the Christian Faith Center may be looking to sell its property.

The reasons given in support of the South 336th Street Alternative were generally that it struck a balance by having fewer impacts to residents, employees, and businesses than the South 344th Street Alternative and would be less costly, faster, and less risky than the Midway Landfill Alternative.

Opposition to the South 336th Street Alternative centered on impacts to residents, employees, and businesses — including organizations like the Christian Faith Center — and, to a lesser extent, the impacts to the natural environment, such as wetlands and streams. Many commenters expressed concerns over the loss of affordable, single-family residences and the impacts to their neighborhood or community due to the property acquisition and displacements that OMF South would require.

South 344th Street Alternative

Approximately 120 people expressed an opinion regarding the South 344th Street Alternative, and of those, about 93 percent opposed the site.

Public opposition to the South 344th Street Alternative centers on potential impacts to the natural and built environment. Of those who provided reasons for opposing the South 344th Street Alternative, the majority cited the greater impact that it would have to residents, businesses, and jobs (the most of any of the three alternatives). Similar to comments over the South 336th Street Alternative, many comments expressed concerns over the loss of affordable, single-family residences and the impacts to their neighborhood or community due to the property acquisition and displacements that OMF South would require. Others cited impacts to the natural environment, including streams and habitat.

Of those who expressed an opinion about the South 344th Street Alternative, approximately half mentioned concerns over the displacement of GarageTown and Ellenos Yogurt. The comments stressed that there are over 60 individual property owners of GarageTown, many of whom operate businesses out of their respective units, and it would be very difficult if not impossible to relocate the entire facility. In addition to concerns about job loss, the comments pertaining to Ellenos Yogurt emphasized the fact that the current manufacturing facility could not simply be relocated into a new facility; rather, it could take over 2 years to build up a new facility in which to transfer operations before closing the current one.

Approximately eight people supported the South 344th Street Alternative. Reasons for supporting the site included improvements to the neighborhood, the location of the site in relation to the Link system, and because the South 344th Street Alternative has a lower cost and shorter construction schedule compared to the other build alternatives.

Midway Landfill Alternative

Approximately 170 people expressed an opinion regarding the Midway Landfill Alternative, and of those, about 95 percent supported the site. Some people specifically mentioned a preference for the Full Excavation or Platform subsurface construction design options. No commenter expressed a preference for the Hybrid subsurface construction design option.

The reasons most often given for support of the Midway Landfill Alternative were that it would have the fewest impacts to the natural and built environment and that it would provide an opportunity to clean up and improve an otherwise contaminated, vacant site. Of those who provided reasons for supporting the Midway Landfill Alternative, many cited the greater impact that the South 336th Street and South 344th Street alternatives would have to businesses, jobs, residents, and/or the natural environment.

People recognized that the Midway Landfill Alternative would be more expensive and take longer to construct, but many felt it was worth the extra cost and time. Several people suggested that Sound Transit investigate additional funding opportunities via the state and/or federal government for converting the Midway Landfill to a usable OMF site.

Reasons given in opposition to the Midway Landfill Alternative include the larger cost, longer construction time frame (and therefore greater construction impacts), and concerns over potential hazardous materials pollution.

5.2 Overview of the 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement

The 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement was published on September 22, 2023. There was a 45-day comment period, during which Tribes, agencies, and members of the public were invited to comment. The comment period ended November 6, 2023.

An online open house was live for the duration of the comment period (September 22 to November 6, 2023). The public could visit the website to review what had changed since the 2021 SEPA Draft EIS, review a summary of the findings of the 2023 NEPA Draft/SEPA Supplemental Draft EIS and supporting materials, and submit comments via an online comment form.

Sound Transit hosted one online public meeting and one in-person public meeting to provide general information about the Draft EIS and offer attendees the opportunity to provide public comment. The online public meeting was held on Zoom on Thursday, October 19, from

11:30 a.m. to 1:30 p.m., with more than 20 people attending. The in-person meeting was held at the Federal Way Performance Arts & Events Center on Tuesday, October 24, from 5:30 to 7:30 p.m., with approximately 25 attendees.

Table 5.2-1 summarizes the type of commenters who provided feedback.

Table 5.2-1 Communications Received by Commenter Type

Commenter Type	Number
Tribe	1
Federal Agency	2
State Agency	1
Local Jurisdiction	1
Business or Community Group	1
Individual	52
Total	**58**

5.2.1 Comments from Tribes, Agencies, and Jurisdictions

Sound Transit received five communications from the following Tribes, federal and state agencies, and local jurisdictions:

- Suquamish Indian Tribe of the Port Madison Reservation (Suquamish Tribe)
- EPA
- FHWA
- WSDOT
- City of Federal Way

5.2.1.1 Tribes

Suquamish Tribe

The Suquamish Tribe confirmed receipt of the 2023 NEPA Draft/SEPA Supplemental Draft EIS and stated that they had no comments or concerns regarding cultural resources based on the analysis in the Historical and Archaeological Resources Technical Report (Appendix G4) and its associated attachments.

5.2.1.2 Federal and State Agencies

Environmental Protection Agency

EPA's comments focused on environmental justice. EPA believes OMF South has "the potential to disproportionately impact communities with environmental justice concerns, including tribal, minority, and low-income communities."

EPA asks that the Final EIS further evaluate and identify communities with environmental justice concerns and suggests specific tools for that evaluation, including EPA's EJScreen and the Washington State Department of Health Environmental Health Disparities Map.

EPA believes the Final EIS should include a more complete description of efforts to meaningfully engage with communities with environmental justice concerns and describe how those engagement efforts were used to develop the proposed project. EPA also asks for more information in the Air Quality analysis to address potential impacts on environmental justice communities.

EPA also suggested that Final EIS include more information on surface water quality and a discussion of the recent EPA-approved Water Quality Standards. The letter also asks for information regarding permitting.

EPA suggested coordinating with other agencies on specific topics, including the EPA Region 10 Superfund Program regarding the Midway Landfill Alternative and USFWS, NMFS, and WDFW regarding potential impacts to biological resources. EPA also recommends the Final EIS describes Tribal coordination and how issues have been addressed.

EPA recommends the Final EIS include more detail on monitoring construction of the project and the development of an adaptive management plan so that any necessary adjustments can be made to meet environmental objectives.

Finally, EPA asks that the Final EIS include an analysis of the social cost of greenhouse gas emissions.

Federal Highway Administration

FHWA’s comments focused on the language accessibility of public outreach and impacts concerning ecosystem and water resources; environmental justice; noise; acquisitions, displacements, and relocations; and transportation.

FHWA asked that the discussion on 6PPD-quinone be expanded to include more recent research on salmonid mortality. There were also comments asking for clarification in the Water Resources analysis concerning pollutant-generating impervious surfaces.

FHWA suggested specifying that there would be fewer noise impacts from the mainline because property acquisitions would increase the distance between sensitive receptors and the track would make the noise analysis more understandable to the reader.

Several comments were made on the Acquisitions, Displacements, and Relocation analysis, mostly relating to definition of terms.

Washington State Department of Transportation

WSDOT provided comments on stormwater, ecosystem resources, community impacts, and hazardous materials. WSDOT asked Sound Transit and FTA to inventory WSDOT-owned and managed facilities that could be affected by the project to ensure adequate mitigation is provided. WSDOT recommended that fish passage barriers be identified with Washington Department of Fish and Wildlife identification numbers and ownership and provided a link to WSDOT’s current 2030 fish passage delivery plans. Additionally, WSDOT asks how the 2019 Memorandum of Understanding between Sound Transit and Ecology concerning stormwater runoff from mainline tracks will apply to OMF South.

5.2.1.3 Local Jurisdictions

City of Federal Way

Federal Way provided comments on the 2023 NEPA Draft/SEPA Supplemental Draft EIS and resubmitted comments made on the 2021 SEPA Draft EIS, incorporating them by reference. Federal Way supports the selection of the Midway Landfill Alternative.

The city provided comments on impacts related to transportation; social resources, community facilities, and neighborhoods; economics; land use; visual and aesthetic resources; noise and vibration; ecosystems resources; and cumulative effects. Their comments focused mainly on transportation and land use. Under transportation, Federal Way believes that the analysis does not adequately analyze the Preferred and South 344th Street alternatives because not all proposed driveways and intersections were included in the analysis and some incorrect driveways were included. Federal Way notes that the city controls all intersections in the study area for the alternatives, including those along state routes, so the analysis should list volume/capacity ratios for all intersections. The city also expressed concern over the safety impacts of the project, noting that the South 344th Street Alternative does not include designs to replace the current bicycle and pedestrian path, which is present at the site.

Federal Way believes there is insufficient information to be able to make an informed decision regarding changes to existing land uses and vacating streets and that supplemental trip generation analysis and volume figures should be provided. Federal Way also asks about replacement parking due to impacts to the Federal Way/S 320th Street Park & Ride.

Federal Way had a number of comments concerning Appendix H2, Land Use Technical Appendix, disagreeing with some of the conclusions regarding zoning and comprehensive plan consistency.

5.2.2 Comments from Businesses and Community Groups

Sound Transit received one communication from a potentially affected business and community group, the GarageTown Condominium Association. The GarageTown Condominium Association continues to support development of the Midway Landfill for the OMF South and strongly opposes the South 344th Street Alternative.

The association commented on the proposed extension of 21st Avenue S with the Preferred Alternative. They are concerned that it would intrude onto the southeast corner of the GarageTown property, reducing the width of GarageTown’s eastern driveway and an emergency secondary access for fire equipment. The association also states that retaining the cul-de-sac at the eastern end of S 344th Street is unnecessary and undesirable, as it is a known site for illicit activity.

The GarageTown Condominium Association is strongly opposed to replacing the culvert under S 344th Street with a fish passable structure due to concern of potential damage to buildings if the existing culvert is excavated. They suggest rerouting the stream instead.

5.2.3 General Public Comments

During the OMF South Draft EIS comment period, Sound Transit received 52 communications (letters, emails, oral comments at public hearings, online comment form) from the general public.

Within the 52 communications there were approximately 139 individual comments, which are summarized in the following subsections. General or project-wide comment topics are described first, followed by comments about specific OMF South alternatives.

5.2.3.1 General or Project-Wide Comments

The most common general themes in the public comments, outside of statements for or against a particular alternative, concerned impacts to the community or neighborhood due to displacements of residents, businesses, and employees as well as impacts to natural resources such as streams, wetlands, and habitat. Six individuals submitted a comment letter that expresses opposition to the Federal Way alternatives and asks Sound Transit to reconsider other sites, particularly in Fife. The letter cites ecosystem concerns, and land use and zoning issues as reasons why the Federal Way sites should not be chosen.

5.2.3.2 Preferred Alternative

Of the 37 commenters who expressed support for a particular site, 10 supported the Preferred Alternative (one supported both the Preferred or South 344th Street alternative), citing the alternative’s proximity to SR 99 and the belief that the current uses on the site could be relocated in the area. Of the 22 commenters that expressed opposition to a particular site, 17 opposed the selection of the Preferred Alternative (nine expressed opposition to both the Preferred and South 344th Street alternatives). Most of these commenters feel that Federal Way has been disproportionately affected by Sound Transit projects.

5.2.3.3 South 344th Street Alternative

Of the 37 commenters who expressed support for a particular site, two supported the South 344th Street Alternative (one supported either the Preferred or South 344th Street alternative) because of its proximity to I-5. Of the 22 commenters who expressed opposition to a particular site, 11 opposed the selection of the South 344th Street Alternative, citing impacts to businesses and employment (nine expressed opposition to both the Preferred and South 344th Street alternatives).

5.2.3.4 Midway Landfill Alternative

Of the 37 commenters who expressed support for a particular site, 22 supported the Midway Landfill Alternative. Supporters cited the relative lack of impacts to businesses and natural resources. Of the 22 commenters who expressed opposition to a particular site, three opposed the selection of the Midway Landfill Alternative: one with no reason cited, the others expressing concern over construction at a Superfund site and the uncertainties around cost and schedule.

5.3 Responses to Common Comments

Sound Transit reviewed all comments submitted during both comment periods. Appendix L, Draft EIS Comments and Responses includes responses to each of the comments received during the comment periods. Many of the comments expressed similar themes, such as support for a particular alternative or concern about a specific issue. Table 5.3-1 provides responses to the most common comments. These responses are also referenced in Appendix L, using the common comment number found in the first column of the table.

Table 5.3-1 Responses to Common Comments

Number	Common Comment	Response
1	Sound Transit underestimated the impacts associated with business and employee displacements. The EIS should report an accurate number of employee displacements, or the total number of jobs gained or lost. Specifically, neither Ellenos Yogurt nor GarageTown could be easily relocated, and the impacts to those properties are not characterized adequately. GarageTown comprises multiple owners.	The number of displaced employees is based on the business building size (taken from King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers. While not an actual survey of businesses, it allows an equal comparison between alternatives without having to access confidential or proprietary business information. The Final EIS does not calculate a net job gain or loss because relocation decisions are determined by individual business owners. Some displaced businesses may choose to relocate, while others may choose to permanently close when their property is purchased. As described in Section 3.3., Acquisitions, Displacements, and Relocations, Sound Transit provides relocation assistance to displaced businesses and, on past projects, has successfully helped many businesses that chose to relocate within the project area. To estimate the number of GarageTown owners, Sound Transit used GarageTown's website to count the number of displaced units. The Final EIS acknowledges that both Ellenos Yogurt and GarageTown are unique facilities that would be challenging to relocate. This is described in Section 3.3, Acquisitions, Displacements, and Relocations.
2	There would be too many residential displacements with either of the alternatives in Federal Way. Many of these displacements would affect lower income and/or elderly residents. Relocation of residents of Belmor Mobile Home Park is of particular concern.	The Preferred Alternative would displace up to 97 residences, mostly concentrated in the Belmor residential area. Section 3.3, Acquisitions, Displacements, and Relocations, describes the relocation benefits for displaced residents (both owners and tenants); it also provides specific information about relocation of mobile homes. Displacements from all alternatives would occur in areas with concentrations of minority and low-income populations. Appendix E, Environmental Justice Assessment, discusses how displacements would affect low-income and minority populations and how Sound Transit would provide advisory services to help find comparable housing for these residents. For properties that require relocation, Sound Transit's policies and procedures comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Washington State's relocation and property acquisitions requirements. In some cases, Sound Transit provides advisory services to property owners above the minimum requirements of federal and state law. Sound Transit would compensate affected property owners in accordance with Sound Transit's Real Estate Property Acquisition and Relocation Policy, Procedures, and Guidelines (Sound Transit 2017). Benefits would depend on the level of impact, available relocation options, and other factors. Sound Transit would offer relocation assistance that includes compensation and supporting services that consider the needs of those being relocated to help reduce inconveniences or hardships. Sound Transit would also satisfy federal and state requirements for residential relocation, which define a "comparable replacement dwelling" as having the following attributes: • Decent, safe, and sanitary. • Adequate in size to accommodate the occupants. • Within the financial means of the displaced person. • Functionally equivalent.

Table 5.3-1 Response to Common Comments (continued)

Number	Common Comment	Response
		• In an area not subject to unreasonable adverse environmental conditions. • In a location generally not less desirable than the location of the displaced person's dwelling with respect to public utilities, facilities, services, and the displaced person's place of employment. To meet these requirements, Sound Transit may identify relocation properties that are in better condition and of higher value than the properties being acquired. If so, tenants may be eligible for a down payment or rent supplement.
3	Hylebos Creek and associated wetlands are important and need to be protected.	Section 3.10, Ecosystem Resources, of the Final EIS discusses the project's anticipated impacts (and proposed mitigation) to two tributaries to Hylebos Creek and associated wetlands. In addition, the Final EIS recognizes that the project would impact existing vegetation, including mature forested buffer areas. Impacts to the two tributaries to Hylebos Creek and wetlands have been avoided and minimized where possible during conceptual design. After publication of the 2021 SEPA Draft EIS, Sound Transit modified the design of the Preferred Alternative to reduce impacts to streams and wetlands. Further avoidance and minimization of wetland impacts would occur during future design and permitting of the project. Native vegetation would be restored in wetlands and buffers temporarily affected by construction. Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. As part of the Section 404 and Section 401 permitting process under the Clean Water Act, Sound Transit would work with Tribes and resource agencies to develop a mitigation approach. As part of this approach, Sound Transit would develop plans for compensatory mitigation for the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis. Potential mitigation areas downstream of the preferred alternative would enhance and restore wetlands and streams that contribute to the overall health of salmonids in the West Fork Hylebos Creek drainage. To the extent possible, off-site compensatory mitigation sites would be identified and would compensate for lost values in kind.
4	Comments limited to expressing a preference or objection to one or more alternatives, including preferences or objections supported by non-substantive comments or analysis already provided in the EIS. In particular, many commenters expressed a preference for the Midway Landfill Alternative based on the following reasons: • Large, mostly vacant site • Relatively few natural environment impacts • Relatively few business displacements • No residential displacements	Sound Transit reviewed all comments submitted during the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS comment periods. NEPA and SEPA require Sound Transit to respond to substantive comments related to the content of the Draft EIS, but not to questions or comments limited to public policy decisions (e.g., general statements of support or opposition). Before identifying the Preferred Alternative, the Sound Transit Board received a comment summary report that included a copy of all comments submitted on the 2021 SEPA Draft EIS in November 2021. Appendix L of the Final EIS includes copies of the comments and responses to substantive comments made on both the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS. The Midway Landfill Alternative was initially identified for study largely due to attributes that many commenters found appealing. While the Board did not identify the Midway Landfill Alternative as the Preferred Alternative for evaluation in the Final EIS, it is being carried forward as an alternative for consideration. After considering the Draft EIS comments, analysis in the Final EIS, and other factors, the Sound Transit Board will select the project to be built.

Table 5.3-1 Response to Common Comments (continued)

Number	Common Comment	Response
	- Brownfield redevelopment potential Commenters opposed the South 344th Street Alternative based on the following reasons: - Greatest number of business and employee displacements - Impacts to GarageTown and Ellenos Yogurt - Ecosystem impacts - Residential displacements due to the mainline alignment Reasons commenters gave for opposing the Preferred Alternative included: - Ecosystem impacts - Displacement of Christian Faith Center - Residential displacements due to the mainline alignment	
5	Sound Transit should identify sources of federal funding for the project. Specifically, there are funds related to Superfund site redevelopment that could lower the costs of developing the Midway Landfill Alternative.	Sound Transit executed a grant agreement with the FTA in December 2023 for $4.9M in 5307 funds for OMF South. Sound Transit will continue pursuing applicable federal funding sources to help fund the project including, but not limited to FTA's Capital Investments Grants programs (e.g., Expedited Project Delivery, Full Funding Grant Agreement), a U.S. DOT Build America Bureau Transportation Infrastructure Finance and Innovation Agreement (TIFIA) loan, and other federal sources such as EPA programs (e.g., Brownfields and Climate Pollution Reduction).

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix A: Environmental Impact Statement Support Information

Federal Transit Administration

SoundTransit

June 2024

Appendix A: Final Environmental Impact Statement Support Information

Appendix A1	List of Preparers
Appendix A2	Distribution List
Appendix A3	Glossary
Appendix A4	References

Appendix A1 – List of Preparers

Sound Transit

Elma Borbe – Senior Environmental Planner
Ted Ellis – Acting Executive Operations Director – Transit Expansion
Erin Green – South Corridor Environmental Manager
Curvie Hawkins – Project Development Director
Sagar Ramachandra – Community Outreach
Jennifer Schreck – Senior Cultural Resources Specialist
Alex Stevenson – Cultural Resources Manager
Teresa Vanderburg – Senior Environmental Permitting Specialist

HDR (Consultant Project Team Lead/Engineering Design)

MarySue Abel – Project Manager
Victoria Hsu – Air Quality and Greenhouse Gas Emissions
Tanya Kalaskar – Air Quality and Greenhouse Gas Emissions
Pablo Lopez-Hilfiker – Lead Engineer, Preliminary Engineering
Kenneth McDonald – Project Engineer
Cherie Quincieu – Project Assistant
Andrew Scheppe – Project Engineer
Zachary Silberman – GIS Mapping
Eleanor Smith – GIS Mapping
Chelsey Yan – Sustainability

Parametrix (Primary EIS Contributor)

Josh Ahmann – GIS
Matt Austin – Utilities
Julie Brandt – Water Resources
Kelly Carini – Hazardous Materials/Geology and Soils
Jill Czarnecki – Senior Environmental Planner
Debbie Fetherston – Document Production Lead
Arianna Frender – Water Resources
Mike Hall – Ecosystem Resources
Anna Hoenig – Ecosystem Resources
Steve Krueger – Ecosystem Resources
Mark Mazzola – Environmental Lead
Alicia McIntire – Transportation
Savannah Moore – Cumulative Impacts

Adam Romey – Hazardous Materials/Geology and Soils
Katheryn Seckel – Public Services/Section 4(f)
Margaret Spence – Energy/Electromagnetic Fields
Kathleen Stephanick – Senior Environmental Planner
Jens Swenson – Visual and Aesthetic Resources/Parks and Recreational Resources
Susan Swift – Editor
Bryan Townley – Transportation
Emily Welter – Transportation
Alyssa Worsham – Acquisitions
Josh Wozniak – Ecosystem Resources
Patricia Yi – Graphics

ECONorthwest (Land Use and Economics)

Taylor Burton

Jennifer Cannon

Barrett Lewis

Morgan Shook

Two Hundred (Visual and Aesthetic Resource Simulations)

Morgan Richards

John Richards

Cross Spectrum Acoustics Inc. (Noise and Vibration)

Lance Meister

Aqua Terra Cultural Resource Consultants (Archaeology)

Sarah Amell

Edgar Huber

Andrew Viloudaki

Historical Research Associates, Inc. (Historic and Archaeological Resources)

Ron Adams

Chrisanne Beckner

Gabe Frazier

EnviroIssues (Public Outreach)

Sophie Cottle

Nyles Green

Nicolas Kadir Jensen

Chris Johnstone

Alayna Linde

Appendix A2 – Distribution List

Federal Agencies

Bonneville Power Administration
Federal Aviation Administration, Northwest Mountain Region
Federal Highway Administration, Washington State Division
National Oceanic and Atmospheric Administration, Fisheries (NOAA Fisheries)
U.S. Army Corps of Engineers
U.S. Bureau of Indian Affairs, Northwest Region
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency, Region 10

Tribes

Muckleshoot Indian Tribe
Nisqually Indian Tribe
The Puyallup Tribe of the Puyallup Reservation
Snoqualmie Indian Tribe
Squaxin Island Tribe of the Squaxin Island Reservation
Suquamish Indian Tribe of the Port Madison Reservation
The Confederated Tribes and Bands of the Yakama Nation

State Agencies

Washington State Department of Archaeology and Historic Preservation
Washington State Department of Ecology
Washington State Department of Fish and Wildlife
Washington State Department of Natural Resources
Washington State Department of Social and Health Services
Washington State Department of Transportation
Washington State Parks
Washington State Patrol
Washington State Recreation and Conservation Office

Regional Agencies

Puget Sound Regional Council
Puget Sound Clean Air Agency
South King Fire and Rescue

Copies provided for Public Reference

Kent City Hall
Kent Commons Community Center
Kent Library
Federal Way City Hall
Federal Way Community Center
Federal Way Library
Federal Way 320th Library

Counties

King County

Transit Agencies

King County Metro Transit
Pierce Transit

Local Agencies

City of Des Moines
City of Federal Way
City of Kent

Utility Providers

Lumen
City of Federal Way Public Works
City of Kent Public Works
Comcast
Highline Water District
Lakehaven Water and Sewer District
MCImetro Access Transmission Services, LLC
Midway Sewer District
Puget Sound Energy
Seattle Public Utilities
Zayo Group, LLC

Appendix A3 – Glossary

Air pollutant. Smoke, dust, fumes, or odors in the ambient air that have the potential for harmful effects.

Alignment. Horizontal geometric elements, which define the location of the light rail track or roadway.

Aquatic resource. The physical elements of the aquatic environment, such as streams, rivers, lakes, and shorelands; as well as life forms such as aquatic plants and fish that live within the aquatic environment.

Aquifer. An underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.

Arterial. A major thoroughfare used mainly for through traffic rather than access to adjacent property. Arterials generally have greater traffic-carrying capacity than collector or local streets and are designed for continuously moving traffic.

At-grade. Term used to express that a feature, such as a rail track or crosswalk, and a roadway meet at the same elevation.

Attainment area. An attainment area is an area considered to have air quality as good as or better than the national ambient air quality standards for specific pollutants as defined in the Clean Air Act.

A-weighted sound level (dBA). To approximate the way humans interpret sound, a filter circuit with frequency characteristics similar to the human hearing system is built into sound measurement equipment. Measurements with this filter enacted are referred to as A-weighted sound levels, expressed in dBA (see Decibel).

Ballast. Gravel or coarse stone used to form the bed of a railroad track or road.

Best management practices (BMPs). Approved physical, structural, and/or managerial practices that, when used singularly or in combination, prevent or reduce pollutant discharges.

Buffer. An area adjacent a critical area (e.g., wetland or stream) that functions to avoid loss or decline in ecological functions and values. In addition to preserving the ecological functions of a wetland system, a buffer physically isolates a critical area from potential disturbance and harmful intrusion, and works to minimize risk to the public from loss of life, well-being, or property damage.

Capacity, vehicle. The maximum number of vehicles that can be accommodated in a given time by a transit or highway facility.

Capital costs. Nonrecurring costs required to construct transit systems, including costs of right-of- way, facilities, rolling stock, power distribution, and the associated administrative and design costs, as well as financing charges during construction.

Carbon monoxide (CO). A colorless, odorless, tasteless gas, and one of the U.S. Environmental Protection Agency's criteria air pollutants released from automobile exhaust.

Census tract. A census tract is a small subdivision of an urban area used by the U.S. Census Bureau to identify population and housing statistics. Census blocks are subdivisions of census tracts and are the smallest unit of census geography for which the Census Bureau collects data. The boundaries of census blocks are generally streets or other notable physical features and often correspond to a city block. A census block group is a combination of census blocks, typically encompassing two to four city blocks.

The U.S. Census collects some information at the block level, some at the block group level, and some at the tract level.

Concentration (also, level). A measure of the air pollutant in the ambient air, having the units of mass per volume.

Conformity (air quality). A process that ensures federal funding and approval goes to transportation activities consistent with federal air quality goals. The Federal Highway Administration and the Federal Transit Administration jointly determine that specific regions meet air quality standards.

Construction staging area. During construction, a site temporarily used for materials or equipment storage, assembly, or other temporary, construction-related activities.

Criteria air pollutants. Those air pollutants that have been recognized by the U.S. Environmental Protection Agency as potentially harmful and for which standards have been set to protect the public health and welfare. The criteria air pollutants are carbon monoxide, sulfur dioxide, particulates, nitrogen dioxide, ozone, hydrocarbons, and lead.

Day night sound level (Ldn). Ldn is a 24-hour equivalent continuous sound level (Leq), but with a 10-dB penalty assessed to noise events occurring at night. Nighttime is defined as 10 pm to 7 am. This strongly weights Ldn toward nighttime noise because most people are more easily annoyed by noise during the nighttime hours when background noise is lower and most people are sleeping.

dBA. The sound level obtained through the use of A-weighting characteristics specified by the American National Standards Institute (ANSI) Standard S1.4-1971. The unit of measure is the decibel (dB), commonly referred to as dBA when A-weighting is used. The “A” weighting scale closely resembles human response to noise.

Decibel. The unit used to measure the loudness of noise.

De minimis. De minimis is a Latin phrase meaning something of insignificance or negligible. De minimis impacts are defined as those elements that do not adversely affect the activities, features, and attributes of a Section 4(f) resource or property.

Dewatering. The temporary removal of ground or surface water from a construction area to allow construction to be done under dry conditions.

Displacement. A property acquisition that would require removing an existing use.

Elevated mainline. A mainline that is positioned above the normal activity level (e.g., elevated structure for light rail to cross over a street).

Emission. Particulate, gaseous, noise, or electromagnetic byproducts of the transit system or vehicle.

Endangered species. According to the Endangered Species Act of 1973, an endangered species is any species in danger of extinction throughout all or a significant portion of its range, other than an insect determined by the Secretary of the Interior to constitute a pest whose protection under the provisions of this act would present an overwhelming and overriding risk to man.

Equivalent level (Leq). Leq is a measure of sound energy over a period of time. It is referred to as the equivalent sound level because it is equivalent to the level of a steady sound which, over a referenced duration and location, has the same A-weighted sound (dBA) energy as the fluctuating sound.

Forest habitat. In the Puget Sound lowlands, a habitat type generally dominated by Douglas fir, western red cedar, and western hemlock, frequently with a hardwood understory. The ground cover is generally lush. Birds and small mammals abound, and larger mammals are common in large stands.

Full acquisition. The full parcel would be acquired, and the current use would be displaced. Full acquisitions include parcels that might not be fully needed for the project but would be affected to the extent that current uses would be substantially impaired (e.g., loss of parking or access).

Glacial till. This type of soil typically consists of a diverse mix of gravelly sand with scattered cobbles and boulders in a clay/silt matrix. It is very dense and is locally referred to as “hardpan.” The predominant glacial till encountered in the project area is Vashon-age glacial till.

Grade separated. Parallel or crossing lines of traffic that are vertically or horizontally physically separated from each other and do not share a common intersection.

Greenhouse gas (GHG). Greenhouse gases include carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), hydrofluorocarbons (HFCs), and perfluorocarbons. (PFCs), and sulfur hexafluoride (SF6). These gas emissions are collectively leading to the greenhouse effect, trapping the sun’s solar rays and leading to an increase in Earth temperature.

Groundborne noise. Noise that is transmitted through the ground, typically reported in decibels.

Groundborne vibration. A small but rapidly fluctuating motion transmitted through the ground, typically reported as velocity or acceleration.

Habitat function. Terrestrial plant communities, wetlands, and aquatic systems such as streams provide a variety of functions in the environment. For instance, depending on the condition and location of a wetland, wetland functions might include water quality improvement, groundwater recharge, nutrient and sediment filtering, and habitat for a variety of animals, as well as education and recreation opportunities for people—the habitat function is one of several functions potentially performed by wetlands. Similarly, terrestrial and aquatic systems each also may perform many functions. When they provide habitat for animals, they are said to be performing or providing a “habitat function.”

Habitat value. The value of a plant community’s function as determined by the habitat’s ability to support the needs of biological species. High-value habitats are those that support or may support threatened, endangered, and/or sensitive species as determined by federal, state, and local jurisdictions.

Hazardous materials. Hazardous materials are materials, which, because of their chemical, physical, or biological nature, pose a potential risk to life, health, or property when released. Such materials include hazardous waste, dangerous waste, hazardous substances, and toxic substances.

Headway. The headway between vehicles in public transit systems is the amount of time (usually in minutes) that elapses between two vehicles passing the same point traveling in the same direction on a given route.

High-capacity transit. A system of public transportation services within an urbanized region operating principally on exclusive rights-of-way; examples include light rail transit or express buses on exclusive bus ways and their supporting services.

Hours of service. The number of hours during the day between the start and end of service on a transit route, also known as the service span.

Lead Track. A track connecting a railroad yard or facility with a mainline track.

Ldn. The day/night average noise level.

Leq. The equivalent steady-state sound level that, in a specified time period, would contain the same acoustic energy as the varying sound level during the same period; considers volume capacity, travel speeds, and delay.

Leq(h). The hourly value of Leq**.**

Level of service (LOS). A qualitative measure that represents the collective factors of travel under a particular volume condition. A measure of traffic congestion.

Light rail transit (also light rail). A mode of mass transportation comprising light rail vehicles, which travel on steel tracks and are powered by electricity from overhead wires. This mode is characterized by its ability to operate in at-grade and/or grade-separated environments.

Link. Sound Transit’s light rail system.

Low income. A person whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

Low income population. Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by the project.

Mainline. Track that is used for LRVs or is the principal artery of a system to which other components (such as operation and maintenance facilities) are connected (see Elevated Mainline).

Maintenance area. Maintenance areas are geographic areas with a history of nonattainment of National Ambient Air Quality Standards (NAAQS), but they now consistently meet NAAQS.

Megawatt (MW). 1,000,000 watts.

Minority. A person who is:

- Black - A person having origins in any of the black racial groups of Africa;
- Hispanic or Latino - A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
- Asian - A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
- American Indian or Alaskan Native - A person having origins in any of the original people of North or South America, including Central America, and who maintains cultural identification through tribal affiliation or community recognition; or
- Native Hawaiian or Other Pacific Islander - A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Minority population. Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by the project.

Mobility. The ease of continuous movement along the transportation system.

Mode. A particular form or method of travel, such as pedestrian, bicycle, automobile, bus, or light rail.

Model Toxics Control Act (MTCA). The Model Toxics Control Act Cleanup Regulation, WAC 173-340, implements the Model Toxics Control Act, RCW 70.105D, which addresses strict requirements for site discovery and reporting, site assessments, and site remediation. Most important, the regulation defines standard methods used to assess whether a site is contaminated or clean.

National Ambient Air Quality Standards (NAAQS). Federal limits on levels of atmospheric contamination necessary to protect the public from adverse effects on health (primary standards) and welfare (secondary standards).

National Historic Preservation Act of 1966 (NHRA). The Act that established the National Register of Historic Places and State Historic Preservation program and set forth guidelines and regulations for environmental review of projects involving federal funding.

National Register of Historic Places (NRHP). The official list of the nation’s cultural resources determined to be worthy of preservation; the register is maintained by the National Park Service.

Network. A system of real or hypothetical interconnecting links that forms the configuration of transit routes and stops comprising the total system.

Nonattainment area. An area designated by the U.S. Environmental Protection Agency as currently violating the National Ambient Air Quality Standards, based on archival air quality data.

NO_X. Oxides of nitrogen (nitrogen oxide and nitrogen dioxide). The pollutants released during high-temperature combustion of fossil fuels such as diesel.

Off-peak. Those periods of the day when demand for transit service is not at a maximum.

Operating costs. Recurring costs incurred in operating transit systems, including wages and salaries, maintenance of facilities and equipment, fuel, supplies, employee benefits, insurance, taxes, and other administrative costs. Amortization of facilities and equipment is not included.

Ozone. A gas consisting of three oxygen atoms formed in reactions of nonmethane hydrocarbons and nitrogen oxides in the presence of sunlight. Ozone is one of the U.S. Environmental Protection Agency's criteria air pollutants.

Partial acquisition. Part of a parcel would be acquired, but the current use generally would not be displaced. In some instances, such as larger parcels that hold multiple uses, a business or residential unit on a parcel could be displaced, but most uses would remain.

Particulate matter. A mixture of extremely small particles and liquid droplets that is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. U.S. Environmental Protection Agency is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs.

Peak hour. The hour of the day in which the maximum demand for service is experienced, accommodating the largest number of automobile or transit patrons.

Peak period. A time period or periods when travel activity is at its heaviest.

Pollution-Generating Impervious Surface (PGIS). Impervious surfaces considered to be a significant source of pollutants in stormwater runoff. Such surfaces include those subject to vehicular use, industrial activities (as defined in Washington State Department of Ecology's Stormwater Management Manual), or storage of erodible or leachable materials, wastes, or chemicals, and which receive direct rainfall or the run-on or blow-in of rainfall.

Preferred alternative. Following publication of the Draft EIS, the Sound Transit Board identifies a preferred alternative, including route and station options. The Final EIS will further evaluate the preferred alternative as well as other alternatives. A preferred alternative is not an action or decision within the meaning of WAC 197-11-070.

Recessional outwash. Sediment deposited by meltwater streams flowing away from a retreating glacier during the last episode of glaciation.

Reliability. How often transit service is provided as promised; affects waiting time, consistency of passenger arrivals from day to day, total trip time, and loading levels.

Right-of-way. The corridor (horizontal and vertical space) owned by the transit agency for the transportation way.

Riparian habitat. A habitat type associated with stream or river margins and characterized by dense vegetation consisting primarily of willow, alder, and cottonwood species, supporting a wide variety of waterfowl, songbirds, amphibians, and small mammals.

Runoff. The rainwater that directly leaves an area in surface drainage, as opposed to the amount that seeps out as groundwater.

Section 106. Section 106 of the National Historic Preservation Act of 1966 established a procedure to review the potential effects on cultural resources by projects that involve a federal action.

Section 4(f). Section 4(f) of the U.S. Department of Transportation Act restricts the United States Department of Transportation's approval of projects affecting the following properties: publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge, or any land from a significant historic site.

Section 401. Section 401 of the Clean Water Act is a certification program administered by the Washington Department of Ecology under guidelines of the U.S. Environmental Protection Agency to ensure projects applying for a Section 404 permit comply with state water quality standards and other requirements of the state law.

Section 404. Section 404 of the Clean Water Act is a permit program administered by the U.S. Army Corps of Engineers under guidelines by the U.S. Environmental Protection Agency to protect the nation's waters from dredged and fill sources.

Section 6(f). Section 6(f) of the Land and Water Conservation Act of 1965 established restrictions on, and replacement requirements for, the use of land acquired with funds authorized under the Land and Water Conservation Fund Act.

Sensitive receptor (Auditory). A local area or site that supports activities easily disrupted by audio intrusions or distractions, such as a school, historic landmark, or residential neighborhood.

Sensitive view. A view that is identified by local jurisdictions as requiring protection.

Social interaction. Intra-neighborhood communication and circulation using street, sidewalk, and bikeway connections between residential areas and community facilities, retail businesses, and employment centers. Also includes verbal interaction and telecommunications facilities.

Sound Transit 2 (ST 2). A package of high-capacity transit investments in the regional transit system, adopted by the Sound Transit Board in July 2008, which included light rail as the mode choice for the project corridor. ST 2 includes a major expansion of the Link light rail system. ST 2 would extend light rail from North Seattle into Snohomish County, across Lake Washington into East King County, and south of SeaTac International Airport to Federal Way.

Sound Transit 3 (ST 3). Sound Transit 3, for which financing was approved by voters in 2016, includes the expansion of bus, bus rapid transit, commuter rail, and light rail service throughout the region. Under Sound Transit 3, the light rail system in central Puget Sound would grow to 116 miles with over 80 stations. Light rail would expand north to Everett, south to Federal Way and Tacoma, east to Redmond, south Kirkland, and Issaquah, and west to West Seattle and Ballard.

Staging area. Section of land near a construction site designated for equipment and truck storage, maintenance, and warm-up prior to engagement in construction activities.

Stormwater. Stormwater is rain and snow melt that runs off surfaces such as rooftops, paved streets, highways, and parking lots. As water runs off these surfaces, it can pick up pollution.

Stormwater detention. The temporary storage of stormwater runoff and subsequent release at a slower rate.

Stormwater treatment. Stormwater ponds and underground vaults are used to remove sediments and dissolved metals from stormwater. They collect sediments on the bottom of the pond or vault, where maintenance workers can clean them out on a regular basis.

Subduction zone. An area where one crustal plate is descending below another. The Puget Sound area is close to a subduction zone, which is formed by the Juan de Fuca plate descending below the North American plate. This action can cause significant seismic activity.

Threatened species. According to the Endangered Species Act of 1973, any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Till. A poorly sorted, gravel-like deposit of sediment that is left behind by a glacier, which does not show stratification. Till is sometimes called boulder clay because it is composed of clay, boulders of intermediate sizes, or a mixture of these.

Transit. A transportation system principally for moving people in an urban area and made available to the public usually through paying a fare.

Transit center. A station with shelters where a large number of transit vehicles and passengers can be brought together with safety and convenience.

Transit-oriented development. The Transportation Research Board provides several definitions of transit-oriented development that emphasize high-quality walking environments, mixed land uses, and high-density developments linked to transit. Generally, transit agencies agree that what constitutes a transit-oriented development is a pattern of dense, diverse, pedestrian-friendly land uses near transit nodes that, under the right conditions, translates into higher transit patronage.

Travel time (in vehicle). The time required to travel between two points, not including terminal or waiting time.

Trip. The one-way movement of one person between the origin and the destination, including transfers, and the walk distance to and from the means of transportation.

Unity. In visual analysis, the visual coherence and compositional harmony of the landscape.

Use of Section 4(f) land. According to regulations of the U.S. Department of Transportation, use of Section 4(f) land is defined as: (1) acquisition of title or easement to land, or (2) in unusual circumstances, serious indirect impacts, such as increase in noise, visual intrusion, or access obstruction.

Vehicle hours of travel (VHT). The total vehicle hours expended traveling on the roadway network in a specified area during a specified time period.

Vibration velocity. Vibration velocity is the basic measure of groundborne vibration. It is a measure of the rate at which particles in the ground are oscillating relative to the equilibrium point.

Vibration velocity level. It is generally accepted that, over the frequency range important for groundborne vibration from transit systems, human response to vibration is best correlated to the root mean square (rms) vibration velocity.

Viewer sensitivity. The extent of the viewer’s concern for a particular view or viewshed. Viewer sensitivity to the viewed environment is classified as low, average, or high.

View. A scene observed from a given vantage point.

Viewshed. An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point.

Visual character. Refers to identifiable visual information, including visual elements and major environmental features.

Visual quality. Refers to the evaluation of the visual experience to the public and is described in terms of vividness, intactness, and unity. *Vividness* refers to the way landscape components combine in distinctive and memorable visual patterns. *Intactness* refers to whether the natural and human-built visual patterns form a consistent landscape, or whether highly contrasting features intrude into the view. *Unity* refers to the visual coherence and compositional harmony of the landscape considered as a whole. Visual quality is an assessment of the visual character and is categorized as low, medium, or high, as follows:

Low visual quality. Views that lack a dominant visual character in which there is a low level of fit between disparate elements. In some cases, these views appear disorganized with features that seem out of place, or are views with some compositional harmony but include eyesore elements that can dominate one’s perception.

Medium visual quality. Views with a unity or compositional harmony between elements of the landscape that produce a pleasing overall impression in which encroaching elements are minor and do not substantially alter the perception of the landscape as a unit. These views lack vivid, memorable features and are generally characterized as common or ordinary.

High visual quality. Views with vivid, memorable, distinctive features in a landscape with compositional harmony or that fit between elements of the landscape that is free from encroaching elements.

Washington State Department of Ecology 303(d) List. The federal Clean Water Act (CWA), adopted in 1972, requires states to restore their waters to be “fishable and swimmable.” The CWA established a process to identify and clean up polluted waters. Every 2 years, all states are required to prepare a list of water bodies that do not meet water quality standards. This list is called the 303(d) list because the process is described in Section 303(d) of the CWA.

Appendix A4 – References

Fact Sheet

Sound Transit (Central Puget Sound Regional Transit Authority). 2014a. Regional Transit Long-Range Plan Update. Adopted December 18, 2014. Available at: https://www.soundtransit.org/sites/default/files/documents/2015123_lrpupdate.pdf. Accessed July 14, 2020.

Sound Transit. 2014b. Regional Transit Long-Range Plan Update Final Environmental Impact Statement. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/long-range-plan-final-supplemental-environmental-impact-statement. Accessed July 14, 2020.

Sound Transit. 2016a. Federal Way Link Extension Final Environmental Impact Statement. Prepared by HDR Engineering, Inc. and CH2M HILL, Seattle, WA. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/federal-way-link-extension-final-environmental-impact-statement. Accessed July 16, 2020.

Sound Transit. 2016b. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. Adopted June 2016. Available at: https://www.soundtransit.org/sites/default/files/project-documents/st3-system-plan-2016.pdf. Accessed July 14, 2020.

Sound Transit. 2018a. Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Information Report. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/tacoma-dome-link-extension-early-scoping-information-report. Accessed July 14, 2020.

Sound Transit. 2018b. Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Summary Report. Available at: https://www.soundtransit.org/sites/default/files/project-documents/AE%25200030-17%25205.3.C%2520Early%2520Scoping%2520Summary%2520Report%2520and%2520Appendices%2520.pdf. Accessed 2020.

Sound Transit. 2019a. OMF South Alternatives Evaluation Technical Memorandum. Prepared by MWilliams & Associates and HDR Engineering, Inc., Seattle, WA. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf. Accessed July 14, 2020.

Sound Transit. 2019b. Operations and Maintenance Facility South Scoping Information Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-scoping-information-report.pdf. Accessed July 14, 2020.

Sound Transit. 2019c. Operations and Maintenance Facility South Scoping Summary Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-scoping-report-summary.pdf. Accessed 2020.

Executive Summary

Sound Transit. 2016. Federal Way Link Extension Final Environmental Impact Statement. Prepared by HDR Engineering, Inc. and CH2M HILL, Seattle, WA. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/federal-way-link-extension-final-environmental-impact-statement. Accessed July 16, 2020.

WSDOT (Washington State Department of Transportation). 2022. Roadside Policy Manual. Available at: https://www.wsdot.wa.gov/publications/manuals/fulltext/m3110/rpm.pdf. Accessed December 2022.

Chapter 2. Alternatives Considered

Ecology (Washington State Department of Ecology). 2003. State Environmental Policy Act Handbook. Washington State Department of Ecology Publication #98-114. September 1998. Updated 2003. Available at: https://fortress.wa.gov/ecy/publications/documents/98114.pdf. Accessed July 14, 2020.

Sound Transit (Central Puget Sound Regional Transit Authority). 1996. Sound Move, the Ten-Year Regional Transit System Plan. Adopted May 31, 1996. Available at: https://www.soundtransit.org/sites/default/files/documents/199605-sound-move-ten-year-regional-transit-system-plan.pdf. Accessed July 14, 2020.

Sound Transit. 2004. Environmental Policy. Adopted April 2004. Available at: https://www.soundtransit.org/sites/default/files/documents/pdf/about/environment/environmental-policy.pdf. Accessed 2020.

Sound Transit. 2008. Sound Transit 2: A Mass Transit Guide. The Regional Transit System Plan for Central Puget Sound. Adopted July 2008. Available at: https://www.soundtransit.org/sites/default/files/documents/st2_plan_web.pdf. Accessed July 14, 2020.

Sound Transit. 2014. Regional Transit Long-Range Plan Update. Adopted December 18, 2014. Available at: https://www.soundtransit.org/sites/default/files/documents/2015123_lrpupdate.pdf. Accessed July 14, 2020.

Sound Transit. 2016a. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. Adopted June 2016. Available at: http://soundtransit3.org/document-library. Accessed July 14, 2020.

Sound Transit. 2016b. Federal Way Link Extension Final Environmental Impact Statement. Prepared by HDR Engineering, Inc. and CH2M HILL, Seattle, WA. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/federal-way-link-extension-final-environmental-impact-statement. Accessed July 16, 2020.

Sound Transit. 2018a. Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Information Report. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/tacoma-dome-link-extension-early-scoping-information-report. Accessed July 14, 2020.

Sound Transit. 2018b. Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Summary Report. Available at: https://www.soundtransit.org/sites/default/files/project-documents/AE%25200030-17%25205.3.C%2520Early%2520Scoping%2520Summary%2520Report%2520and%2520Appendices%2520.pdf. Accessed July 14, 2020.

Sound Transit. 2018c. Operations and Maintenance Facility South Pre-Screening Technical Memorandum. Prepared by MWilliams & Associates/HDR, Seattle, WA.

Sound Transit. 2019a. Pre-Screening and Level 1 Alternatives Evaluation Report. Prepared by HDR and Parametrix. February 2019.

Sound Transit. 2019b. Level 2 Alternatives Evaluation Report. Prepared by HDR and Parametrix. August 2019.

Sound Transit. 2019c. OMF South Alternatives Evaluation Technical Memorandum. Prepared by MWilliams & Associates and HDR Engineering, Inc., Seattle, WA. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf. Accessed July 14, 2020.

Sound Transit. 2019d. Operations and Maintenance Facility South Scoping Information Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-scoping-information-report.pdf. Accessed July 14, 2020.

Sound Transit. 2019e. Operations and Maintenance Facility South Scoping Summary Report. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/operations-maintenance-facility-south-scoping-summary-report. Accessed July 14, 2020.

Sound Transit. 2019f. Sustainability Plan – 2019 Update. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/2019-sustainability-plan. Accessed July 14, 2020.

Chapter 3. Affected Environment, Significant Impacts, and Mitigation Measures

Section 3.2. Transportation

City of Federal Way. 2011. 2010 Estimated Weekday ADT (PDF). Electronic document, https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/Traffic/Resources/ADTmap.PDF. Accessed June 2020.

City of Federal Way. 2015 (revised). Final Comprehensive Plan. Available at: https://www.cityoffederalway.com/content/comprehensive-plan. Accessed November 10, 2020.

City of Federal Way. 2019. Development Standards Manual. Federal Way Department of Public Works, 2019. Available at: https://docs.cityoffederalway.com/WebLink/DocView.aspx?id=789818&dbid=0&repo=CityofFederalWay&cr=1. Accessed December 2022.

City of Kent. 2008. Transportation Master Plan Final Report. Prepared for City of Kent Public Works Department. Prepared by Fehr & Peers|Mirai in association with Henderson Young & Company, Nelson/Nygaard, The Transpo Group, and CH2M Hill. Kirkland, WA.

City of Kent. 2009. Average Daily Traffic Volume. Available at: https://www.kentwa.gov/home/showdocument?id=4052. Accessed November 10, 2020.

King County Metro Transit. 2020. King County Metro Homepage. Available at: https://kingcounty.gov/depts/transportation/metro.aspx. Accessed November 10, 2020.

King County Metro. 2023. Utilization data for Federal Way S 320th Street Park & Ride: Q3 2018 to Q4 2023. Unpublished Excel file from S. Weinberger, Intern, King County Metro to Parametrix, Seattle, WA. March 2, 2023.

Pierce Transit. 2020. Pierce Transit Bus Routes. Available at: https://www.piercetransit.org/pierce-transit-routes/. Accessed November 10, 2020.

Sound Transit. 2016. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. Adopted June 2016. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/sound-transit-3. Accessed April 2024.

Transportation Research Board. 1980. Transportation Research Circular Number 212. Interim Materials on Highway Capacity. Washington, D.C.

Transportation Research Board. 2000. Highway Capacity Manual 2000. Transportation Research Board, Washington, DC.

Transportation Research Board. 2010. Highway Capacity Manual 2010, Fifth edition. Transportation Research Board, Washington, DC.

Transportation Research Board. 2016. Highway Capacity Manual 6th Edition. Transportation Research Board, Washington DC.

WSDOT (Washington State Department of Transportation). 2018. WSDOT Traffic GeoPortal. Available at: https://www.wsdot.wa.gov/data/tools/geoportal/?config=traffic. Accessed November 10, 2020.

WSDOT. 2020. Washington State Freight and Goods Transportation System (FGTS) 2019 Update. Available at: https://wsdot.wa.gov/sites/default/files/2006/02/13/washington-freight-and-goods-transportation-system-2019.pdf. Accessed November 10, 2020.

Section 3.3. Acquisitions, Displacements, and Relocations

CoStar Realty Information Inc. 2020. Costar Listing Search. Available at: https://www.costar.com/home/demo?gclid=CjwKCAiAkan9BRAqEiwAP9X6UehfNwGjCSwO0-1Z5Fh93hOzB5siQIqIJznZGkK03vfOfa6fLtLjoxoCAV0QAvD_BwE. Accessed August 28, 2020.

King County. 2019. King County Assessor John Wilson. Available at: https://www.kingcounty.gov/depts/assessor.aspx. Accessed November 10, 2020.

Sound Transit (Central Puget Sound Regional Transit Authority). 2014a. Property Acquisition and Residential Relocation Handbook. Adopted October 2014. Available at: https://www.soundtransit.org/sites/default/files/documents/property-acquisition-and-residential-relocation-handbook.pdf. Accessed July 14, 2020.

Sound Transit. 2014b. Property Acquisition and Non-Residential Relocation Handbook. Updated July 2015. Available at: https://www.soundtransit.org/sites/default/files/Non-Residential_handbook_2014w.pdf. Accessed July 14, 2020.

Sound Transit. 2017. Sound Transit's Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines. Updated November 2017. Available at: https://www.soundtransit.org/sites/default/files/real-property-acquisition-relocation-policy-procedures-guidelines.pdf. Accessed July 14, 2020.

Sound Transit. 2022. Language Assistance Plan – Providing Access to Sound Transit Services for Limited English Proficiency Persons. Available at: https://www.soundtransit.org/sites/default/files/documents/APPENDIX-F1-2022-Language-Assistance-Plan-FINAL.pdf. Accessed December 13, 2023.

U.S. Census Bureau. 2019. 2014-2018 ACS 5-year Estimates. Available at: https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2018/5-year.html. Accessed November 10, 2020.

Section 3.4. Land Use

City of Federal Way 2019. Zoning Map.

City of Kent. 2019. Zoning and Comprehensive Plan Maps. ArcGIS. Available at: https://www.arcgis.com/apps/MapSeries/index.html?appid=a8cd81ee741e40b0a7e8e7cdf2ed920b. Accessed November 10, 2020.

EPA (U.S. Environmental Protection Agency). 2000. Superfund Fact Sheet Midway Landfill, Kent, Washington.

King County. 2019. King County Assessor John Wilson. Available at: https://www.kingcounty.gov/depts/assessor.aspx. Accessed November 10, 2020.

King County Superior Court. 1990. Consent Decree No. 90-213283-8. Signed May 1990.

PSRC (Puget Sound Regional Council). 2020c. Vision 2050: A plan for the Central Puget Sound Region. Available at: https://www.psrc.org/vision. Accessed November 10, 2020.

ULI (Urban Land Institute) Advisory Services Panel. 2014. Seattle Washington: Sound Transit Operations and Maintenance Facility. Available at: http://uli.org/wp-content/uploads/ULI-Documents/Seattle-SoundTransit_PanelReport_Flo.pdf. Accessed July 14, 2020.

Section 3.5. Economics

City of Federal Way. 2020. City of Federal Way 2021/2022 Biennium Budget. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/FI/Budget/2021-22/2021-2022%20Proposed%20Budget.pdf. Accessed November 30, 2022.

City of Kent. 2021. 2021-2022 Adopted Biennium Budget. Available at: https://www.kentwa.gov/home/showpublisheddocument/15456/637370649046370000. Accessed November 30, 2022.

Kiel, K. and M. Williams. 2007. The Impact of Superfund Sites on Local Property Values: Are All Sites the Same? Journal of Urban Economics. 61(1):170–192.

King County. 2024. King County Assessor John Wilson. Available at: https://www.kingcounty.gov/depts/assessor.aspx. Accessed March 6, 2024.

PSRC (Puget Sound Regional Council). 2019. Regional Data Profile: Economy. PSRC. Available at: https://www.psrc.org/rdp-economy. Accessed July 14, 2020.

PSRC. 2020a. The last 20 years, by the numbers. Available at: www.psrc.org/whats-happening/blog/last-20-years-numbers. Accessed July 14, 2020.

PSRC. 2020b. Census Data. Available at: https://www.psrc.org/census-and-american-community-survey. Accessed May 21, 2020.

PSRC. 2022. Land Use Vision 2050: Population, Household, and Employment Forecast. Available at: https://www.psrc.org/our-work/projections-cities-and-other-places. Accessed June 9, 2023.

U.S. Census Bureau. 2020. B01003 Total Population, S1101 Households and Families, DP03 Selected Economic Characteristics: Occupation, Industry. 2020 ACS 5-Year Estimates, Detailed Tables. Available at: data.census.gov. Accessed June 9, 2023.

Washington Office of Financial Management. 2015. Input-Output Study. Available at: https://ofm.wa.gov/washington-data-research/economy-and-labor-force/washington-input-output-model/2007-washington-input-output-model. Accessed November 10, 2020.

Section 3.6. Environmental Justice, Social Resources, Community Facilities, and Neighborhoods

American Public Transportation Association. 2008. 2007 Public Transportation Fact Book. Available at: https://www.apta.com/wp-content/uploads/Resources/resources/statistics/Documents/FactBook/APTA_2008_Fact_Book.pdf.

Center for Housing Policy. 2006. A Heavy Load: The Combined Housing and Transportation Burdens of Working Families. Available at: http://reconnectingamerica.org/assets/Uploads/pubheavyload1006.pdf.

City of Kent. 2011. Midway Subarea Plan. Ordinance No. 4009. Adopted December 2011. Available at: https://www.kentwa.gov/home/showdocument?id=4893. Accessed July 14, 2020.

FTA. (Federal Transit Administration). 2012. Title VI Requirements and Guidelines for Federal Transit Administration Recipients. Circular FTA C 4702.1B. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf. Accessed July 14, 2020.

FHWA (Federal Highway Administration). 2018. Community Impact Assessment: A Quick Reference for Transportation. 2018 Update. Publication No. FHWA-HEP-18-055. Available at: https://www.fhwa.dot.gov/livability/cia/quick_reference/ciaguide_053118.pdf. Accessed July 14, 2020.

HHS (U.S. Department of Health and Human Services). 2020. HHS Poverty Guidelines for 2020. Available at: https://aspe.hhs.gov/poverty-guidelines. Accessed November 10, 2020.

U.S. Census Bureau. 2017. 2012–2016 ACS 5-year Estimates. Available at: https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2016/5-year.html. Accessed November 10, 2020.

Section 3.7. Visual and Aesthetic Resources

WSDOT (Washington State Department of Transportation). 2022. Roadside Policy Manual. Available at: https://www.wsdot.wa.gov/publications/manuals/fulltext/m3110/rpm.pdf. Accessed December 2022.

Section 3.8. Air Quality and Greenhouse Gas Emissions

CEQ (Council on Environmental Quality). 2023. National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. Available at: https://www.federalregister.gov/d/2023-00158. Accessed January 2024.

DOH (Washington State Department of Health). 2022. Washington Environmental Health Disparities Map. Available at: https://fortress.wa.gov/doh/wtnibl/WTNIBL/. Accessed January 2024.

Ecology (Washington State Department of Ecology). 2016. Methods for Dust Control. Ecology Publication no. 96-433. Available at: https://apps.ecology.wa.gov/publications/documents/96433.pdf. Accessed January 2024.

Ecology. 2020. Facility greenhouse gas reports. Available at: https://ecology.wa.gov/Air-Climate/Climate-change/Greenhouse-gases/Greenhouse-gas-reporting/Facility-greenhouse-gas-reports. Accessed June 2020.

EPA (U.S. Environmental Protection Agency). 2023a. Nonattainment Areas for Criteria Pollutants (Green Book). Washington Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Available at: https://www3.epa.gov/airquality/greenbook/anayo_wa.html. Accessed January 2024.

EPA. 2023b. Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. Available at: https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf. Accessed January 2024.

EPA. 2024a. EJScreen: Environmental Justice Screening and Mapping Tool. Available at: https://ejscreen.epa.gov/mapper/. Accessed January 2024.

EPA. 2024b. Greenhouse Gas Equivalencies Calculator. Available at: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator. Accessed January 2024.

FTA (Federal Transit Administration). 2017. Award Management Requirements. Circular FTA C 5010.1E, Washington, D.C. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Grant%20Management%20Requirements%20Circular_5010-1E.pdf. Accessed July 17, 2020.

FTA. 2022. FTA Transit Greenhouse Gas Emissions Estimator v. 3.0. Updated April 19, 2022.

King County. 2023. Geographic GHG Wedge Planning Tool. Available for download at "King County greenhouse gas emissions" webpage: https://kingcounty.gov/en/legacy/services/environment/climate/actions-strategies/strategic-climate-action-plan/emissions-inventories. Accessed May 2024.

PSCAA (Puget Sound Clean Air Agency). 2020. Puget Sound Clean Air Agency Air Quality Data Summary 2019. Available at: https://pscleanair.gov/615/Data-Summary. Accessed January 2024.

PSCAA. 2022. Puget Sound Clean Air Agency Air Quality Data Summary 2021. Available at: https://pscleanair.gov/615/Data-Summary. Accessed January 2024.

PSCAA. 2023. Puget Sound Clean Air Agency Air Quality Data Summary 2022. Available at: https://pscleanair.gov/615/Data-Summary. Accessed January 2024.

PSRC (Puget Sound Regional Council). 2020. Vision 2050: A plan for the Central Puget Sound Region. Available at: https://www.psrc.org/vision. Accessed November 10, 2020.

Sound Transit. 2016. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. Adopted June 2016. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/sound-transit-3. Accessed April 2024.

Section 3.9. Noise and Vibration

FHWA (Federal Highway Administration). 2006. FHWA Construction Noise Handbook. Final Report FHWA-HEP-06-015.

FTA. 2018. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Federal Transit Administration, John A. Volpe National Transportation System Center and Cross-Spectrum Acoustics Inc.

Sound Transit (Central Puget Sound Regional Transit Authority). 2015. Link Light Rail Operations and Maintenance Satellite Facility Noise and Vibration Technical Report. Michael Minor & Associates, Inc.

Sound Transit. 2019. 2019 Reference Noise and Vibration Levels for Link Light Rail Projects.

Sound Transit. 2023a. OMF South Highway Traffic Noise Study Technical Memorandum. Cross-Spectrum Acoustics Inc.

Sound Transit. 2023b. Sound Transit Board Resolution No. R2023-15. 2023 Link Light Rail Noise and Vibration Policy.

Section 3.10. Ecosystem Resources

Anchor (Anchor QEA). 2019. SR 509 Completion – SR 509 Stage 1b Project Wetland Assessment Report. Prepared by Anchor QEA, July 2019. 339 pp.

Barnard, R.J., J. Johnson, P. Brooks, K.M. Bates, B. Heiner, J.P. Klavas, D.C. Ponder, P.D. Smith, and P.D. Powers. 2013. Water crossings design guidelines. Washington Department of Fish and Wildlife, Olympia, WA.

Brinkmann, M., D. Montgomery, S. Selinger, J. Miller, E. Stock, A. Alcaraz, J. Challis, L. Weber, D. Janz, M. Hecker, and S. Wiseman. 2022. Acute toxicity of the tire rubber-derived chemical 6PPD-quinone to four fishes of commercial, cultural, and ecological importance. Environmental Science and Technology Letters. 9(4).

Corps (U.S. Army Corps of Engineers). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Ecology. 2022. 6PPD in road runoff: Assessment and mitigation strategies. Report prepared for the Model Toxics Control Act Legislative Program. Publication 22-03-020.

Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2021. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 2). Washington State Department of Ecology Publication #21-06-003. Olympia, WA.

Eisler, R. 1993. Zinc hazards to fish, wildlife, and invertebrates: A synoptic review. U. S. Fish and Wildlife Service, Biological Report 10, Contaminant Hazard Reviews Report 26.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, Environmental Laboratory, Department of the Army, Waterways Experiment Station, Vicksburg, MS.

French, B.F., D.H. Baldwin, J. Cameron, J. Prat, K. King, J.W. David, J.K. McIntyre, N.L. Scholz. 2022. Urban roadway runoff is lethal to juvenile coho, steelhead, and chinook salmonids, but not congeneric sockeye. Environmental Science and Technology Letters. 9(9).

Gresham, Doug. 2020. Personal communication of March 17, 2020. Wetland specialist, Washington State Department of Ecology, Bellevue, WA.

HDR. 2014. City of Federal Way Hylebos Creek fish use and habitat technical memorandum. December 2014.

Hruby, T. 2014. Washington State Wetland Rating System for Western Washington: 2014 update. Washington State Department of Ecology Publication #14-06-029. Olympia, WA. Available at: https://fortress.wa.gov/ecy/publications/publications/1406029.pdf. Accessed July 16, 2020.

Kemp, P.S., and J.G. Williams. 2008. Response of Migrating Chinook Salmon (*Oncorhynchus tshawytscha*) Smolts to in Stream Structure Associated with Culverts. River Research and Applications 24(5):571–579.

King County. 1990. Hylebos Creek and Lower Puget Sound Watershed, Current and Future Conditions Report. Prepared by King County Surface Water Management Division for the City of Federal Way in Cooperation with Pierce County, Cities of Des Moines, Fife, Kent, Milton, and Tacoma. Seattle, WA.

Marks, E. L., R.C. Ladley, B.E. Smith, A.G. Berger, T.G. Sebastian and K. Williamson. 2018. 2017–2018 annual salmon, steelhead and bull trout report: Puyallup/White River Watershed—Water Resource Inventory Area 10. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2019. Puyallup Tribal Fisheries annual salmon, steelhead and bull trout report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2018–2019. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2020. Puyallup Tribal Fisheries annual salmon, steelhead and bull trout report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2019–2020. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2021. Puyallup Tribal Fisheries annual salmon, steelhead and bull trout report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2020–2021. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E., R. Ladley, B. Smith, A. Berger, D. Campbell, J. Close, and K. Williamson. 2022. Puyallup Tribal Fisheries Annual Salmon, Steelhead And Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2021–2022. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E., R. Ladley, B. Smith, A. Berger, D. Campbell, J. Close, and K. Williamson. 2023. Puyallup Tribal Fisheries Annual Salmon, Steelhead And Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2022–2023. Puyallup Tribal Fisheries, Puyallup, WA.

Meador, J.P., F.C. Sommers, G.M. Ylitalo, and C.A. Sloan. 2006. Altered growth and related physiological responses in juvenile Chinook salmon (*Oncorhynchus tshawytscha*) from dietary exposure to polycyclic aromatic hydrocarbons (PAHs). Canadian Journal of fisheries and Aquatic Sciences. 63:2364–2376.

Moore, M., B.A. Berejikian, and E.P. Tezak. 2013. A Floating Bridge Disrupts Seaward Migration and Increases Mortality of Steelhead Smolts in Hood Canal, Washington State. PLoS ONE 8(9):e73427. Available at: https://doi.org/10.1371/journal.pone.0073427. Accessed July 16, 2020.

NWIFC (Northwest Indian Fisheries Commission). 2020. State of Our Watersheds, 2020: A report by the treaty Tribes in western Washington. Available at: https://nwifc.org/publications/state-of-our-watersheds/. Accessed December 2022.

NWIFC. 2023. Statewide Integrated Fish Distribution (SWIFD) Web Map. Available at: https://geo.nwifc.org/SWIFD/. Accessed February 2023.

Sandahl, J.F., D. Baldwin, J.J. Jenkins, and N.L. Scholz. 2007. A Sensory System at the Interface between Urban Stormwater Runoff and Salmon Survival. Environmental Science and Technology. 2007(41):2998–3004.

Tian, Z., and 28 others. 2021. A ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon. Science 371(6525):185–189.

Tong, Kristina. 2019. Personal communication of October 30, 2019. U.S. Army Corps of Engineers, Seattle, WA.

USFWS (U. S. Fish and Wildlife Service). 2023. Information for Planning and Consultation (IPaC) List of ESA-Listed Species and Critical Habitats. Obtained May 2023.

Varanasi, U., E. Casillas, M.R. Arkoosh, T. Hom, D.A. Misitano, D.W. Brown, S.L. Chan, T.K. Collier, B.B. McCain, and J.E. Stein. 1993. Contaminant Exposure and Associated Biological Effects in Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) from Urban and Nonurban Estuaries of Puget Sound. NOAA Technical Memorandum NMFS-NWFSC-8. NMFS NFSC Seattle, WA. April 1993. 69 pp.

Washington Trout. 2003. Water Type Survey Results South King County May/June 2003. Available at: http://moonlitgeo.com/legacy_maps/kcpuget/index.shtml. Accessed July 16, 2020.

WDFW (Washington Department of Fish and Wildlife). 2008. Priority Habitats and Species list. Updated March 2022. Olympia, WA. 292pp.

WDFW. 2023. WDFW Fish Passage and Diversion Screening Inventory Database. Available at: https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html. Accessed February 2023.

WDNR (Washington Department of Natural Resources). 2019. Washington Natural Heritage Program geographic information system data set. Data current as of July 26, 2019. Accessed October 22, 2019.

Section 3.11. Water Resources

Barnard, R.J., J. Johnson, P. Brooks, K.M. Bates, B. Heiner, J.P. Klavas, D.C. Ponder, P.D. Smith, and P.D. Powers. 2013. Water crossings design guidelines. Washington Department of Fish and Wildlife, Olympia, WA.

City of Federal Way. 2011. Federal Way Comprehensive Plan, Chapter Eleven – Shoreline Master Program. Available at: http://www.federalwaywa.gov/sites/default/files/Documents/Department/CD/Comprehensive%20Plan/Final_Chapter_11.pdf. Accessed January 2, 2020.

City of Federal Way. 2014. Federal Way Shoreline Master Plan, Shoreline Environment Designations Map. Available at: https://www.cityoffederalway.com/sites/default/files/maps/SMP.pdf. Accessed January 2, 2020.

City of Federal Way. 2015. Federal Way Comprehensive Plan, Chapter Nine – Natural Environment. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/CD/Comprehensive%20Plan/Final_Chapter_9.pdf. Accessed January 2, 2020.

City of Federal Way. 2017. Federal Way Addendum to The King County Surface Water Design Manual. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/City%20Addendum%20to%202016%20KCSWDM.pdf. Accessed January 2, 2020.

City of Kent. 2009. City of Kent Planning Council Kent Shoreline Master Program (with Draft 2019 Amendments). September 2009. Available at: https://www.kentwa.gov/home/showdocument?id=11868. Accessed December 2019.

City of Kent. 2017. Surface Water Design Manual. March 2017. Available at: https://www.kentwa.gov/home/showdocument?id=5398. Accessed January 20, 2020.

City of Kent. 2018. Water Quality Report. July 1, 2019. Available at: https://www.kentwa.gov/home/showdocument?id=12230. Accessed January 20, 2020.

Ecology (Washington State Department of Ecology). 2005. First Five-Year Review Report for Midway Landfill Site. Available at: https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=4729. Accessed November 10, 2020.

Ecology. 2012. Washington State Water Quality Assessment 303(d)/305(b) List. Available at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d. Accessed March 13, 2019.

Ecology. 2017. National Pollutant Discharge Elimination System Construction Stormwater General Permit (Modification effective May 5, 2017). Available at: https://ecology.wa.gov/DOE/files/a1/a11b5cb4-491e-4810-ba0f-c79cd9e6f93c.pdf. Accessed December 27, 2019.

Ecology. 2019. 2019 Stormwater Management Manual for Western Washington. Available at: https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm. Accessed July 16, 2020.

EPA (U.S. Environmental Protection Agency). 2019. Sole Source Aquifers for Drinking Water (SSA) Program Website. Available at: https://www.epa.gov/dwssa. Accessed July 16, 2020.

FEMA (Federal Emergency Management Agency). 1995. Flood Insurance Rate Map for King County, Washington, and Incorporated Areas. Map Numbers 53033C -0968F, -1250F.

King County. 1990. Hylebos Creek and Lower Puget Sound Watershed, Current and Future Conditions Report. Prepared by King County Surface Water Management Division for the City of Federal Way in Cooperation with Pierce County, Cities of Des Moines, Fife, Kent, Milton, and Tacoma. Seattle, WA.

King County. 2016a. Surface Water Design Manual. King County Department of Natural Resources and Parks. Available at: https://kingcounty.gov/services/environment/water-and-land/stormwater/documents/surface-water-design-manual.aspx. Accessed July 16, 2020.

King County. 2016b. Stormwater Pollution Prevention Manual: Best Management Practices for Commercial, Multi-Family, and Residential Properties. Department of Natural Resources and Parks Water and Land Resources Division, Stormwater Services Section. Available at: https://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-pollution-prevention-manual/Final%20SPPM%20April%202016.pdf. Accessed July 16, 2020.

NWIFC (Northwest Indian Fisheries Commission). 2023. Statewide Integrated Fish Distribution (SWIFD) Web Map. Available at: https://geo.nwifc.org/SWIFD/. Accessed February 2023.

Puget Sound Partnership. 2012. Low Impact Development Technical Guidance Manual for Puget Sound. Available at: https://www.psp.wa.gov/downloads/LID/20121221_LIDmanual_FINAL_secure.pdf. Accessed July 16, 2020.

Sound Transit (Central Puget Sound Regional Transit Authority). 2020. Sound Transit Link Design Criteria Manual, Rev. 5. Seattle, Washington. Available at: https://www.soundtransit.org/sites/default/files/documents/design-criteria-manual-202002.pdf. Accessed July 16, 2020.

USDA NRCS (U.S. Department of Agriculture Natural Resources Conservation Service). 2007. National Engineering Handbook Part 630 Hydrology, Chapter 7 – Hydrologic Soil Groups. Available at: https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba. Accessed March 2, 2020.

USDA NRCS. 2019a. Web Soil Survey Report for King County Area, Washington. Version 15, October 23, 2019 (Kent).

USDA NRCS. 2019b. Web Soil Survey Report for King County Area, Washington. Version 15, October 23, 2019 (Federal Way).

Section 3.12. Geology and Soils

City of Kent. 2019. Midway Landfill Redevelopment Feasibility Study: Preliminary Geotechnical Engineering Services Report Revised. Prepared by GeoEngineers.

Frankel, A. and M. Peterson. 2008. The Uniform California Earthquake Rupture Forecast, Version 2, Appendix L: Cascadia Subduction Zone. USGS Open File Report: 2007-1437L. Available at: https://pubs.usgs.gov/of/2007/1437/l/of2007-1437l.pdf. Accessed July 16, 2020.

Gomberg, J., B. Sherrod, C. Weaver, and A. Frankel. 2010. A Magnitude 7.1 Earthquake in the Tacoma Fault Zone – A Plausible Scenario for the South Puget Sound Region, Washington. U.S. Geological Survey Fact Sheet 2010-3023. Available at: https://pubs.usgs.gov/fs/2010/3023/. Accessed July 16, 2020.

Jones, M.A. 1996. Thickness of unconsolidated deposits of the Puget Sound aquifer system, Washington and British Columbia. USGS Water Resources Investigations Report: 94-4133. Available at: https://pubs.er.usgs.gov/publication/wri944133. Accessed July 16, 2020.

Shannon & Wilson. 2020. TDLE – OMF South Draft Preliminary Geotechnical Recommendations. Unpublished memo by Shannon & Wilson, Inc. to Sound Transit and HDR. July 1, 2020.

USDA NCRS (U.S. Department of Agriculture Natural Resources Conservation Service. 2020. Web Soil Survey. United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). Available at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed January 15, 2020.

WDNR (Washington Department of Natural Resources) 2020. Washington Geologic Information Portal. Available at: https://www.dnr.wa.gov/geologyportal. Accessed January 15, 2020.

Section 3.13. Hazardous Materials

City of Seattle, Seattle Public Utilities (SPU). 2007. A Reuse Planning Report: Kent Highlands & Midway Landfills. Superfund Redevelopment Initiative. Prepared by E^2 Inc. Available at: https://semspub.epa.gov/work/10/501000115.pdf. Accessed July 16, 2020.

EPA (U.S. Environmental Protection Agency). 2008. Brownfields Technology Primer: Vapor Intrusion Considerations for Redevelopment. Office of Solid Waste and Emergency Response. Washington, DC. Available at: https://www.epa.gov/remedytech/brownfields-technology-primer-vapor-intrusion-considerations-redevelopment. Accessed July 16, 2020.

EPA. 2015. Second Five-Year Review Report for Midway Landfill Site. Available at: https://semspub.epa.gov/work/10/500009993.pdf. Accessed November 10, 2020.

EPA. 2019. Superfund Site: Midway Landfill. Available at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=1000851. Accessed July 16, 2020.

King County Superior Court. 2020. Prospective Purchaser Consent Decree, Ecology vs Sound Transit. March 2020.

SPU (Seattle Public Utilities). 2020. FWLE/SR-509 Midway Project Hazardous Materials Response and Sampling Plan. Prepared by Floyd|Snider. May 2020.

Section 3.14 Public Services

City of Federal Way. 2020. Lynette Allen, Crime Analyst & Prevention Specialist, Federal Way Police Department 2020, data received February 20, 2020.

City of Federal Way. 2021. Lynette Allen, Crime Analyst & Prevention Specialist, Federal Way Police Department. Email correspondence, data received April 12, 2022.

City of Federal Way. 2023. Police data for trips along 20th Avenue S. Kent Smith, Sound Transit Liaison, Federal Way Public Works. Email correspondence, data received April 6, 2023.

City of Kent. 2022. City of Kent Public Records Request. Data received on April 29, 2022.

Highline College. 2022. Enrollment Data. Available at: https://www.highline.edu. Accessed April 1, 2022.

OSPI (Washington Office of Superintendent of Public Instruction). 2022. Washington State Report Card District Data and Private School Enrollment by Grade Level. Available at: https://washingtonstatereportcard.ospi.k12.wa.us. Accessed April 4, 2022.

Puget Sound Fire. 2022. About Puget Fire. Available at: https://pugetsoundfire.org/. Accessed April 27, 2022.

South King Fire and Rescue. 2020a. South King Fire & Rescue Performance Report: Response Standards for 2020 as Required by RCW 52.33. Provided by Lauri Perry, Public Records Officer, South King Fire on April 18, 2022.

South King Fire and Rescue. 2020b. Lauri Perry, Public Records Officer. 2020. Email correspondence, data received February 18, 2020.

South King Fire and Rescue. 2022. Lauri Perry, Public Records Officer. 2022. Email correspondence, data received April 18, 2022.

Valley Communications Center. 2021. Incidents Average Response Times by Priority, Hour of Day, and Day of Week. Entry date range 01/01/2021 – 12/31/2021 for Kent Police. Public Information Request data received on April 18, 2022.

WSP (Washington State Patrol). 2019. Washington State Patrol Strategic Plan 2019-2022. Available at: https://www.wsp.wa.gov/wp-content/uploads/2019/01/2019-2022-WSP-Strategic-Plan-Final-Full.pdf. Accessed November 10, 2020.

Section 3.15. Utilities, Energy, and Electromagnetic Fields

BPA (Bonneville Power Administration). 2023. Hydropower Resources/Power Outages. Available at: https://www.bpa.gov/learn-and-participate/community-education/hydropower-101/power-outages. Accessed February 20, 2023.

EIA (U.S. Energy Information Administration). 2019. Units and Calculators Explained: Energy Conversion Calculators. Available at: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php. Accessed November 11, 2019.

EIA. 2022. WA Energy Profile for 2019. Last updated February 17, 2022. Available at: https://www.eia.gov/state/print.cfm?sid=WA. Accessed March 29, 2022.

IEEE (Institute of Electrical and Electronics Engineers). 2019. C95.1-2019 – IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz.LTK Engineering Services. 2006. North Link Hi-Lo Mitigation EMI Report. Available at: http://www.globaltelematics.com/pitf/UWimpacts/NL_16-NorthLink-EMI_Report.pdf. Accessed November 13, 2019.

NIEHS (National Institute of Environmental Health Sciences and National Institutes of Health). 2002. Electric and Magnetic Fields Associated with the Use of Electric Power: Questions and Answers. Available at: https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf. Accessed October 21, 2019.

PSE (Puget Sound Energy). 2017. 2017 PSE Integrated Resource Plan. November 2017. Available at: https://www.pse.com/-/media/PDFs/001-Energy-Supply/001-Resource-Planning/8a_2017_PSE_IRP_Chapter_book_compressed_110717.pdf. Accessed October 24, 2019.

PSE. 2019a. WUTC Supplemental Pages for Gas. Available at: https://www.utc.wa.gov/sites/default/files/2021-02/PSE-2019-WUTC-Supplemental-Pages-Gas-%285-1-2020%29.pdf. Accessed March 29, 2022.

PSE. 2019b. 2019 TAG Meeting #4: System planning (transmission and distribution), portfolio sensitivities, and load forecast. PowerPoint presentation. Available at: https://www.pse.com/-/media/PDFs/001-Energy-Supply/001-Resource-Planning/03_IRP_01_09_19_TAG_Meeting_4_Slide_Deck_FINAL.pdf. Accessed March 29, 2022.

PSE. 2020. WUTC Supplemental Pages for Electric. Available at: https://www.utc.wa.gov/sites/default/files/2021-05/140%20-%20Puget%20Sound%20Energy%20-%202020%20-%20AR%20-%20Supplemental%20Pages.pdf. Accessed March 29, 2022.

PSE. 2022. About Us. Available at: https://www.pse.com/about-us. Accessed March 29, 2022.

Sound Transit (Central Puget Sound Regional Transit Authority). 2016. Federal Way Link Extension Final Environmental Impact Statement. Prepared by HDR Engineering, Inc. and CH2M HILL, Seattle, WA. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/federal-way-link-extension-final-environmental-impact-statement. Accessed July 16, 2020.

Sound Transit. 2019d. Sustainability Plan – 2019 Update. Seattle, WA. Available at: https://www.soundtransit.org/sites/default/files/documents/2019-sustainability-plan.pdf. Accessed 2020.

Washington State Department of Commerce. 2011. 2012 Washington State Energy Strategy with Forecasts 2012-2035: Issues and Analysis for the Washington State Legislature and Governor. State Energy Office. December 2011. Available at: http://www.commerce.wa.gov/wp-content/uploads/2016/06/Commerce-State-energy-strategy-2012.pdf. Accessed October 15, 2019.

Washington State Department of Commerce. 2018. 2019 Biennial Energy Report: Issues, Analysis and Updates. State Energy Office. December 2018 Report to the Legislature. Available at: http://www.commerce.wa.gov/wp-content/uploads/2013/01/COMMERCE-Biennial-Energy.pdf. Accessed October 14, 2019.

Washington State Department of Commerce. 2020a. Washington 2021 State Energy Strategy: Transitioning to an Equitable Clean Energy Future. December 2020. Available at: https://www.commerce.wa.gov/wp-content/uploads/2020/12/Washington-2021-State-Energy-Strategy-December-2020.pdf. Accessed March 29, 2022.

Washington State Department of Commerce. 2020b. Washington State Electric Utility Fuel Mix Disclosure Reports for Calendar Year 2019. November 10, 2020. Available at: https://www.commerce.wa.gov/wp-content/uploads/2021/03/FMD-Report-2019-FINAL.pdf. Accessed March 29, 2022.

Section 3.16. Historic and Archaeological Resources

Chidley, Michael. 2020. State of Washington Archaeological Site Form: 45KI1476, Resource ID: 699440. Accessed on WISAARD August 23, 2020.

DAHP (Department of Archeology and Historic Preservation). 2020. Washington State Standards for Cultural Resource Reporting, January 2, 2020. Available at: https://dahp.wa.gov/project-review/washington-state-standards-for-cultural-resource-reporting. Accessed January 2, 2020.

NPS (National Park Service). 1995. National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Cultural Resources Department, Washington DC.

Chapter 4. Cumulative Effects Analysis

CEQ (Council on Environmental Quality). 1997. Considering Cumulative Effects under the National Environmental Policy Act. Available at: https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf. Accessed November 10, 2020.

City of Federal Way. 2014. 2015-2021 SWM CIP – Capital Projects. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/Surface%20Water/EstimateDocument.pdf_null20160707105058.pdf. Accessed February 7, 2023.

City of Federal Way. 2018. Pacific Highway South HOV Lanes, Phase V (S 359th Street to S 340th Street). Available at: https://www.cityoffederalway.com/page/pacific-highway-south-hov-lanes-phase-v-s-359th-street-s-340th-street. Accessed February 7, 2023.

City of Federal Way. 2019a. Notice of Land Use Public Hearing: Creekside Commons Townhomes. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/CD/Planning/Land%20Use/Creekside%20w%20Map.pdf. Accessed February 7, 2023.

City of Federal Way. 2019b. Economic Development Activity in Federal Way, Washington. Johnson, T., Economic Development Director.

City of Federal Way. 2020a. Environmental Checklist: Pape Kenworth NW – Federal Way. July 20, 2020. Available at: https://docs.cityoffederalway.com/WebLink/edoc/837052/20-102489-Environmental%20Checklist-2020-06-09-V1.pdf?dbid=0&repo=CityofFederalWay. Accessed February 6, 2023.

City of Federal Way. 2020b. Capital Projects 2020-2026: A Guide to the City's Major Street and Stormwater Projects. Available at: https://www.cityoffederalway.com/sites/default/files/FedWay_CIP2020F_digital.pdf. Accessed February 7, 2023.

City of Federal Way. 2021. Notification of Upcoming 2022 Asphalt Overlay Project. Available at: https://www.cityoffederalway.com/sites/default/files/maps/2022%20Overlay%20Resident%20Notif%20-%20final.pdf. Accessed February 7, 2023.

City of Federal Way. 2022. Federal Way City Center Access Factsheet. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/Traffic/FWCCA_Factsheet_080922_EN.pdf. Accessed February 7, 2023.

City of Federal Way. 2023. City of Federal Way 2015 Adopted Comprehensive Plan. Amended 2023. Available at: https://www.cityoffederalway.com/content/2015-comprehensive-plan. Accessed January 2024.

City of Kent. 2020. Current & Future Projects. Available at: https://www.kentwa.gov/city-hall/public-works/construction-projects-and-project-design/current-future-projects. Accessed November 10, 2020.

FHWA and WSDOT (Federal Highway Administration and Washington State Department of Transportation. 2018. Puget Sound Gateway Program – Phase 1 of the SR 509 Completion Project Environmental Re-evaluation. Available at: https://wsdot.wa.gov/sites/default/files/2021-03/SR509Phase1-Environmental-Reevaluation-Completed_0.pdf. Accessed November 10, 2020.

FTA (Federal Transit Administration). 2017. Record of Decision, Federal Way Link Extension. March 2017. Seattle, WA.

FUSION Federal Way. 2023. The Pete Andersen FUSION Family Center. Available at: https://fusionfederalway.org/pete-andersen-family-center/. Accessed February 7, 2023.

Industrial Realty Group. 2022. Woodbridge Corporate Park website, www.woodbridgecorporatepark.com. Accessed December 22, 2022.

Nieto, Mark. 2022. Washington State Plans to Repurpose Weyerhaeuser Campus. Available at: https://www.connectcre.com/stories/washington-state-plans-to-repurpose-weyerhaeuser-campus/. Accessed February 13, 2023.

Sound Transit. 2016a. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. Adopted June 2016. Available at: http://soundtransit3.org/document-library.

Sound Transit. 2016b. Federal Way Link Extension Final Environmental Impact Statement. Prepared by HDR Engineering, Inc. and CH2M HILL, Seattle, WA. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/federal-way-link-extension-final-environmental-impact-statement. Accessed November 10, 2020.

Sound Transit. 2023a. Federal Way Link Extension Project Map and Summary. Available at: https://www.soundtransit.org/system-expansion/federal-way-link-extension. Accessed February 6, 2023.

Sound Transit. 2023b. Tacoma Dome Link Extension Project Map and Summary. Available at: https://www.soundtransit.org/system-expansion/tacoma-dome-link-extension. Accessed February 6, 2023.

WSDOT (Washington State Department of Transportation). 2003. SR 509: Corridor Completion/I-5/South Access Road: Final Environmental Impact Statement and Section 4(f) Evaluation. Available at: https://wsdot.wa.gov/Projects/SR509/completion/Library.htm. Accessed November 10, 2020.

WSDOT. 2022. Pin Report: SR 161/Milton Rd S Vicinity to SR 18 – Paving. Available at: https://www.wsdot.wa.gov/Projects/Search/Report.aspx?ReportType=1p&Pin=116135A%2C116135B. Accessed February 7, 2023.

WSDOT. 2023a. SR 509 Completion Project: Project Overview. Available at: https://wsdot.wa.gov/construction-planning/search-projects/sr-509-completion-project. Accessed February 6, 2023.

WSDOT. 2023b. I-5 – SR 161 – SR 18 Triangle Interchange Vicinity – Improvements: Project Overview. Available at: https://wsdot.wa.gov/construction-planning/search-projects/i-5-sr-161-sr-18-triangle-interchange-vicinity-improvements. Accessed February 7, 2023.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix B: Public Involvement and Agency Coordination

Federal Transit Administration

SOUNDTRANSIT

June 2024

Table of Contents

1 OUTREACH GOALS AND OBJECTIVES B-1

2 CHARTERED GROUP ENGAGEMENT B-3

2.1 Lead Agencies B-3

2.2 Cooperating Agencies B-3

2.3 Tribal and Agency Coordination B-3

2.3.1 Specific Agency Input during Development of Environmental Impact Statement Alternatives B-5

2.4 Tribal Coordination B-10

3 OUTREACH ACTIVITIES AND TOOLS B-12

3.1 GovDelivery Listserv B-12

3.1.1 Briefings B-13

3.2 Open Houses and Drop-In Sessions B-13

3.3 Fact Sheets and Brochures B-14

3.4 Community Events B-14

3.5 Project Webpage B-14

3.6 News Media B-15

3.7 Notifications to Potentially Affected Properties B-15

3.8 Targeted Outreach B-16

4 OUTREACH DURING ENVIRONMENTAL IMPACT STATEMENT PROCESS B-19

4.1 Early Scoping B-19

4.2 September 2018 Outreach B-20

4.3 SEPA Scoping B-21

4.3.1 Public Comment Period and Scoping Meetings B-22

4.4 Public Outreach during 2021 SEPA Draft Environmental Impact Statement Development B-23

4.4.1 November 2019 Outreach Activities (November 13 to December 6, 2019) B-23

4.5 2021 SEPA Draft Environmental Impact Statement Comment Period B-25

4.5.1 Public Comment Period, Online Open House, and Public Meetings and Hearings B-25

4.6 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Scoping B-26

4.7 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Public Comment Period B-26

4.7.1 Public Comment Period, Online Open House, and Public Meetings and Hearings B-27

5 OUTREACH STAKEHOLDER BRIEFINGS, INTERVIEWS, AND TABLING EVENTS B-30

5.1 2021 SEPA Scoping B-30

5.2 Other Activities (2018 to 2020) B-30

5.3 2021 SEPA Draft Environmental Impact Statement Comment Period B-32

5.4 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Comment Period B-32

6 REFERENCES B-33

Tables

Table B.2-1 ELG Meeting Dates B-4

Table B.2-2 IAG Meeting Dates B-4

Table B.2-3 OMF South Agency and Local Jurisdiction Coordination Meetings B-5

Table B.3-1 Outreach Mailings B-12

Table B.3-2 Print and Online Publications B-17

Table B.5-1 2021 SEPA Scoping Events and Dates B-30

Table B.5-2 Outreach Activities and Dates Associated with the 2021 SEPA Draft Environmental Impact Statement B-30

Table B.5-3 Outreach Associated with Comment Period of 2021 SEPA Draft Environmental Impact Statement B-32

Acronyms and Abbreviations

APE	Area of Potential Effect
Belmor	Belmor Mobile Home Park
BPA	Bonneville Power Administration
Corps	United States Army Corps of Engineers
DAHP	Washington State Department of Archaeology and Historic Preservation
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
ELG	Elected Leadership Group
EO	Executive Order
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
IAG	Interagency Group
NEPA	National Environmental Policy Act
OMF	operations and maintenance facility
Puyallup Tribe of Indians	Puyallup Tribe of the Puyallup Reservation
Q&A	questions and answers
SEPA	Washington State Environmental Policy Act
SPU	Seattle Public Utilities
TDLE	Tacoma Dome Link Extension
WDFW	Washington Department of Fish and Wildlife
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WSDOT	Washington State Department of Transportation
“X”	company formerly known as Twitter

APPENDIX B PUBLIC INVOLVEMENT AND AGENCY COORDINATION

The National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA) emphasize the importance of public engagement and agency involvement as key factors in the environmental review process. Sound Transit is committed to engaging interested parties early and often during the development of Operations and Maintenance Facility (OMF) South. Sound Transit has engaged neighborhood and community stakeholders, Tribes, state and federal agencies, transit partners, and the general public leading into and during development of the 2021 SEPA Draft Environmental Impact Statement (EIS), the 2023 NEPA Draft/SEPA Supplemental Draft EIS, and the NEPA/SEPA Final EIS published in 2024.

This appendix summarizes Sound Transit’s Tribal and agency coordination and public outreach activities to date through the environmental review process for the OMF South project. Sound Transit worked with federal, state, and local agencies, Tribes, and local jurisdictions to create an open and collaborative process that provided numerous opportunities to inform and involve the public.

1 OUTREACH GOALS AND OBJECTIVES

The OMF South is part of the mass transit system expansion by Sound Transit, funded by the Sound Transit 3 initiative approved by voters in 2016. Public participation and input played a critical role in identifying a variety of potential locations and narrowing those to the three alternatives for study in the EIS. To meet the project timeline and goals, Sound Transit engaged the public through an intensive public involvement process.

Throughout alternatives development and environmental review, Sound Transit commits to several goals to ensure successful engagement, including:

- **Proactively engaging audiences and communities** most affected by the project in conversations that would lead to identifying a project to be built.
- **Transparent, meaningful, and inclusive communication** that is clear and timely.
- **Sharing information in a variety of ways** to encourage awareness of project progress and its benefits.
- **Clear communication of how feedback informed project decisions** to ensure accountability.
- **Accessible project information** geared toward accessibility for all audiences, with easy-to-read, understandable, and in-language materials.

Sound Transit focuses outreach toward five key audience groups:

- **Tribes, agencies, and local jurisdictions** through the establishment of an Elected Leadership Group (ELG) and an Interagency Group (IAG) that met regularly to provide input and receive project updates.
- **Neighborhood and community stakeholders**, including advocacy groups, businesses, communities of color, community-based organizations and cultural groups, current and future transit riders, immigrant and refugee populations, limited-English-speaking populations, low-income households, people with disabilities, local residents (renters and homeowners), and social service organizations.

- **Property owners**, including homeowners, condominium owners, apartment complex owners and their tenants and staff, small and minority-owned businesses, and commercial property owners and their tenants.
- **Public**, including people who live, work, and commute in, through, and around the Puget Sound region.
- **Print, digital, and broadcast media**, including community, local, and ethnic resources.

Sound Transit combines **in-person, online, and existing community engagement strategies** to continue to reach and engage as many members of the public as possible. English and translated materials have been available throughout the project.

2 CHARTERED GROUP ENGAGEMENT

2.1 Lead Agencies

The Federal Transit Administration (FTA) is acting as the NEPA lead agency with Sound Transit acting as the SEPA lead agency.

2.2 Cooperating Agencies

Cooperating agencies include:

- Federal Highway Administration (FHWA)
- U.S. Army Corps of Engineers (Corps)
- U.S. Environmental Protection Agency (EPA)
- Washington State Department of Transportation (WSDOT)
- City of Federal Way
- City of Kent

2.3 Tribal and Agency Coordination

Sound Transit has engaged with project partners, local jurisdictions, affected Tribes, elected officials, community partners, stakeholders, and partner agencies since the project's beginning. Coordination with agencies and other stakeholders has been primarily through regular meetings with the following two chartered groups.

The ELG was convened starting in February 2018 to provide feedback and recommendations on project alternatives for the Tacoma Dome Link Extension (TDLE) project. The group was composed of elected officials representing the Puyallup Tribe of the Puyallup Reservation (Puyallup Tribe of Indians); the mayors of Federal Way, Milton, Fife, and Tacoma; Sound Transit Board members; and WSDOT. Staff provided OMF South updates to the ELG to keep them informed on the project; however, they were not tasked with making official recommendations due to the technical nature of decisions to site the facility. After Sound Transit identified that OMF South would need to be in south King County to meet operational criteria, limiting the geographic scope north of Pierce County, the Kent mayor was invited to attend all ELG meetings where OMF South updates were discussed beginning in fall of 2018.

Initially, the ELG met approximately every other month and then received updates approximately quarterly during the initial engineering design work and preparation of the 2021 SEPA Draft EIS. A list of meetings is outlined below in Table B.2-1. After the ELG made its recommendations for TDLE in 2019, the group's purpose was achieved. On March 5, 2021, Sound Transit invited the elected officials that composed the ELG to a briefing to provide an overview of findings from the 2021 SEPA Draft EIS and a preview of engagement opportunities during the 45-day comment period. The project team will keep the members of the former ELG informed on major project milestones moving forward, but the group is no longer being convened. ELG meeting dates are listed in Table B.2-1.

Table B.2-1 ELG Meeting Dates

ELG Meeting	Date
1	February 16, 2018
2	March 19, 2018
3	May 18, 2018
4	July 13, 2018
5	October 12, 2018
6	November 30, 2018
7	February 22, 2019
8	May 31, 2019
9	June 14, 2019

Sound Transit is working closely to coordinate with agencies and governments as this project moves forward at a technical level to ensure the project aligns with other city, agency, and Tribal plans and interests. The OMF South IAG is made up of representatives from the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, cities of Federal Way, Kent, and Seattle; Seattle Public Utilities (SPU); Bonneville Power Administration (BPA); FHWA; WSDOT; EPA; Department of Ecology (Ecology); and King County.

The IAG reviewed and commented on the Methodology Memorandums prepared for each element of the environment included in the 2021 SEPA Draft EIS. A list of meetings is outlined below in Table B.2-2. The IAG was kept apprised of development of the site design and the study area used in the environmental analysis as well as the document status. In 2022, the meeting schedule was changed from monthly to quarterly.

Table B.2-2 IAG Meeting Dates

IAG Meeting	Date
1	July 22, 2019
2	October 7, 2019
3	November 12, 2019 (email update)
4	February 11, 2020
5	March 10, 2020
6	April 14, 2020 (email update)
7	June 9, 2020
8	January 19, 2021
9	February 16, 2021
10	March 16, 2021
11	September 21, 2021
12	November 16, 2021
13	December 21, 2021
14	March 15, 2022
15	June 21, 2022 (email update)
16	September 20, 2022 (email update)
17	November 16, 2022 (email update)
18	March 24, 2023 (email update)
19	May 11, 2023 (email update)
20	June 15, 2023 (email update)
21	September 19, 2023
22	December 19, 2023

2.3.1 Specific Agency Input during Development of Environmental Impact Statement Alternatives

Sound Transit has weighed the input of other agencies during the development of the alternatives considered for study in the EIS. In addition, Sound Transit has initiated discussions on a number of specific issues related to the project. Table B.2-3 lists the coordination meetings that have taken place thus far.

Table B.2-3 OMF South Agency and Local Jurisdiction Coordination Meetings

Agency/Local Jurisdiction	Purpose	Dates
SPU, WSDOT, Federal Way, Kent, Seattle	Midway Landfill workshops	**2019** August 13 October 3
SPU, Seattle	Midway Landfill site field work coordination	August 17, 2018 September 30, 2019 **2020** January 16, 31 February 12, 21
SPU, Seattle, Ecology, EPA	Midway Landfill Superfund site considerations	**2019** October 29 December 13 **2020** February 13 August 19 March 10, 2021
EPA	EIS comment coordination	November 30, 2023 March 12, 2024
USFWS, NMFS	Biological Assessment coordination	August 24, 2023
Federal Way	Local coordination	**2018** January 9 June 6 October 3 November 16 **2019** January 9 February 9 May 15 October 1, 21 November 21 December 16 **2020** January 14, 16 February 20 August 20 **2021** January 21 (with Kent) March 10 September 16 October 21 November 8 (with Kent and Seattle) November 29,

Table B.2-3 OMF South Agency and Local Jurisdiction Coordination Meetings (continued)

Agency/Local Jurisdiction	Purpose	Dates
		December 10 **2022** January 6, 20, 31 February 3, 17 March 3, 17, 24 April 21, 28 May 5, 13, 26 June 2, 16 July 13, 20, 28 August 18, September 1, 22 October 6 October 13 (with WSDOT) November 3, 17 December 15, 22 **2023** January 19, February 2, 16, 23 March 16 April 6, 27 May 4, 11, 18 June 1, 22 July 13, 20 August 10, 24 September 7, 21 November 2, 11 **2024** January 18, 25 February 15, 22 March 14, 21
Kent	Local coordination	**2018** July 3 November 8 September 24, 2019 **2020** May 11 August 10 **2021** January 21 (with Federal Way) March 11 September 13 November 8 (with Federal Way and Seattle) December 14 August 31, 2023

Table B.2-3 OMF South Agency and Local Jurisdiction Coordination Meetings (continued)

Agency/Local Jurisdiction	Purpose	Dates
FHWA/WSDOT	NEPA Approach	December 20, 2018 **2019** February 1 July 23 September 18, 27 October 16, 25 March 12, 2020 **2022** April 20 September 19 October 19 October 25 December 12 January 4, 2023
WSDOT	ROW Coordination, Fieldwork Coordination, etc.	On-going meetings originally weekly now bi-weekly
BPA	Transmission Line Tower Modification Coordination	December 18, 2019 **2021** July 21 August 26 October 28. 2022 January 11, 2023
Corps of Engineers, Puyallup Tribe of Indians, Muckleshoot Indian Tribe, WDFW, Ecology	Section 404 Preapplication Meetings	September 2, 2020 July 27, 2023
Corps of Engineers	Site Visit	December 7, 2023
WDFW	Site Visit/Discussion of culvert and stream design	May 12, 2022 August 25, 2023
Ecology	Site Visit	July 11, 2023
Puyallup Tribe of Indians	Ecosystem Impacts and Mitigation Opportunities	February 10, 2020 June 2, 2022 **2023** April 18 August 18 **2024** February 28
Puyallup Tribe of Indians	Preferred Alternative Culvert and Stream Design	August 30, 2023
Muckleshoot Indian Tribe	Ecosystem Impacts	January 23, 2020

2.3.1.1 Midway Landfill

Public interest in pursuing the Midway Landfill as a potential OMF South site was raised early in the scoping process. The property is a mostly vacant site in an appropriate location within the Link system (South Corridor and adjacent to mainline tracks that will be operational when the facility opens); it is publicly owned and operated by SPU; and it would provide an opportunity to put a cleanup site back into productive use.

During development of the 2021 SEPA Draft EIS, Sound Transit hosted two landfill settlement workshops. Attendees included SPU, WSDOT, Federal Way, Kent, Seattle, and their consultant teams. The workshops centered on analyzing and brainstorming settlement solutions for a potential OMF South on the Midway Landfill. The results of the workshop were then presented to the entire IAG at the meeting on February 11, 2020. Sound Transit also met specifically with representatives of Seattle and SPU to discuss the Midway Landfill and to coordinate investigative field work, particularly geotechnical borings.

Sound Transit also met with Seattle, SPU, Ecology, and EPA to gain further understanding of the constraints that would be faced when working on a Superfund site with an approved cleanup action plan and a regulatory path forward if the Midway Landfill were ultimately selected as the final site for the OMF South.

2.3.1.2 Local Jurisdiction Coordination

On an ongoing basis, Sound Transit has met with Kent and Federal Way to coordinate alternatives development to gain understanding of local land use, permitting and other perspectives. These meetings were approximately monthly.

Once the Preferred Alternative was identified, Federal Way and Sound Transit staff set regular meetings every first, third, and fourth week of the month to discuss the project. The regular meetings with Kent have since ended.

2.3.1.3 Coordination Regarding NEPA

During preparation of the 2021 SEPA Draft EIS, Sound Transit coordinated with FHWA and WSDOT to identify the approach for NEPA compliance in support of future federal approvals for the project. Each build alternative would require work within the interstate/federal right-of-way, which would require approvals from FHWA. Due to this federal nexus, NEPA documentation will be prepared.

After publication of the 2021 SEPA Draft EIS, Sound Transit identified federal funding opportunities with FTA. Due to this, FTA was identified as the lead federal agency, and they determined that an EIS under NEPA would also be required.

Sound Transit and FTA met with EPA in November 2023 and March 2024 to discuss EPA’s comments on the Draft EIS related to environmental justice. EPA’s Draft EIS comment letter identified concerns about the conclusions made in the Draft EIS regarding environmental justice impacts. In the meetings, EPA explained that their approach for assessing disproportionate impacts to environmental justice populations focuses on evaluation of project impacts to overburdened communities that may experience environmental harm due to cumulative impacts.

While FTA evaluates project impacts to environmental justice populations, they also consider offsetting benefits and mitigation when assessing disproportionate impacts. This is consistent with DOT Order 5610.C, U.S. Department of Transportation Actions to Address

Environmental Justice in Minority Populations and Low-Income Populations,[1] which states, “In making determinations regarding disproportionately high and adverse effects on minority and low-income populations, mitigation and enhancement measures that will be implemented and all offsetting benefits to the affected minority and low-income populations may be taken into account, as well as the design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas.”

Consideration of offsetting benefits and mitigation is also consistent with FTA’s policy guidance in Circular C-4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients, that states “Many public transportation projects involve both adverse effects such as short-term construction impacts, increases in bus traffic, etc., and positive benefits such as increased transportation options, improved connectivity, or overall improvement in air quality. Whether adverse effects will be disproportionately high is dependent on the net results after consideration of the totality of the circumstances.”

In response to EPA’s comments, FTA clarified the environmental justice assessment methodology; conducted additional direct impact analysis, including additional cumulative impact analysis using EPA’s EJScreen tool; provided a more detailed description of the project benefits and mitigation; and provided additional documentation of meaningful engagement. In the March 2024 meeting, FTA presented the additional analysis and information to EPA, who acknowledged that the additional actions and updates met the general intent of their comments. However, due to differences between EPA’s suggested approach for making a disproportionate and adverse effects determination and FTA’s established methodology, the agencies were unable to reach agreement on the conclusions of the environmental justice assessment. Pursuant to 23 CFR 771.125(a)(2), every reasonable effort and consultation have been made to attempt to resolve the interagency disagreement with regards to the determination of disproportionate and adverse effects on the EJ population.

2.3.1.4 Coordination Regarding Modification to BPA lines

Sound Transit met with representatives of BPA to discuss the proposed modification to the BPA transmission lines, particularly in regard to BPA’s environmental review process and potential Section 106 compliance. Sound Transit will continue to coordinate with BPA as the project progresses.

2.3.1.5 Coordination Regarding Possible Future Environmental Permits

Sound Transit met with representatives from the Corps, the Muckleshoot Indian Tribe, the Washington Department of Fish and Wildlife (WDFW), and Ecology for a preapplication meeting. The purpose of the meeting was to introduce the project, discuss the three alternative sites and the potential impacts of the Preferred Alternative, and discuss potential permitting under Section 404 of the Clean Water Act, should the Preferred Alternative be selected. The Puyallup Tribe of Indians was invited to the preapplication meeting but was unable to attend. A follow-up call with the Corps was held in May 2021 to discuss the NEPA process and federal requirements for the Section 404(b)(1) Alternative Analysis. A second preapplication meeting with the Corps to provide an update on the three alternative sites and the potential impact of the Preferred Alternative occurred on July 27, 2023, with both the Muckleshoot Tribe and Puyallup Tribe of Indians in attendance. A site visit with the Corps was conducted in December 2023, and a follow-up meeting was held to discuss the federal requirements for the Section 404(b)(1) Alternative Analysis.

---

[1] Executive Order (EO) 14096, Revitalizing Our Nation’s Commitment to Environmental Justice for All, was enacted on April 21, 2023. EO 14096 on environmental justice does not rescind EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which has been in effect since February 11, 1994, and is currently implemented through DOT Order 5610.2C. This implementation will continue until further guidance is provided regarding the implementation of the new EO 14096 on environmental justice.

Sound Transit conducted a site visit with WDFW to the South 336th Street site to discuss design concepts and potential impacts to streams and wetlands for the Preferred Alternative. In addition, the requirements for permitting geotechnical borings were discussed. Washington Department of Ecology staff were contacted via email in December 2022 regarding stormwater ponds on the Preferred Alternative site. In July 2023, Sound Transit conducted a site visit with Ecology staff to confirm wetland ratings. Sound Transit also met with WDFW and Puyallup Tribe of Indians in August 2023 to discuss the design of fish-passable structures and stream relocations. In addition, Sound Transit discussed the requirements for permitting for geotechnical borings with WDFW in 2023.

2.3.1.6 Coordination Regarding Eligible Historic Resources

Sound Transit surveyed and inventoried a total of 86 historic-period, built-environment resources in the Area of Potential Effects (APE) in addition to five archaeological resources. The results were documented in historic property inventory forms in the Washington State Department of Archaeology and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD), as well as in a technical report (Appendix G4, Historic and Archaeological Resources Technical Report). Based on the survey results, in October 2023, FTA determined and DAHP concurred that none of the historic-period, built-environment resources surveyed for this project or the archaeological resources within the APE met criteria necessary for eligibility for the National Register of Historic Places (NRHP). Please see Appendix G4, Historic and Archaeological Resources Technical Report, for a copy of the correspondence with DAHP.

In separate consultations, both BPA and FTA determined that the proposed relocation and reconstruction of the NRHP-eligible towers for the Preferred and South 344th Street alternatives would not constitute an adverse effect. In letters dated August 19, 2021, and October 31, 2023, DAHP concurred with this finding.

2.4 Tribal Coordination

FTA and Sound Transit maintain a government-to-government relationship with the sovereign Tribes in the area. The OMF South build alternatives are not on Tribal lands; however, they are within the Usual and Accustomed Fishing Areas of the Muckleshoot Tribe, the Puyallup Tribe of Indians, the Confederated Tribes and Bands of the Yakama Nation, and the Nisqually Indian Tribe.

FTA and Sound Transit consults with the affected Tribes — in a process that is independent of the public involvement process — in areas that the Tribes will have particular interest, such as streams, fisheries, water quality, ecosystems, and cultural resources.

Sound Transit met with the Puyallup Tribe of Indians and the Muckleshoot Indian Tribe to review and discuss the potential ecosystem impacts, particularly to aquatic resources, including fish. On June 2, 2022, Sound Transit met with the Puyallup Tribe of Indians to discuss the Preferred Alternative and potential opportunities for ecosystem mitigation in the Hylebos watershed. Additional meetings with the Puyallup Tribe of Indians related to potential project impacts and ecosystem mitigation were held on April 18, August 18, and August 30, 2023, and February 28, 2024.

FTA and Sound Transit have also coordinated with affected Tribes under the requirements of Section 106, requesting comments on the project's proposed APE and the Section 106 Eligibility and Effects Determination. Further information is found in Appendix G4, Historical and Archaeological Resources Technical Report.

3 OUTREACH ACTIVITIES AND TOOLS

Beginning in 2018, Sound Transit began agency and public outreach efforts for OMF South in coordination with the TDLE project. Outreach methods included online, in-person, existing community efforts, media, English and translated materials (in Spanish, Korean, Vietnamese, Khmer, and Russian) to ensure continual engagement and availability of information throughout Early Scoping, Scoping, 2021 SEPA Draft EIS publication, 2023 NEPA Draft/SEPA Supplemental Draft EIS publication, and additional outreach efforts. Sound Transit engaged with over 950 people in-person to share project information and gather feedback during these outreach efforts. Once TDLE and OMF South outreach events were no longer done together, materials were not translated in Vietnamese and Khmer because those languages are not as commonly spoken in the OMF South project area. However, translation is available in those languages, if requested.

To ensure widely available, accessible project information, Sound Transit used a variety of communication tools and methods, including email updates, a project website, open houses and drop-in sessions, public hearings, fact sheets and brochures, community events, notifications to potentially impacted properties, press releases, and targeted outreach to underrepresented groups.

Each of the outreach periods included online open houses to supplement in-person events. Print, online and media advertisements and project updates disseminated project information throughout each outreach period. A list of the number of mailings sent for each outreach period is outlined below in Table B.3-1.

Table B.3-1 Outreach Mailings

Outreach Period	Number of Mailers Sent
Early scoping	More than 52,160
September 2018 outreach	More than 67,200
SEPA scoping	More than 74,500
November 2019 outreach	More than 43,000
2021 SEPA Draft EIS comment period	Nearly 9,000
2023 NEPA Draft/SEPA Supplemental Draft EIS comment period	More than 5,100

3.1 GovDelivery Listserv

Individuals interested in receiving project information can sign up to receive periodic project updates through email. Sound Transit maintains a database of individuals who have requested to receive updates on project progress and opportunities for public input using a GovDelivery listserv. The listserv includes email addresses of open house attendees, drop-in session attendees, correspondents, commenters, and other interested individuals; for the 2023 Draft EIS, the listserv reached more than 4,800 subscribers.

3.1.1 Briefings

Sound Transit actively seeks opportunities to provide briefings to community and neighborhood groups, organizations, social service providers and businesses in the OMF South project area. Local community groups receive project information, learn about opportunities to provide project feedback and how to stay engaged, and ask questions at these briefings. Many briefings are one-on-one meetings with local stakeholders and community leaders. A full list of community briefings can be found in Section 5, Outreach Stakeholder Briefings, Interviews, and Tabling Events.

3.2 Open Houses and Drop-In Sessions

Sound Transit held open houses and informational drop-in sessions along the project corridor during Early Scoping, Scoping, the 2021 SEPA Draft EIS comment period, the 2023 NEPA Draft/SEPA Supplemental Draft EIS comment period, and additional outreach periods. During Early Scoping in April 2018, September outreach in September 2018, and Scoping in April 2019, Sound Transit held large open houses in three different locations during each outreach period. The project team shared information about alternatives development, project progress, and proposed route and station alternatives. Members of the public were encouraged to attend to speak with members of the project team, ask questions and provide comments and feedback. In November 2019, Sound Transit hosted a series of informal drop-in sessions along the project corridor to provide a project update and share information on alternatives development. In March 2021, Sound Transit hosted two online public meetings to provide information about the 2021 SEPA Draft EIS and offer attendees the opportunity to submit written questions for answers from a panel of Sound Transit staff who represented different disciplines on the project team, including engineering and design, environmental, and property acquisition and relocation. For the NEPA Draft/SEPA Supplemental Draft EIS comment period, Sound Transit hosted two public meetings in October 2023: one online and one in person. The online public meetings preceded formal public hearings for the comment period; see next section.

3.2.1 Public Hearings

Sound Transit has hosted public hearings at the appropriate points during the SEPA process. Specifically, hearings were held during Early Scoping, Scoping, and as part of the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS comment period. The Early Scoping and Scoping hearings were held in person and started with an informational open house, with various stations describing different aspects of the project. Sound Transit and consultant team staff were available to answer questions and engage in discussion. The open house was followed by a presentation by Sound Transit staff. Afterward, members of the public were given the opportunity to make oral comments. There were also forms available for those who wanted to make their comments in writing.

Two hearings were held for both the 2021 and 2023 Draft EIS comment periods. Both 2021 meetings and one 2023 meeting were held virtually; the second meeting in 2023 was in person and was similar in format to the meetings described above. As much as possible, the online hearings kept the same format as the in-person hearings. The virtual public hearings included live-captioning, sign-language interpretation, and simultaneous interpretation in Spanish, Korean, and Russian. The virtual hearings were hosted on Zoom, with on-screen and spoken instructions informing people how to tune into the appropriate audio channel on the Zoom Interpretation feature at the bottom of their screen.

3.3 Fact Sheets and Brochures

Sound Transit distributed OMF South fact sheets and brochures to the public throughout the project lifetime. The fact sheets included general project information and timeline, status of alternatives development, information on preferred alternatives and alternatives to be studied in environmental analysis, project contact information, and the project website URL. The project team also developed a fact sheet focused on summarizing potential fieldwork activities and a folio for potentially impacted property owners along the project corridor that provided an overview of what to expect throughout the project lifecycle. Translated versions of these materials are available in Spanish, Korean, and Russian.

3.4 Community Events

The OMF South project team attends existing events held by community organizations in the project area to connect with audiences that may not receive project information otherwise. By attending these events, Sound Transit builds relationships and establishes an ongoing presence in communities in the project area, provides project information and answers questions, and offers ways to stay engaged through project email updates. The project team has focused on attending events in traditionally underserved communities and providing in-language project information. See Table B5.2 for a full list of community events.

3.5 Project Webpage

Sound Transit maintains a project webpage, https://www.soundtransit.org/system-expansion/operations-maintenance-facility-south, for the OMF South project. The webpage includes a project overview and project maps, information on project stakeholders and partners, news and updates, project timeline and milestones, and a document library of published materials. It is kept up to date and is always accessible to users. Project documents on the OMF South website include:

- OMF South Early Scoping Information Report
- OMF South Early Scoping Report and Appendices
- OMF South Scoping Information Report
- OMF South Scoping Summary Report and Appendices
- OMF South Community Engagement and Communications Plan
- OMF South Project Folio
- OMF South 2021 SEPA Draft EIS
- OMF South Title VI Facility Equity Analysis Report
- OMF South 2021 SEPA Draft EIS Comment Summary Report
- OMF South EIS Public Engagement Summary
- OMF South 2023 NEPA Draft/SEPA Supplemental Draft EIS
- OMF South 2023 NEPA Draft/SEPA Supplemental Draft EIS Comment Summary Report

Visitors can also sign up to receive project email updates on the website.

3.6 News Media

Sound Transit publishes notifications and press releases for project updates, events, outreach periods and board meetings in online and print local news publications along the project corridor. See Table B.3-2 at the end of this section for a full list of publications.

3.7 Notifications to Potentially Affected Properties

Beginning in 2018, the project team has met with potentially affected property owners interested in learning more information or members of the public who have requested a briefing throughout the lifetime of the project. Meetings with property owners have focused on providing an overview of the project, discussing potential impacts in further detail, and answering questions. In addition to these meetings, Sound Transit has conducted door-to-door field visits to provide information about the project and distribute project factsheets and brochures. In 2019, Sound Transit began reaching out to potentially affected residents and businesses to coordinate fieldwork efforts to inform design for site alternatives. The property-owner outreach team conducted field visits to key properties within each of the six initial sites during the 2019 Scoping period. In fall 2019, the project team called property owners, hand-distributed flyers, and conducted door-to-door knocking to notify potentially affected areas.

In January 2020, Sound Transit conducted door-to-door outreach to potentially affected properties and properties adjacent to each of the site alternatives. The goal of this outreach was to keep property owners informed and to encourage them to stay engaged with the project as the environmental review process continues.

In January 2021, Sound Transit mailed individual letters to approximately 150 potentially affected property owners identified in the 2021 SEPA Draft EIS for the alternatives being evaluated. The letters included details of the property's inclusion in the 2021 SEPA Draft EIS, and an offer to meet with the project team to discuss individual property impacts in person. Due to the large number of potentially affected properties and the potential for non-responsive property owners, the project team aimed to offer at least 50 percent of potentially impacted property owners the opportunity to engage in a two-way conversation with Sound Transit prior to the release of the 2021 SEPA Draft EIS.

In January 2022, Sound Transit mailed individual letters to potentially affected property owners identified in the 2021 SEPA Draft EIS. The letters informed property owners of Sound Transit Board's identification of the South 336th Street Alternative as the Preferred Alternative in December 2021 and next steps. The letter also invited them to schedule a briefing with the project team for more information. Letters were mailed to the following groups: those potentially affected by the Preferred Alternative (20), those potentially affected by the South 336th Street and Midway Landfill alternatives (125), and those potentially affected by the mainline tracks (11).

Sound Transit also invited mobile home tenants of the Belmor Mobile Home Park (Belmor) to schedule a briefing with the project team to learn about the OMF South project and relocation benefits available to mobile homeowners. The project team held large group briefings with Belmor tenants on March 8 and April 5, 2021, and August 22, August 30, and November 1, 2023, to provide information on potential effects to Belmor, project alternatives and design options, the property acquisition and relocation processes, and findings from the 2021 and 2023 Draft EISs. Sound Transit also sends periodic OMF South project updates to Belmor residents through their monthly newsletter to keep them informed of project progress.

Sound Transit will continue to communicate transparently with property owners about potential impacts to their property, create and maintain relationships with property owners, and answer questions to help clarify the property acquisition process.

3.8 Targeted Outreach

Sound Transit is committed to equitable engagement and inclusive outreach towards community groups, organizations, residents, businesses, and underrepresented populations who do not typically participate in traditional in-person and online open houses or engagement opportunities. The project team has conducted targeted outreach to populations with limited English proficiency, low incomes, and people of color to build long-term relationships and provide meaningful opportunities to engage in the project planning, design, and environmental review processes. The project team reached out to community organizations and social service providers, when possible, to learn more about individual community needs and events to attend.

Sound Transit conducted a preliminary demographic analysis to identify low-income, minority, and limited-English-proficiency populations in the project area. Based on the demographic analysis, Sound Transit provided project literature in Spanish, Korean, Vietnamese, Khmer, and Russian when outreach was coordinated with TDLE. Sound Transit has continued providing materials in Spanish, Korean, and Russian for the OMF South project.

Sound Transit engages with social service providers, community leaders and organizations and other representatives through targeted outreach efforts. Through these efforts, the project team can share project information, build relationships with the community, and how environmental justice populations may experience adverse impacts or benefits from the project. Sound Transit is using several types of targeted outreach, including:

- **Briefings**: Sound Transit met with representatives of individual communities or organizations to provide a project update, answer questions, and learn more about individual circumstances and better ways to engage with their community. Attention and care have been taken to meet people in locations where they may be more comfortable engaging with government agencies. Briefings were adapted to meet the needs of specific audiences, including presentation content, as well as interpretation/translation.
- **Open houses:** Sound Transit chose locations and times that were accessible for the audiences within the project corridor. At open houses, project outreach staff set up tables of materials and resources, answered questions and participated in facilitated conversations. Advertised availability for translation, ASL interpretation, and tactile interpretation was used by individuals who requested these services.
- **Fair or festival booths:** Project staff attended fairs, festivals, and community/cultural celebrations in the project area (Federal Way and Kent) to distribute project information and answer questions from the general public. Outreach staff have hosted a Sound Transit booth with project-specific materials and general South Puget Sound materials. Booths were open to the public and provided basic information, as well as a chance to discuss specific questions in detail.
- **Tabling and drop-in sessions:** Project outreach provided project information and updates and answered questions at community spaces, including transit centers, UW Tacoma, grocery stores, and community centers to reach a wider audience. These tabling sessions were held at multiple days and times (weekdays/weekends, daytime, and evening) to meet varying schedules of community members. Events were open to the public and provided basic information as well as a chance to discuss specific questions in detail.

- **Stakeholder interviews:** The project team conducted a series of interviews with social service organizations and community advocacy groups in the project area to understand their preferred methods of engagement, establish relationships, and introduce them to the OMF South project.
- **Property owner meetings:** Project staff met with property owners along the project corridor to discuss specific questions and concerns; some with language interpretation.
- **Outreach toolkits:** The project team distributed outreach toolkits to social service organizations along the project corridor to encourage sharing of information by trusted leaders with their audiences during outreach periods and to generate additional feedback. The toolkits included project emails, posters, factsheets, Facebook posts and tweets for organizations to post and share.
- **Door-to-door outreach:** Project staff distributed posters and fliers to share project information, advertise upcoming events, and solicit project feedback. This often included outreach to small businesses and property owners in the project areas, particularly those likely to be affected by future alignments or stations.

The targeted outreach efforts and engagement dedicated towards historically underrepresented groups and underserved populations through the strategies outlined above is vital to build connections and gather project related feedback from these communities. Sound Transit has been able to engage with various audiences and involve people representative of the project corridor through these efforts.

Table B.3-2 lists the print and online publications that have been used to advertise project information.

Table B.3-2 Print and Online Publications

Publication	Media type	Scoping Run Dates	November 2019 Run Dates	2021 SEPA Draft EIS Run Dates	2023 NEPA Draft/SEPA Supplemental Draft EIS Run Dates
Sound Info (Federal Way Mirror and Kent Reporter)	Print and online	Print: March 8 and 15, 2019 Online: February 20 – April 1, 2019	Print: November 15, 22, and 29, 2019 Online: November 13 – December 6, 2019	Print: March 8, 15, 22, 29, April 5 and 15, 2021 Online: March 9 – April 19, 2021	Print: September 29, October 6, 13, and 20, 2023 Online: September 29 – November 6, 2023
Seattle Daily Journal of Commerce	Print	N/A	N/A	March 3, 10, and 17, 2021	September 22, 29, and October 6, 2023
El Siete Dias (available in Spanish)	Print and online	N/A	Print: November 17 and 21, 2019 Online: November 14, 21, and 28, 2019	Print: April 6, 2021, monthly issue Online: March 9 – April 19, 2021	Print: October 5, 2023, monthly issue Online: September 29 – November 6, 2023
International Examiner (Asian Pacific)	Print and online	N/A	Print: November 20 – December 3, 2019 Online: November 13 – December 6, 2019	Print: N/A Online: March 8 – April 19, 2021	Print: N/A Online: September 29 – November 6, 2023

Table B.3-2 Print and Online Publications (continued)

Publication	Media type	Scoping Run Dates	November 2019 Run Dates	2021 SEPA Draft EIS Run Dates	2023 NEPA Draft/SEPA Supplemental Draft EIS Run Dates
Korea Daily (available in Korean)	Print and online	Print: March 11 and 18, 2019	Print: November 13 – December 2, 2019 Online: N/A	Print: N/A Online: N/A	Print: N/A Online: N/A
The Korea Times Seattle (available in Korean)	Print and online	N/A	Print: November 11, 18, and December 2, 2019 Online: November 18 – 24 and November 30 – December 6, 2019	Print: March 12, 19, 26, April 2 and 9, 2021 Online: March 8 – April 19, 2021	Print: October 3, 11, 17, 24, and 31, 2023 Online: September 29 – November 6, 2023
Northwest Vietnamese News (available in Vietnamese)	Print and online	N/A	Print: November 12, 22, and 29, 2019 Online: November 15 –December 6, 2019	Print: N/A Online: N/A	Print: N/A Online: N/A
Russian Town Seattle	Online	N/A	N/A	March 8 – April 19, 2021	September 29 – November 6, 2023
The Seattle Times	Print and online	Print: March 10 and 17, 2019 Online: February 20 – March 21, 2019	Online: November 13 – December 6, 2019 Print: N/A	Print: March 3, 10, and 17, 2021 Online: N/A	September 22, 29, and October 6, 2023
The Tacoma News Tribune	Print and online	Print: March 11 and 18, 2019 Online: March 1 – 22, 2019	Print: N/A Online: N/A	Print: March 3, 10, and 17, 2021 Online: N/A	September 22, 29, and October 6, 2023
Tu Decides Weekly Newsletter (available in Spanish)	Print and online	Online: March 8 and 15, 2019	Print: November 15, 22, 29, 2019 Online: November 15, 22, and 29, 2019	Print: March 5, 12, 19, 26, April 2, and 9, 2019 Online: March 5 – April 19, 2021	Print: N/A Online: N/A
iLoveKent	Online	Online: February 20 – March 21, 2019	N/A	N/A	N/A
Waterland Blog	Online	Online: February 20 – March 21, 2019	N/A	N/A	N/A
B-Town Blog	Online	Online: February 20 – March 21, 2019	N/A	N/A	N/A
Westside Seattle/ Highline Times	Online	Online: February 20 – April 1, 2019	N/A	N/A	N/A
Poster Giant	Print	N/A	November 13, 2019	N/A	N/A

4 OUTREACH DURING ENVIRONMENTAL IMPACT STATEMENT PROCESS

4.1 Early Scoping

The early scoping process was conducted between April 2 and May 3, 2018. Early scoping was conducted concurrently with the TDLE project. More details about early scoping are included in the Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Summary Report (June 2018) located on the TDLE project website (https://www.soundtransit.org/system-expansion/tacoma-dome-link-extension/documents).

The early scoping notice was published in the Ecology SEPA Register on March 28, 2018, with the comment period beginning on April 2, 2018. Sound Transit also mailed postcards to properties along the corridor, placed print and online advertisements, and posted notices to social media sites. An agency meeting and three community open houses were held during the comment period. Sound Transit asked members of the public to comment on the following:

- The route (alignment), stations, potential alternatives, benefits, and impacts for TDLE
- The potential location, benefits, and impacts for an OMF in the South Corridor (South King and Pierce counties)
- The purpose and need for the project

To support early scoping, Sound Transit held three public open houses in Tacoma, Federal Way, and Fife.

- Open House – Tacoma
  Tuesday, April 17, 2018, 6 to 8 p.m.
  Best Western Plus Tacoma Dome Hotel, 2611 East E Street
- Open House – Federal Way
  Wednesday, April 18, 2018, 6 to 8 p.m.
  Todd Beamer High School, 35999 16th Avenue S
- Open House – Fife
  Tuesday, April 24, 2018, 6 to 8 p.m.
  Fife Community Center, 2111 54th Avenue E

More than 190 people attended the in-person open houses.

In addition, an online open house was available from April 2 to May 3, 2018, to inform the public about the project and provide an opportunity to comment on the project purpose and need, potential sites, and their benefits and impacts. All materials presented at the open house were available online.

Between April 2 and May 3, 2018, over 2,470 unique visitors accessed the online open house.

Over 560 written comments were gathered in person and from online comment forms. Public comments were accepted in various ways, including through email, the online open house, open house comment forms, and mail. In addition, an interactive map tool in the online open house allowed users to place notes at specific locations on a map, and users could indicate if they liked or disliked other commenters' notes. Similarly, at the community open houses, attendees placed Post-it Notes with their input on large maps.

The most common themes in the public comments concerned the following:

- Alignment and station location suggestions
- Parking
- Potential for transit oriented development
- Multimodal connections
- General support and expediting construction
- Concern about taxes and project cost
- Light rail operations and future expansion
- Increased access to employment areas
- Environmental concerns such as air quality, wetlands, vegetation, hazardous materials, geologic hazards, and environmental justice

Outreach activities were advertised with the following methods:

- Mailer notifications sent to over 52,160 homes, apartments, and businesses
- Two news releases on April 2 and April 16, 2018
- Online and print ads in 12 local online and print publications
- Posters distributed to 150 different locations between Kent and Tacoma (included translated versions in Spanish, Korean, Vietnamese, Khmer, and Russian)
- Facebook and "X" (formerly Twitter) ads that reached 30,047 subscribers and 81,500 followers
- Five project updates sent to approximately 5,300 recipients on April 2, April 12, April 16, April 24, and May 2, 2018

4.2 September 2018 Outreach

Between early scoping and scoping outreach, Sound Transit focused on inclusive outreach through stakeholder interviews, briefings, tabling events, and fairs and festivals with community groups, organizations, residents, businesses, and underrepresented populations along the project corridor in mind (more information below). This included a project update during a series of three open houses and an online open house. Sound Transit offered shared project updates for the OMF South and TDLE and sought feedback on initial route and station concepts. Although OMF South was not the focus of this outreach and no feedback was sought for the project, staff was available to answer questions and provide updates about the project. A display was presented at the three open houses and the online open house and provided general updates on the OMF siting process since early scoping.

Outreach Activities:

- Open House – Federal Way
  Tuesday, September 11, 2018, 6 to 8 p.m.
  Federal Way Performing Arts Center, 31510 Pete von Reichbauer Way S
- Open House – Fife
  Wednesday, September 12, 2018, 6 to 8 p.m.
  Fife High School, 5616 20th Street E
- Open House – Tacoma
  Wednesday, September 19, 2018, 6 to 8 p.m.
  Best Western Plus Tacoma Dome Hotel, 2611 East E Street

More than 175 people attended the three in-person open houses to provide comment and feedback on the route and station concepts for TDLE.

These activities were advertised as follows:

- Postcard notifications distributed to over 67,000 homes, apartments, and businesses in the project area
- Three project email updates sent to more than 6,200 recipients on the project listserv
- Posters distributed to over 150 locations throughout Federal Way, Fife, Milton, Tacoma, and Tribal areas
- Print and online display advertisements in 11 local publications
- Facebook posts on the Sound Transit page, reaching over 13,000 users and engaging over 600 people
- Sound Transit tweets, reaching over 18,000 “X” users and engaging 271 users with 16 retweets and 17 likes
- One news release on August 30, 2018
- Notification toolkits distributed to local community organizations

4.3 SEPA Scoping

When Sound Transit initiated the formal SEPA scoping process, the OMF South environmental review had been split from the TDLE process. Unlike early scoping, which addressed both projects, the SEPA scoping process described here solely addressed the OMF South project. This section also discusses how the scoping process influenced the development of alternatives.

During scoping, Sound Transit asked for comments on the proposed range of alternatives, the purpose and need for the project, the environmental effects and benefits to be analyzed, the probable significant adverse impacts, mitigation measures, and license or other approvals that may be required.

4.3.1 Public Comment Period and Scoping Meetings

Sound Transit published the Determination of Significance/Scoping Notice in the SEPA Register on February 19, 2019. The comment period for scoping was from February 19 to April 1, 2019. This period exceeded the 30 days required under SEPA regulations and allowed additional time for public, agency, and Tribal comment.

During this period, two open houses were held to inform and obtain input from the community (one in Federal Way and the other in Kent):

- Open House – Federal Way
  Tuesday, March 12, 2019, 6 to 8 p.m.
  Federal Way Performing Arts and Events Center, 31510 Pete von Reichbauer Way S
- Open House – Kent
  Wednesday, March 20, 2019, 6 to 8 p.m.
  Highline College, 2400 S 240th Street, Des Moines

In addition to the open houses, a meeting was held for Tribes, agencies, and cities on March 12, 2019.

- Agency Scoping Meeting
  Tuesday, March 12, 2019, 1 to 2:30 p.m.
  Federal Way Performing Arts and Events Center, 31510 Pete von Reichbauer Way S

Information on the purpose and need of the project, potential OMF South site locations with maps and technical details, details about the environmental review process, and the project timeline were presented at the open houses.

All public meeting locations were accessible to persons with disabilities. Alternative formats and translation services were available, including an accessible laptop with screen reader software. American Sign Language interpretation was requested and provided at the Federal Way open house. Visitors were able to comment on the site options with written comment forms, online comment forms on the online open house with laptops provided, or verbally to a court reporter who transcribed comments. More than 370 people attended the in-person public scoping meetings and 15 agency representatives attended the agency scoping meeting.

During the scoping process, an online open house was available from February 19 to April 1, 2019, and allowed the public to review and provide feedback on potential site locations. The online open house featured the project purpose and need, information about the scoping period and the EIS, and the advantages and disadvantages of each of the six potential OMF South sites. The website included all information that was presented at the in-person open houses. Users were asked to provide comments on the six potential site options.

Between February 19 and April 1, 2019, the online open house received more than 3,400 unique visitors who used a social share widget and shared over 25 times.

Commenters had several ways to comment during the scoping period in addition to the open houses and online open house. They could also comment via email, mail, or phone. Over 1,400 comments were received via in-person and online comment forms during the scoping period, as well as over 2,000 email comments leading up to scoping. Outreach activities and opportunities and ways to provide comment during the scoping process were advertised as follows:

- Newsletters mailed to over 74,000 households and businesses
- Posters distributed to 301 locations throughout Federal Way, Fife, Milton, Tacoma, and Tribal areas
- Four project email updates sent to more than 6,200 recipients on the South Sound email list
- Notification toolkits sent to 13 local organizations to share with constituents and members
- Print and online display advertisements in 10 local publications
- Social media posts, reaching over 9,000 Facebook users and engaging over 250 “X” users

How Comments Were Used

After the end of the comment period on April 1, 2019, Sound Transit collected and considered the comments received and prepared a scoping report to summarize the comments. The report was publicly available on the project website.

The comments received during the scoping period were considered by Sound Transit Board to identify the alternatives to study in the 2021 SEPA EIS.

Scoping Comment Summary

The OMF South Scoping Summary Report (Sound Transit 2019) summarizes the comments received during scoping. Generally, public, agency, and Tribal comments focused on the following:

- Concern over potential site alternatives that commenters believed could preclude future transit oriented development opportunities, specifically the S 240th Street and SR 99 site, which includes Dick’s Drive-In
- Concern about potential business displacements and other economic impacts
- For the alternatives in Federal Way, concerns about potential impacts to Hylebos Creek and its associated wetlands

Most commenters who expressed a site preference stated that one or either of the Midway Landfill sites were superior to the others.

4.4 Public Outreach during 2021 SEPA Draft Environmental Impact Statement Development

4.4.1 November 2019 Outreach Activities (November 13 to December 6, 2019)

In November and December of 2019, Sound Transit held a series of drop-in sessions to provide the public opportunities to learn more about both TDLE and OMF South. There was also an online open house available from November 13 through December 6, 2019. More than 250 people attended the drop-in sessions, and over 1,600 users participated in the online open house.

These were primarily opportunities for information sharing. Although it was not a formal comment period, Sound Transit received approximately 20 comments from in-person and online comment forms. Commenters primarily had questions about Sound Transit's property acquisition process and timeline and how the recent passage of I-976 could affect the project. Commenters who expressed a site preference generally encouraged Sound Transit to choose the Midway Landfill Alternative.

The drop-in sessions were conducted at the following locations:

- Federal Way Link Extension Open House
  Wednesday, November 13, 2019, 6 to 8 p.m.
  Highline College, 2400 S 240th Street, Des Moines
- Drop-in session – Federal Way
  Saturday, November 16, 2019, 10 a.m. to noon
  Federal Way Library, 34200 1st Way S
- Drop-in session – Kent
  Tuesday, November 19, 2019, 8 to 10 a.m.
  Fred Meyer, 25250 Pacific Highway S
- Federal Way Link Extension Open House
  Wednesday, November 20, 2019, 6 to 8 p.m.
  Federal Way Performing Arts Center, 31510 Pete von Reichbauer Way S
- Drop-in session – Federal Way
  Wednesday, December 4, 2019, 5 to 7 p.m.
  Federal Way Community Center, 876 S 333rd Street

An online open house was available from November 13 to December 9, 2019. All materials from the drop-in sessions were available on the site. The site provided a project update on the three sites to be studied in environmental review and laid out the timeline for the project as well as the next opportunity for the public to provide comments and feedback.

The site had a landing page translated into Khmer, Korean, Russian, Spanish, and Vietnamese, with instruction on how to use Google Translate to navigate the site. The site also included in-language content for all aforementioned languages.

Between November 13 and December 9, 2019, the online open house had more than 1,600 unique visitors. These visitors used a social share widget on the site, sharing it 18 times. These activities were advertised with the following:

- Mailers and notifications sent to over 43,000 homes and businesses
- Social media posts reaching over 16,000 Facebook users and engaging over 5,000 "X" users
- Posters distributed to 105 different locations throughout SeaTac, Kent, Des Moines, and Federal Way
- Three project email updates sent to more than 6,200 recipients on South Sound email lists
- Notification toolkits sent to 12 local organizations to share with constituents and members
- Print and online display advertisements in eight local publications

4.5 2021 SEPA Draft Environmental Impact Statement Comment Period

Sound Transit published notification of the availability of the 2021 SEPA Draft EIS in the SEPA Register on March 5, 2021. The 45-day comment period was from March 5 to April 19, 2021. Public comments could be submitted through comment forms on the 2021 SEPA Draft EIS website (see online open house below), email, letter, voicemail, or as verbal comments during the public hearing portion of two online public meetings and hearings on March 24 and March 30. Sound Transit received more than 270 comments on the 2021 SEPA Draft EIS. See the 2021 SEPA Draft EIS public engagement summary for more details. It is posted online at www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-public-engagement-summary-20211110.pdf.

4.5.1 Public Comment Period, Online Open House, and Public Meetings and Hearings

Online Open House

The online open house launched on March 5, 2021, and concluded on April 19, 2021. Information presented on the online open house included project background and history, details about the environmental review process, analysis of the three OMF South build alternatives with maps and statistical comparisons, and the project timeline. The online open house was fully translated into Spanish, Korean, and Russian and included Google Translate so users could translate webpage text into additional languages. Users were able to submit comments on the 2021 SEPA Draft EIS findings via a comment form on the online open house. Over 2,400 users visited the online open house during the comment period.

Online Public Meetings and Hearings

During this period, Sound Transit hosted two online public meetings and hearings via Zoom Webinar to provide general information about the 2021 SEPA Draft EIS and offer attendees the opportunity to provide public comment. A live captioner provided simultaneous subtitles in English. Spanish, Korean, and Russian interpreters provided simultaneous interpretation in audio channels. Sound Transit staff communicated the language and accessibility features throughout the meetings and hearings to ensure attendees understood how to fully participate. More than 120 people attended the virtual public meetings and hearings.

- Online public meeting and hearing #1
  Wednesday, March 24, 2021, 5:30 to 8:30 p.m.
  Zoom Webinar
- Online public meeting and hearing #2
  Tuesday, March 30, 2021, 11 a.m. to 1 p.m.
  Zoom Webinar

The first hour of the meeting consisted of a prerecorded presentation and a live question-and-answer segment. The presentation provided an overview of the OMF South project and the 2021 SEPA Draft EIS comment period. The Q&A segment offered the public the opportunity to submit written questions for answers from a panel of Sound Transit staff who represented different disciplines on the project team, including engineering and design, environmental, and property acquisition and relocation.

During the public hearing section of the virtual meeting, a representative of Sound Transit was present to listen to attendees who wanted to provide public comments. A court reporter documented the verbal public comments for incorporation into the 2021 SEPA Draft EIS. While all members of the public were invited to provide comments, in an effort to center on equity and provide access to people who have historically been excluded from public processes, Sound Transit invited attendees who identified as people of color, people with disabilities, and anyone working with an interpreter the opportunity to speak first before opening the floor to the rest of the attendees. Ten people submitted comments during the public hearing section of the virtual meeting.

The dates of the online open house and virtual public meetings and hearings were advertised as follows:

- Legal notices in The Seattle Times, The News Tribune, and Seattle Daily Journal of Commerce
- Several posts on Sound Transit's Facebook page (33,433 subscribers) and "X" account (88,700 followers)
- 8,962 mailers sent to homes, apartments, and businesses in Kent and Federal Way within 0.5 mile of the build alternatives. The mailer included translations in Korean, Russian, and Spanish
- One news release and three update notices to an email list with approximately 7,000 subscribers
- Display advertisements and online community calendar postings in seven local online and print publications and promoted posts on Facebook for zip codes in the project area

2021 SEPA Draft Environmental Impact Statement Comment Summary

The OMF South Comment Summary Report summarizes the comments received during the comment period. The Comment Summary Report was made available on Sound Transit's website on November 21, 2021. The Sound Transit Board considered the 2021 SEPA Draft EIS analysis and the comments received before identifying the Preferred Alternative for the project.

4.6 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Scoping

FTA and Sound Transit published a Notice of Intent in the Federal Register on July 19, 2023. The notice initiated a 30-day comment period where agencies, Tribes, and members of the public were invited to comment on the proposed scope of the EIS, particularly on changes made to the proposal since the 2021 SEPA Draft EIS.

4.7 2023 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Public Comment Period

The Draft EIS was published on September 22, 2023. There was a 45-day comment period, during which Tribes, agencies, and members of the public were invited to comment. The comment period ended November 6, 2023.

4.7.1 Public Comment Period, Online Open House, and Public Meetings and Hearings

Public engagement for this comment period included:

Online Open House (omfsouth.participate.online)

An online open house was live for the duration of the comment period (September 22 to November 6, 2023). The public could visit the website to review what had changed since the 2021 SEPA Draft EIS and review a summary of the findings of the NEPA Draft/SEPA Supplemental Draft EIS and supporting materials, along with submitting comments via an online comment form. In addition to English, the website was also available in Korean, Russian, and Spanish. The website contained accessibility features, including screen-reader-friendly content and detailed alternative text. Digital factsheets and documents throughout the site were made into accessible PDFs. A total of 1,321 people visited the online open house including the following: 1,241 visitors to the English site, 72 visitors to the Spanish site, two visitors to the Korean site, and six visitors to the Russian site.

Public Meetings and Hearings

Sound Transit hosted one online public meeting and one in-person public meeting to provide general information about the Draft EIS and offer attendees the opportunity to provide public comment.

The online public meeting was held on Zoom on Thursday, October 19, from 11:30 a.m. to 1:30 p.m. More than 20 people attended the meeting. The first portion of the virtual meeting consisted of a presentation and a live question-and-answer (Q&A) segment. The presentation provided an overview of the OMF South project and the 2023 NEPA Draft/SEPA Supplemental Draft EIS comment period. The Q&A segment offered the public the opportunity to submit written questions for answers from a panel of Sound Transit staff who represented different disciplines on the project team, including engineering and design, environmental, and property acquisition and relocation. The second portion of the online meeting consisted of a public hearing with a representative of Sound Transit listening to attendees who wanted to provide a public comment. Public hearing comments were captured by a court reporter.

The in-person meeting was held at the Federal Way Performance Arts & Events Center on Tuesday, October 24, 2023, from 5:30 to 7:30 p.m. More than 25 people attended the meeting. The in-person meeting included an open house where members of the public could browse displays with information on the environmental review process and Draft EIS findings. Sound Transit subject-matter experts were available to answer questions from the public. The event also included an overview presentation on OMF South and the NEPA Draft/SEPA Supplemental Draft EIS comment period. Following the presentation, members of the public could return to the open house or participate in the public hearing, with a representative of Sound Transit listening to attendees who wanted to provide a public comment. Public hearing comments were captured by a court reporter and attendees were also able to fill out a written comment form at the meeting.

Both meetings utilized standard accessibility features. The online meeting featured live captioning (in English) and was screen-reader accessible. Sound Transit offered simultaneous interpretation in American Sign Language, Spanish, Korean, and Russian at the online and in-person meetings. The in-person meeting also included translated materials in Spanish, Korean, and Russian. Sound Transit staff communicated the language and accessibility features throughout the public meetings and hearings to ensure attendees understood how to fully participate. Languages available for interpretation were based on the demographic data of the study area.

Mailers

The project team sent 5,170 mailers to residences and businesses within 0.5-mile of site alternatives. The mailer included translations in Korean, Russian, and Spanish. The content included information about the comment period, an overview of site locations, directions on how to comment, and resources about where recipients could find more information about the OMF South environmental review process and access the NEPA Draft/SEPA Supplemental Draft EIS.

Posters

To increase awareness of the comment period, the project team distributed posters to eight community gathering spaces and other areas where the public is likely to congregate in Kent and Federal Way. The poster included information on the online open house, public meeting and hearing dates, and how to submit a comment. The poster included translations in Korean, Russian, and Spanish.

Online and Print Display Ads for South Sound Publications

Sound Transit ran print display ads and online ad campaigns in six publications throughout the comment period. Ad placements included English, Spanish, Korean, and Russian publications to reach audiences in the project area and region. Online ads were geo-targeted, when possible, to focus on audiences in Kent and Federal Way. The ad messaging communicated learning more about the NEPA Draft/SEPA Supplemental Draft EIS and providing new comments on it. The project team placed ads in the following publications: Kent Reporter, Federal Way Mirror, International Examiner, El Siete Dias, Korean Times Seattle, Russian Town Seattle, and Facebook (geotargeted ads in English, Spanish, and Russian).

Legal Notices

Sound Transit ran a legal notice about the availability of the NEPA Draft/SEPA Supplemental Draft EIS for public comment in the Seattle Times, the Tacoma News Tribune, and the Daily Journal of Commerce. Legal notices were run on September 22, September 29, and October 6, 2023. The legal notice provided information on the project, availability of the SEPA Draft/NEPA Supplemental Draft EIS, public meeting times and locations, and how to comment.

Sound Transit Project Listserv Updates

The project team sent four email updates regarding the NEPA Draft/SEPA Supplemental Draft EIS comment period to over 4,800 subscribers of the OMF South project listserv. The purpose of these listserv updates was to announce publication of the document and the comment period, direct recipients on how to access the document and submit comments, and invite people to the online public meetings and hearings.

Social Media

Sound Transit promoted the OMF South 2023 Draft EIS comment period and online open house through content on Sound Transit’s Facebook account. This included posts and events for the two public meetings and hearings on Facebook reaching 224 people.

Sharing Physical Materials

To increase accessibility for the community, project staff mailed physical copies of the NEPA Draft/SEPA Supplemental Draft EIS to frequently visited community hubs, including the Federal Way Library, Federal Way 320th Library, Federal Way Community Center, Federal Way City Hall, Kent Library, Kent Commons Community Center, and Kent City Hall, and to other locations by community request.

Outreach Toolkits

During the comment period, the project team distributed four outreach toolkits to local organizations and governments so they could amplify the EIS comment period and the opportunity to comment to their respective networks. The outreach toolkit included a digital flyer and social media posts.

5 OUTREACH STAKEHOLDER BRIEFINGS, INTERVIEWS, AND TABLING EVENTS

5.1 2021 SEPA Scoping

Table B.5-1 below lists events and dates associated with scoping.

Table B.5-1 2021 SEPA Scoping Events and Dates

Federal Way Chamber Roundtable	March 1, 2019
Federal Way Chamber Luncheon	March 6, 2019
Kent Cultural Communities Board	February 26, 2019
Korean Community Quarterly Meeting	March 21, 2019
North Lake Improvement Club of Federal Way	March 4, 2019
South King County Mobility Coalition	March 14, 2019

5.2 Other Activities (2018 to 2020)

Table B.5-2 below lists other outreach activities conducted during development of the 2021 SEPA Draft EIS.

Table B.5-2 Outreach Activities and Dates Associated with the 2021 SEPA Draft Environmental Impact Statement

Organization	Outreach Type	Date
Briefings and Interviews		
West Hill Cambridge Neighborhood Council	Briefing	January 22, 2019
Auburn Area Roundtable	Briefing	August 2, 2019
Pacific Christian Academy School Board	Briefing	June 13, 2019 April 15, 2020
Garage Town	Briefing	March 7, 2019 March 18, 2020
Federal Way Black Collective	Briefing	October 1, 2020
Federal Way – Councilmember Baruso	Briefing	April 3, 2020
Federal Way – Councilmember Honda	Briefing	April 1, 2020
Federal Way – Councilmember Kochmar	Briefing	April 8, 2020
Federal Way – Mayor Jim Ferrell	Briefing	May 22, 2020
Federal Way Staff	Briefing	August 20, 2020
Federal Way Council Study Session	Briefing	February 19, 2019 October 1, 2019
Kent – Mayor Dana Ralph	Briefing	June 25, 2020
Kent Staff	Briefing	August 10, 2020
Kent Mill Creek Neighborhood Association	Briefing	April 11, 2019
Kent Council Workshop	Briefing	March 5, 2019

Table B.5-2 Outreach Activities and Dates Associated with the 2021 SEPA Draft Environmental Impact Statement (continued)

Multi-Service Center	Briefing	January 15, 2019 October 24, 2019
North Park Neighborhood Association	Briefing	June 13, 2019
Rock Automotive and Sunset Motel	Briefing	July 19, 2019
Neighbors of West Hill Council	Briefing	September 19, 2019
Hopelink	Briefing	November 25, 2019
U.S. Army Corps of Engineers	Briefing	September 2, 2020
Belmor Park Leadership	Briefing	February 16, 2021
Belmor Park Leadership	Briefing	March 8, 2021
Federal Way – Mayor Jim Ferrell	Briefing	March 8, 2021
Federal Way – Mayor Dana Ralph	Briefing	March 9, 2021
SPU/EPA/Ecology	Briefing	March 10, 2021
Federal Way Black Collective	Briefing	March 11, 2021
City of Kent	Briefing	March 11, 2021
City of Federal Way	Briefing	March 11, 2021
Federal Way Chamber Government Affairs Committee	Briefing	March 11, 2021
Federal Way City Council	Briefing	March 16, 2021
Kent City Council	Briefing	March 16, 2021
Federal Way Planning Commission	Briefing	March 17, 2021
Federal Way Chamber of Commerce	Briefing	March 17, 2021
Pacific Christian Academy	Briefing	March 31, 2021
Christian Faith Center	Briefing	March 31, 2021
Kent Chamber of Commerce	Briefing	April 1, 2021
Belmor Park Residents	Briefing	April 5, 2021
GarageTown	Briefing	April 12, 2021
Multi-Service Center	Briefing	April 15, 2021
Pacific Christian Academy Briefing	Briefing	January 26, 2022
Pacific Christian Academy Science Class Fieldwork Lesson	Briefing	March 28, 2022
Pacific Christian Academy Science Class Fieldwork Lesson	Briefing	March 30, 2022
Tacoma Urban League	Briefing	May 11, 2022
Fairs, Festivals, and Tabling		
Federal Way Library Office Hours	Tabling	January 23, 2019 January 30, 2019
Ecology Midway Landfill Site Public Hearing	Hearing	February 11, 2019
Auburn Food Bank Tabling	Tabling	March 8, 2019
Federal Way Farmers Market	Tabling	July 27, 2019 July 29, 2019
Federal Way State of the City	Tabling	February 28, 2019 February 27, 2020
Kent Field Visits (12)	Door-to-door	February 28, 2019 January 28 – 31, 2020
Federal Way Field Visits (10)	Door-to-door	March 4, 2019 January 22 – 28, 2020
Kent Farmers Market	Tabling	June 22, 2019

5.3 2021 SEPA Draft Environmental Impact Statement Comment Period

Table B.5-3 lists outreach efforts associated with the public comment period of the 2021 SEPA Draft EIS.

Table B.5-3 Outreach Associated with Comment Period of 2021 SEPA Draft Environmental Impact Statement

Organization	Outreach Type	Date
Belmor Park Leadership	Briefing	March 8, 2021
Belmor Park Residents	Briefing	April 5, 2021
Federal Way – Mayor Jim Ferrell	Briefing	March 8, 2021
Kent – Mayor Dana Ralph	Briefing	March 9, 2021
SPU/EPA/Ecology	Briefing	March 10, 2021
Federal Way Black Collective	Briefing	March 11, 2021
City of Kent	Briefing	March 11, 2021
City of Federal Way	Briefing	March 11, 2021
Federal Way Chamber Government Affairs Committee	Briefing	March 11, 2021
Federal Way City Council	Briefing	March 16, 2021
Kent City Council	Briefing	March 16, 2021
Federal Way Planning Commission	Briefing	March 17, 2021
Federal Way Chamber of Commerce	Briefing	March 17, 2021
Pacific Christian Academy	Briefing	March 31, 2021
Christian Faith Center	Briefing	March 31, 2021
Kent Chamber of Commerce	Briefing	April 1, 2021
GarageTown	Briefing	April 12, 2021
Multi-Service Center	Briefing	April 15, 2021

5.4 NEPA Draft/SEPA Supplemental Draft Environmental Impact Statement Comment Period

Sound Transit sought briefings with agency partners to continue building relationships. Discussion topics included the EIS process, updated Draft EIS findings, and next steps for the OMF South project. Sound Transit met separately with the cities of Federal Way and Kent.

Property owners have had the opportunity to request briefings with members of the project through an online scheduling tool. Briefings with property owners included project updates and information on the property acquisition and relocation process.

Sound Transit met separately with GarageTown (2 attendees) and Belmor residents (59 attendees) during the comment period to speak about NEPA Draft/SEPA Supplemental Draft EIS findings, answer questions, and share how to comment on the Draft EIS.

6 REFERENCES

Sound Transit. 2018. Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Summary Report. Available at: https://www.soundtransit.org/sites/default/files/project-documents/AE%25200030-17%25205.3.C%2520Early%2520Scoping%2520Summary%2520Report%2520and%2520Appendices%2520.pdf. Accessed 2020.

Sound Transit. 2019. Operations and Maintenance Facility South Scoping Summary Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-scoping-report-summary.pdf. Accessed 2020.

Sound Transit. 2021a. Operations and Maintenance Facility South Draft Environmental Impact Statement Comment Summary Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-deis-comment-summary-report-20211110.pdf. Accessed 2021.

Sound Transit. 2021b. Operations and Maintenance Facility South Draft Environmental Impact Statement Public Engagement Summary. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-public-engagement-summary-20211110.pdf.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix E: Environmental Justice Assessment

SOUND TRANSIT
TRANSIT
140A
Link
154B
SOUND

Federal Transit Administration

SOUNDTRANSIT

June 2024

Table of Contents

1 INTRODUCTION E-1
1.1 Project Background E-1
1.1.1 Sound Transit Mission E-1
1.1.2 Sound Transit System Planning E-1
1.1.3 OMF South Purpose and Need E-3
1.2 Regulatory Framework E-4
2 METHODS AND APPROACH E-7
2.1 Study Area E-8
2.2 Data Sources E-8
3 AFFECTED ENVIRONMENT E-9
3.1 Study Area Demographics E-9
3.2 Community Facilities E-17
4 OUTREACH TO MINORITY AND LOW-INCOME POPULATIONS E-21
4.1 Scoping Outreach E-21
4.1.1 Early Scoping E-21
4.1.2 SEPA Scoping E-22
4.2 2021 SEPA Draft EIS Outreach E-24
4.3 NEPA Scoping E-25
4.4 2023 NEPA Draft/SEPA Supplemental Draft EIS Outreach E-25
4.5 Additional Targeted Outreach and Community Feedback E-26
5 PROJECT IMPACTS, BENEFITS, AND MITIGATION E-28
5.1 Direct Impacts and Mitigation Measures E-28
5.1.1 No-Build Alternative E-28
5.1.2 Build Alternatives E-28
5.2 Indirect Impacts E-50
5.3 Cumulative Impacts E-50
5.4 Project Benefits E-51
5.4.1 Indirect Benefits E-51
5.4.2 Direct Benefits E-52
6 CONCLUSION E-53
REFERENCES E-55
ATTACHMENT A: EJSCREEN REPORTS

Figures

Figure E.1-1 Link System Future Expansion and OMF Site Locations E-2
Figure E.3-1 Minority Populations: Preferred Alternative E-11
Figure E.3-2 Minority Populations: South 344th Street Alternative E-12
Figure E.3-3 Minority Populations: Midway Landfill Alternative.. E-13
Figure E.3-4 Low-Income Populations: Preferred Alternative E-14
Figure E.3-5 Low-Income Populations: South 344th Street Alternative E-15
Figure E.3-6 Low-Income Populations: Midway Landfill Alternative................................... E-16
Figure E.3-7 Social Resources: Preferred Alternative and South 344th Street Alternative E-18
Figure E.3-8 Social Resources: Midway Landfill Alternative E-19
Figure E.5-1 Mainline Tracks Looking East from Belmor E-47
Figure E.5-2 Mainline Tracks Looking North from 24th Ave S E-47

Tables

Table E.3-1 Comparison of Demographic Characteristics E-10
Table E.3-2 Comparison of Race and Ethnicity Characteristics E-10
Table E.3-3 Public Schools within Build Alternative Study Areas E-17
Table E.5-1 Summary of Potential Impacts and Mitigation E-29
Table E.5-2 Preferred Alternative Impacts by Block Group E-39
Table E.5-3 South 344th Street Alternative Impacts by Block Group E-39
Table E.5-4 Midway Landfill Alternative Impacts by Block Group...................................... E-40

Acronyms and Abbreviations

ACS	American Community Survey
Belmor	Belmor Mobile Home Park
BMP	best management practice
DBE	Disadvantaged Business Enterprise
DOT	U. S. Department of Transportation
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FWLE	Federal Way Link Extension
I-5	Interstate 5
LRV	light rail vehicle
NEPA	National Environmental Policy Act
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
OSPI	Washington State Office of Superintendent of Public Instruction
SEPA	State Environmental Policy Act
Sound Transit	Central Puget Sound Regional Transit Authority
Sound Transit 3	Sound Transit 3: The Regional Transit System Plan for Central Puget Sound
SR	State Route
TDLE	Tacoma Dome Link Extension
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct an operations and maintenance facility (OMF) in the South Corridor to support Sound Transit's Link light rail system expansion. Sound Transit is evaluating three alternatives for the Operations and Maintenance Facility South (OMF South) Project in its South Corridor service area: two in Federal Way and one in Kent. Both cities are located in King County, Washington.

This appendix of the OMF South Final Environmental Impact Statement (EIS) documents the environmental justice analysis conducted for the No-Build and build alternatives for the OMF South project. The analysis defines and describes the minority and low-income populations present in the study area; describes the project effects on minority and low-income populations; identifies measures to avoid, minimize, or mitigate potential adverse effects; and makes a determination of whether the project has disproportionate and adverse effects on these populations. This appendix also summarizes the public outreach to minority and low-income populations within the project area.

1.1 Project Background

1.1.1 Sound Transit Mission

As stated in the 2020 Five-Year Agency Strategic Plan (Sound Transit 2020), Sound Transit's mission statement is:

> Connecting more people to more places to make life better and create equitable opportunities for all.

1.1.2 Sound Transit System Planning

Sound Transit's system planning has served to develop transit improvements throughout the three-county Sound Transit service district. The service district consists of King, Pierce, and Snohomish counties. Sound Transit is currently implementing Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). Sound Transit 3 builds on the programs of Sound Move and Sound Transit 2 and seeks to expand the regional light rail system north to Everett; south to Federal Way and Tacoma; east to downtown Redmond, south Kirkland, and Issaquah; and west to Ballard and West Seattle, totaling 116 miles with over 80 stations. See Figure 1-1 for a map of Sound Transit's planned future expansion.

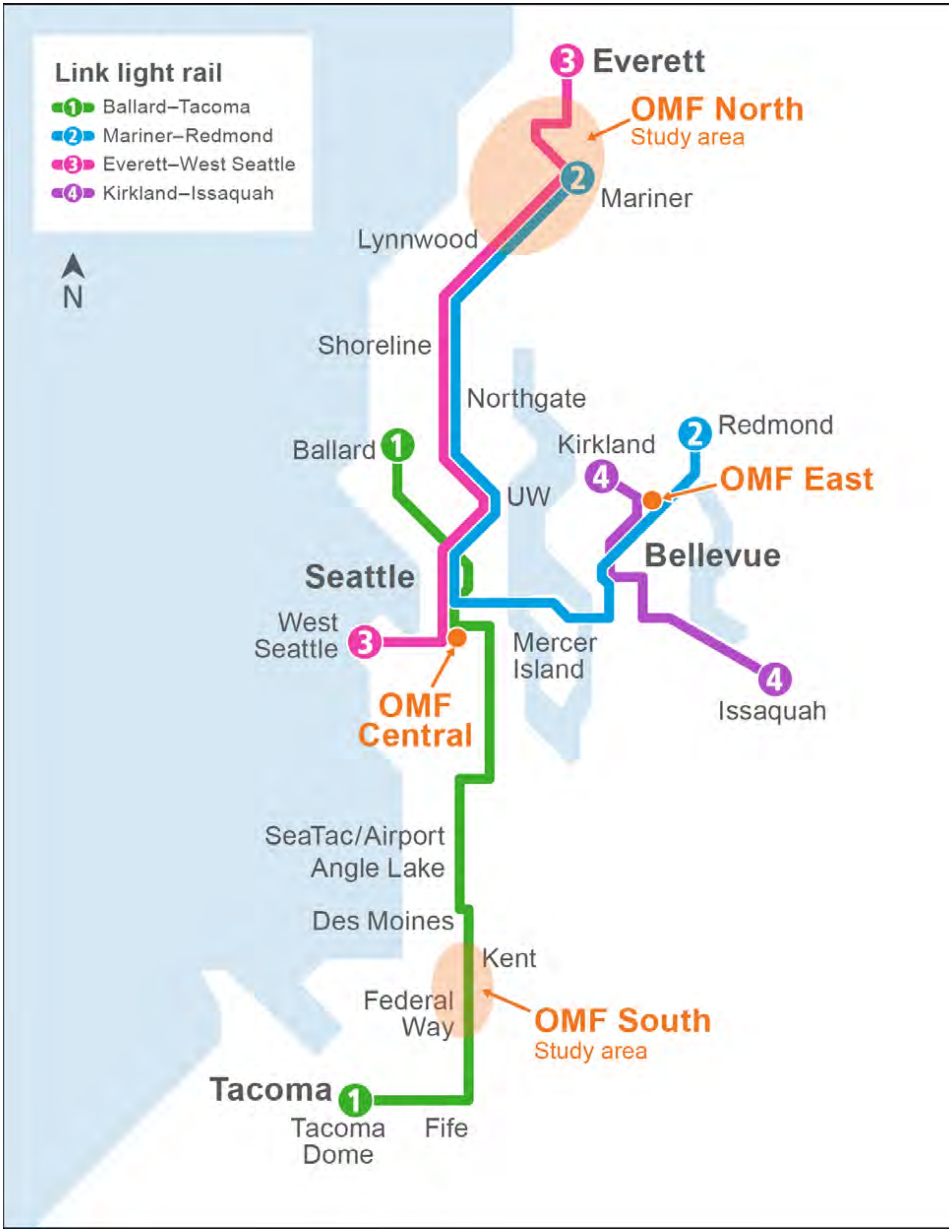

Link light rail
1 Ballard–Tacoma
2 Mariner–Redmond
3 Everett–West Seattle
4 Kirkland–Issaquah
N
3 Everett
OMF North
Study area
2 Mariner
Lynnwood
Shoreline
Northgate
Ballard 1
UW
Kirkland
4
2 Redmond
OMF East
Bellevue
Seattle
West Seattle 3
Mercer Island
OMF Central
4 Issaquah
SeaTac/Airport
Angle Lake
Des Moines
Kent
Federal Way
OMF South
Study area
Tacoma 1
Tacoma Dome
Fife

Figure E.1-1 Link System Future Expansion and OMF Site Locations

As shown in Figure E.1-1, the Sound Transit light rail system will serve four corridors: north, central, east, and south. Future improvements, including existing and planned maintenance facilities, for each of the corridors are outlined below.

- North Corridor: Sound Transit 3 would extend light rail north from the Lynnwood Transit Center that is under construction to downtown Everett via the Southwest Everett Industrial Center. The line includes six stations serving the areas of West Alderwood Mall: Ash Way, Mariner, Southwest Everett Industrial Center, State Route (SR) 526 near Evergreen Way, and the area at the existing Everett Station. A future light rail OMF would be located in the North Corridor, with similar programming functions to OMF South. The facility will maintain and store a portion of the light rail fleet for the future Everett to Alaska Junction and Mariner Way to Downtown Redmond services.
- Central Corridor: Sound Transit 3 would add two light rail extensions in Seattle. The first would extend light rail from downtown Seattle to West Seattle, with stations serving the sports stadiums; the SODO, Delridge, and Avalon districts/neighborhoods; and the Alaska Junction business district. In addition, light rail would extend to Ballard, with stations serving the International District/Chinatown, Midtown, Westlake, Denny, South Lake Union, Seattle Center, Smith Cove, Interbay, and Ballard districts/neighborhoods. Three infill stations would be added serving NE 130th Street, S Graham Street, and S Boeing Access Road near Interstate 5 (I-5). Connections to the existing OMF Central would be built to service vehicles operating in this corridor. The existing OMF Central would maintain and store a portion of the light rail fleet for multiple lines.
- East Corridor: Sound Transit 3 would extend light rail east of Seattle, connecting Redmond, Bellevue, south Kirkland, and Issaquah to each other and to the regional system. Eastside investments include two stations serving southeast Redmond and downtown Redmond that are currently under construction, along with a new light rail line from south Kirkland to Issaquah via Bellevue. Four stations would be included on the light rail extension, serving south Kirkland, the Richards Road area, Eastgate near Bellevue College, and central Issaquah. Maintenance needs in the east corridor would be served by the recently completed OMF East, which will maintain and store a portion of the light rail fleet for the Mariner Way to Downtown Redmond and South Kirkland to Issaquah services.
- South Corridor: Sound Transit 3 would extend light rail south from Kent/Des Moines to Federal Way, with stations serving South 272nd Street and the Federal Way Downtown Station. These are currently in construction. From there, light rail would continue south to Pierce County, with stations in south Federal Way, Fife, and Tacoma, where it would provide a multimodal connection to the existing Tacoma Link, the Sounder commuter rail, the Sound Transit Express Bus, and Amtrak. Sound Transit 3 also includes an expansion of Tacoma Link to Tacoma Community College, with six stations. OMF South (the proposed project) would be built in the South Corridor to maintain and store a portion of the future light rail fleet for FWLE (currently under construction) and the West Seattle/Ballard to Tacoma Dome service and to receive, test, commission, store, maintain, and deploy new light rail vehicles (LRVs) and materials for maintenance of the mainline track for the entire system.

1.1.3 OMF South Purpose and Need

The purpose of OMF South is to:

- Provide a facility with the capacity to receive, test, commission, store, maintain, and deploy vehicles to support the intended level of service for the system-wide light rail system expansion.
- Support efficient and reliable light rail service that minimizes system operating costs.

- Support and connect efficiently to the regional system and be technically and financially feasible to build, operate, and maintain, consistent with Sound Transit 3 and Sound Transit's Regional Transit Long-Range Plan.

The project is needed because:

- The current regional system lacks a facility with sufficient capacity and suitable location to support the efficient and reliable long-term operations for system-wide light rail expansion, including the next phase of expansion in King and Pierce counties.
- New light rail maintenance and storage capacity needs to be available with sufficient time to accept delivery of and commission new vehicles to meet the expansion needs outlined in Sound Transit 3 and to store existing vehicles while the new vehicles are tested and prepared.

The OMF South project is necessary to support the addition of approximately 144 LRVs as part of the Sound Transit 3 system expansion. The facility includes functions that support the entire Link light rail system, such as receiving, testing, and commissioning new LRVs. In addition, OMF South would include Maintenance of Way facilities and a Link System-Wide Storage building to receive and store vehicle, track, and station parts and components.

1.2 Regulatory Framework

The environmental justice analysis was performed in compliance with:

- Presidential Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994
- U.S. Department of Transportation (DOT) Order on Environmental Justice, Department of Transportation Order 5610.2C – Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, May 14, 2021
- Circular FTA C-4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients, August 15, 2012
- Executive Order 14096, Executive Order to Revitalize our Nation's Commitment to Environmental Justice for All, April 21, 2023

EO 12898 provides that ". . . each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands." The EO addresses the importance of public participation in the review process. EO 14096 – "Revitalizing Our Nation's Commitment to Environmental Justice for All" was enacted on April 21, 2023. EO 14096 requires agencies to "identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities, including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns." EO 14096 on environmental justice does not rescind EO 12898, which has been in effect since February 11, 1994, and is currently implemented through the May 14, 2021 DOT Order 5610.2C. This implementation will continue until further guidance is provided regarding the implementation of the new EO 14096 on environmental justice.

The U.S. DOT issued DOT Order 5610.2(a), which established the procedures to use to comply with EO 12898, to avoid disproportionate and adverse effects on minority and low-income populations. The order has been superseded twice and is now U.S. DOT Order 5610.2C. The DOT order requires agencies to observe the following principles (DOT Order 5610.2C, § 6(b)):

1. Planning and programming activities for policies, programs, and activities that have the potential to have a disproportionately high and adverse effect on human health or the environment shall include explicit consideration of the effects on minority populations and low-income populations.
2. Steps shall be taken to provide the public, including members of minority populations and low-income populations, access to public information concerning the human health or environmental impacts of programs, policies, and activities, including information that will address the concerns of minority and low-income populations regarding the health and environmental impacts of the proposed action. This includes ensuring that information is made available in languages other than English and in accessible formats for persons with disabilities.

The DOT order further explains that "In making determinations regarding disproportionately high and adverse effects on minority and low-income populations, mitigation and enhancement measures that will be implemented and all offsetting benefits to the affected minority and low-income populations may be taken into account, as well as the design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas." (DOT Order 5610.2C, § 9(b)).[1] The following definitions are from the DOT order for disproportionate and adverse effects, minority persons, and low-income persons:

Disproportionate and adverse effect on minority and low-income populations means an adverse effect that is predominantly borne by a minority population and/or a low-income population or will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population (DOT Order 5610.2C, Appendix § 1(g)).

Minority person means a person who is:

- Black: a person having origins in any of the black racial groups of Africa.
- Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent.
- American Indian or Alaskan Native: a person having origins in any of the original people of North America and South America (including Central America) and who maintains cultural identification through tribal affiliation or community recognition).
- Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands (DOT Order 5610.2C, Appendix § 1(c)).

---

[1] Under EO 14096, agencies will continue their efforts to advance environmental justice in ways that complement and deepen prior work. EO 14096 uses the term "disproportionate and adverse" as a simpler, modernized version of the phrase "disproportionately high and adverse" used in EO 12898. Those phrases have the same meaning but removing the word "high" eliminates potential misunderstanding that agencies should only be considering large disproportionate effects. FACT SHEET: President Biden Signs Executive Order to Revitalize Our Nation's Commitment to Environmental Justice for All | The White House.

Low-income person means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines (DOT Order 5610.2C Appendix § 1(b)).

For the purposes of this assessment, a low-income person is defined as a person whose median household income is less than or equal to two times the Federal Poverty Level, which in 2018 was $24,280 for an individual. This is consistent with the local threshold that Sound Transit and other regional transit agencies use in determining eligibility for reduced fare programs and reflects the increasingly high cost of living in the region. In this assessment, individuals considered low income will include persons living below this threshold.

In addition to the relevant regulations considered for all environmental analyses, the following list of federal, state, and local regulations; executive orders; and plans and/or policies that guide the assessment of environmental justice effects are considered as part of this analysis:

- Title 49 of the Code of Federal Regulations Part 21 (49 CFR 21), Nondiscrimination in Federally Assisted Programs of the Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964.
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Relocation Act, 42 U.S. Code 61). This act defines the federal regulations governing property acquisition and relocation for federally funded projects.
- Washington State Department of Transportation Environmental Manual, Chapter 458, Social and Community Effects, and Chapter 460, Environmental Justice (WSDOT 2023).

2 METHODS AND APPROACH

The purpose of this analysis is to identify, analyze, and address potential disproportionate and adverse effects on minority or low-income populations from the OMF South project. The regulatory framework and definitions of these populations is included in Section 1.2 above.

The OMF South environmental justice analysis follows FTA Circular C 4703.1 Chapter II, Conducting Environmental Justice Analysis, to determine whether the project would result in disproportionate and adverse effects. This includes:

- Creating a residential demographic profile through demographic data to help determine where environmental justice populations are located, including census data and supplemental data, such as elementary school statistics and information collected through community engagement.
- Implementing a targeted public engagement plan that encourages the meaningful engagement by all members of the affected communities to inform the environmental justice analysis.
- Identifying the potential for disproportionate burdens on environmental justice versus non-environmental justice populations by comparing the percentage of low-income and minority populations in the study area to the Sound Transit service district average. This is used to understand how the distribution and concentration of minority and low-income populations that could be affected by the project relate to the broader geographic area where Sound Transit provides services. The Sound Transit service district includes the area that would experience impacts and receive benefits of Sound Transit projects and consists of the urbanized areas of King, Pierce, and Snohomish counties that are within the Sound Transit taxing district.
- Identifying adverse effects of the project.
- Analyzing whether adverse effects are disproportionate. This includes wholistic consideration of the project impacts, mitigation, and benefits. The FTA Circular states that “Many public transportation projects involve both adverse effects such as short-term construction impacts, increases in bus traffic, etc., and positive benefits such as increased transportation options, improved connectivity, or overall improvement in air quality. Whether adverse effects will be disproportionately high is dependent on the net results after consideration of the totality of the circumstances.”
- Determining whether the adverse effect would be borne by environmental justice populations by considering:
  - Whether the adverse effects on environmental justice populations exceed those borne by non-environmental justice populations.
  - Whether cumulative or indirect effects would adversely affect an environmental justice population.
  - Whether mitigation and enhancement measures will be taken for environmental justice and non-environmental justice populations.
  - Whether there are off-setting benefits to environmental justice populations as compared to non-environmental justice populations.

2.1 Study Area

The study area for the environmental justice analysis encompasses an approximately 0.5-mile radius from the project's potential construction limits for each of the build alternatives. This area is where direct and indirect project impacts could occur to adjacent populations based on the analysis in Chapter 3, Affected Environment, Environmental Impacts, and Mitigation Measures, of the OMF South Final EIS. A 0.5-mile study area also captures and reflects the demographic characteristics of the affected population more accurately than a larger study area. For example, for OMF South, a larger 1-mile study area would include populations that are unlikely to experience adverse effects and would also decrease the percentage of affected low-income and minority populations considered in the analysis. This could unintentionally mask or underestimate the project's potential adverse effects to environmental justice populations.

2.2 Data Sources

The environmental justice analysis is based on U.S. Census Bureau data reported at the census tract and block-group levels. A census tract is a small subdivision of an urban area used by the U.S. Census Bureau to identify population and housing statistics. Census blocks are subdivisions of census tracts and are the smallest geographical units for which the U.S. Census Bureau collects data. The boundaries of census blocks are generally streets or other notable physical features and often correspond to a city block. A census block group is a combination of census blocks, typically encompassing two to four city blocks, and is the smallest geographical unit for which yearly census data are published. This analysis uses demographic data at the block group level to provide a more accurate portrayal of environmental justice populations within the OMF South alternative study areas, given the localized nature of the project's potential impacts.

The analysis compares minority and low-income population data between the study area for each OMF South alternative, the cities of Federal Way and Kent, and the Sound Transit service district. The purpose of these comparisons is to understand how minority and low-income populations could be affected by the proposed project and how the distribution and concentration of those populations within the project study areas compare to the broader relevant geographic area where Sound Transit provides services.

Available datasets from the U.S. Environmental Protection Agency (EPA) EJScreen (Environmental Justice Screening and Mapping) and the Council on Environmental Quality's Climate and Economic Justice Screening tool were used to validate environmental justice characteristics in the study area (EPA 2022).

Elementary school data were used to enhance Sound Transit's understanding of the communities surrounding the project. Elementary school data were used primarily because they better represent the project study area they overlap since the attendance areas are geographically smaller than middle or high school attendance areas. The data source was the 2022–2023 school year Washington State Report Card published by the Washington State Office of Superintendent of Public Instruction (OSPI 2022).

Affordable housing was identified in the study areas by reviewing information from the U.S. Department of Housing and Urban Development and King County Housing Authority to identify properties and housing developments that provide subsidized housing or housing assistance for low-income and cost-burdened families.

3 AFFECTED ENVIRONMENT

The following section summarizes the population demographics and community facilities within the 0.5-mile study area for each OMF South build alternative. As a comparison, this section also summarizes the population demographics of the Sound Transit service district. This section largely relies on publicly available data for the basis of the analysis; sources are noted where additional information from in-person contacts, local knowledge, and other research was used.

3.1 Study Area Demographics

Demographic characteristics for minority and low-income populations within 0.5-mile of each build alternative were determined based on estimates from the U.S. Census Bureau's 2016–2020 5-year American Community Survey (ACS) data.

As noted above, in addition to U.S. Census data, available datasets from EJScreen were used to validate environmental justice characteristics in the study area. The EJScreen reports are included in Attachment A. Further analysis into elementary school demographics was conducted based on Washington State Report Card data published by OSPI.

Table E.3-1 summarizes the study area's demographic characteristics and compares them with those of the cities of Federal Way, Kent, and Des Moines, and the Sound Transit service district. Table E.3-2 summarizes race and ethnicity characteristics and compares them across the same study areas and jurisdictions.

In addition to Tables E.3-1 and E.3-2 below, geographic information system maps were developed to visually illustrate demographic characteristics within each study area. Figures E.3-1 through E.3-3 depict minority populations for each build alternative, and Figures E.3-4 through E.3-6 show low-income populations at the census block group level.

These data show that the study area for each build alternative has relatively similar concentrations of low-income and minority populations. Minority persons account for approximately 66 to 68 percent of the total population residing within 0.5 mile of each build alternative, and low-income individuals account for approximately 39 to 44 percent of the population in the same area. The study area for each build alternative has higher concentrations of low-income and minority persons than found within the surrounding jurisdictions (12 to 14 percent greater) or the Sound Transit service district as a whole (18 to 23 percent greater).

Given the overlap of potential construction limits of the Preferred and South 344th Street alternatives, demographic characteristics between these alternatives are nearly identical. The study areas represent between approximately 8,500 and 9,500 residents, and both have the same proportion of minority residents (66 percent) and relatively similar median household incomes, at approximately $51,000. However, the Preferred Alternative has slightly higher proportions of low-income individuals than the South 344th Street Alternative.

Table E.3-1 Comparison of Demographic Characteristics

	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative	Sound Transit Service District	Federal Way	Kent	Des Moines
Total Population[1]	8,452	9,482	10,712	3,189,953	96,812	130,038	31,983
Minority Population[2]	66%	66%	68%	42%	57%	58%	48%
Low-Income Persons[3]	40%	39%	44%	21%	28%	30%	33%
Population under 5 years old	7%	7%	10%	6%	7%	7%	6%
Population over 64 years old	15%	15%	7%	13%	14%	11%	18%
Households with Limited English Proficiency[4]	18%	18%	15%	6%	9%	10%	5%
Median Household Income	$51,029	$51,580	$61,212	$96,803	$68,672	$73,891	$70,268

Source: U.S. Census Bureau, American Community Survey (ACS) 2016–2020 5-Year Estimates

Notes:

(1) Data represent the latest U.S. Census 5-year estimates based on 2016–2020 survey data. Survey data are not available at the census-block level; the data represent an estimate of minority and low-income persons in block groups within 0.5 mile of each project alternative.

(2) Minority is defined as all but Non-Hispanic White Alone.

(3) Low-income is defined as the percentage of a block group's population in households where the household income is less than or equal to twice the federal poverty level. This threshold is used by Sound Transit and other regional transit agencies to determine eligibility for reduced-fare programs and reflects the increasingly high cost of living in the region.

(4) Limited English proficiency refers to anyone above the age of 5 in households who reported speaking English less than "very well," as classified by the U.S. Census Bureau.

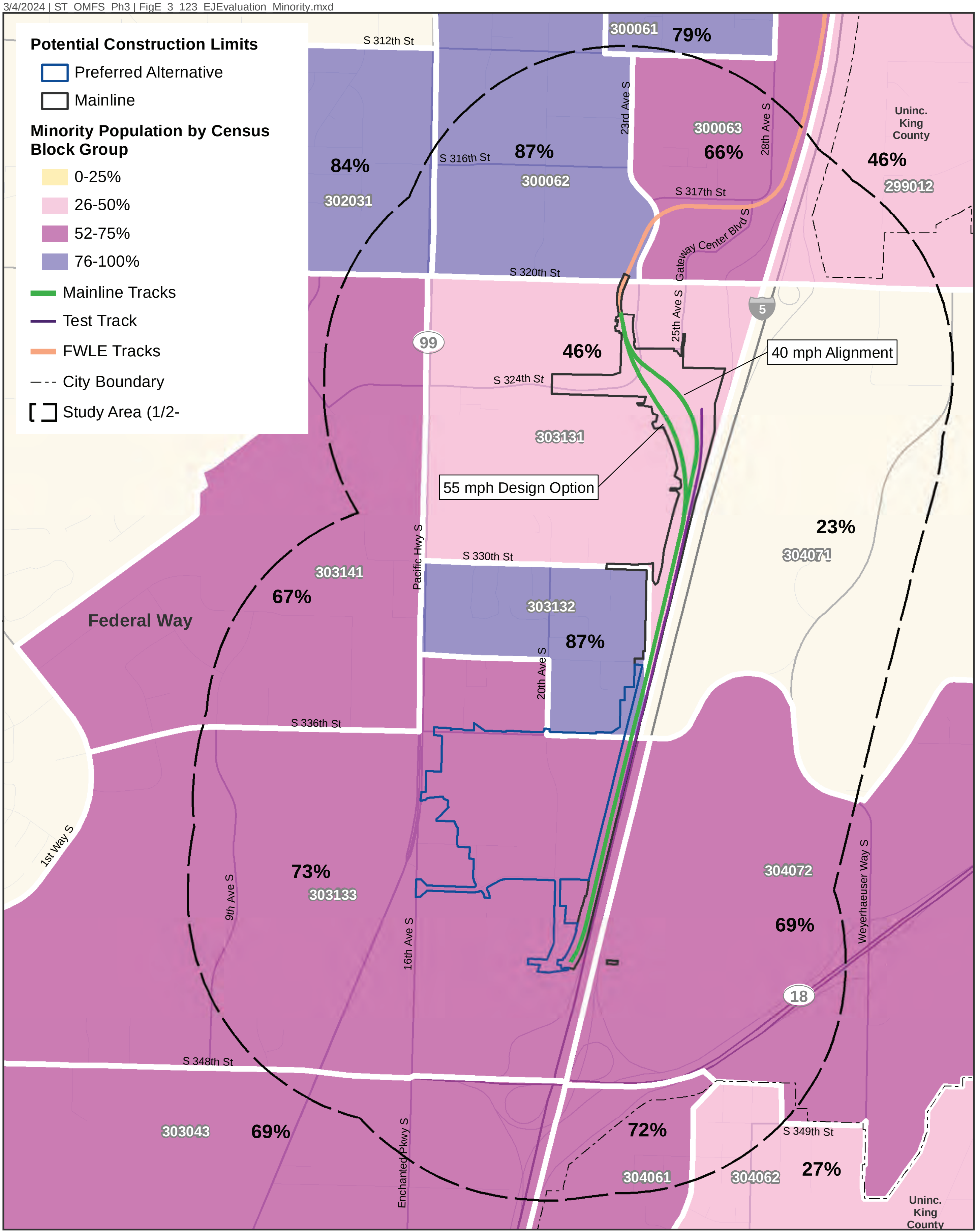
Table E.3-2 Comparison of Race and Ethnicity Characteristics

	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative	Sound Transit Service District	Federal Way	Kent	Des Moines
Hispanic or Latino	21%	21%	30%	11%	17%	16%	20%
Black or African American	18%	18%	13%	7%	15%	12%	9%
Asian	18%	17%	14%	16%	14%	22%	16%
American Indian and Native Alaskan	<1%	<1%	<1%	1%	1%	<1%	3%
Native Hawaiian/ Pacific Islander	1%	2%	3%	1%	2%	2%	4%
Two or More Races and Other	7%	7%	8%	7%	7%	7%	7%

Source: U.S. Census Bureau, American Community Survey (ACS) 2016–2020 5-Year Estimates

The Midway Landfill Alternative in Kent has a higher proportion of low-income and minority residents compared to the two alternatives in Federal Way. The study area for the Midway Landfill Alternative represents approximately 10,700 residents. Of these residents, approximately 68 percent are reported as minorities, and 44 percent are reported as low-income. The Midway Landfill Alternative study area also reported the highest median household income of the three alternatives at approximately $61,000.

3/4/2024 | ST_OMFS_Ph3 | FigE_3_123_EJEvaluation_Minority.mxd


Potential Construction Limits
Preferred Alternative
Mainline
Minority Population by Census Block Group
0-25%
26-50%
52-75%
76-100%
Mainline Tracks
Test Track
FWLE Tracks
City Boundary
Study Area (1/2-
S 312th St
300061
79%
84%
302031
S 316th St
87%
300062
23rd Ave S
300063
66%
28th Ave S
Uninc. King County
46%
299012
S 317th St
Gateway Center Blvd S
S 320th St
25th Ave S
5
99
46%
40 mph Alignment
S 324th St
303131
55 mph Design Option
23%
304071
Pacific Hwy S
S 330th St
303141
67%
Federal Way
303132
87%
20th Ave S
S 336th St
1st Way S
73%
303133
9th Ave S
16th Ave S
304072
69%
Weyerhaeuser Way S
18
S 348th St
303043
69%
Enchanted Pkwy S
72%
304061
304062
S 349th St
27%
Uninc. King County

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

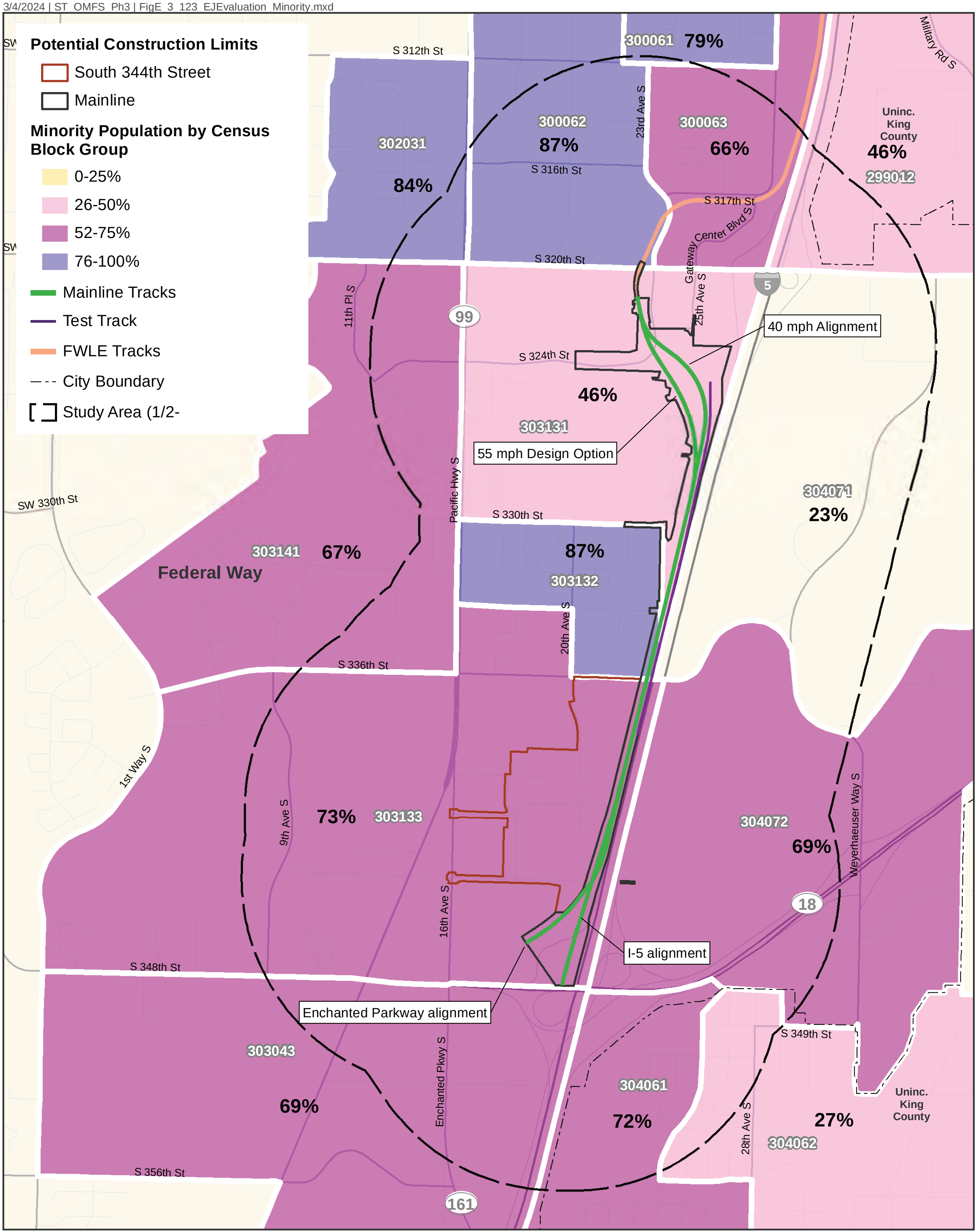
N

0 0.25 0.5 Miles

FIGURE E.3-1
Minority Populations
Preferred Alternative

OMF South

3/4/2024 | ST_OMFS_Ph3 | FigE_3_123_EJEvaluation_Minority.mxd

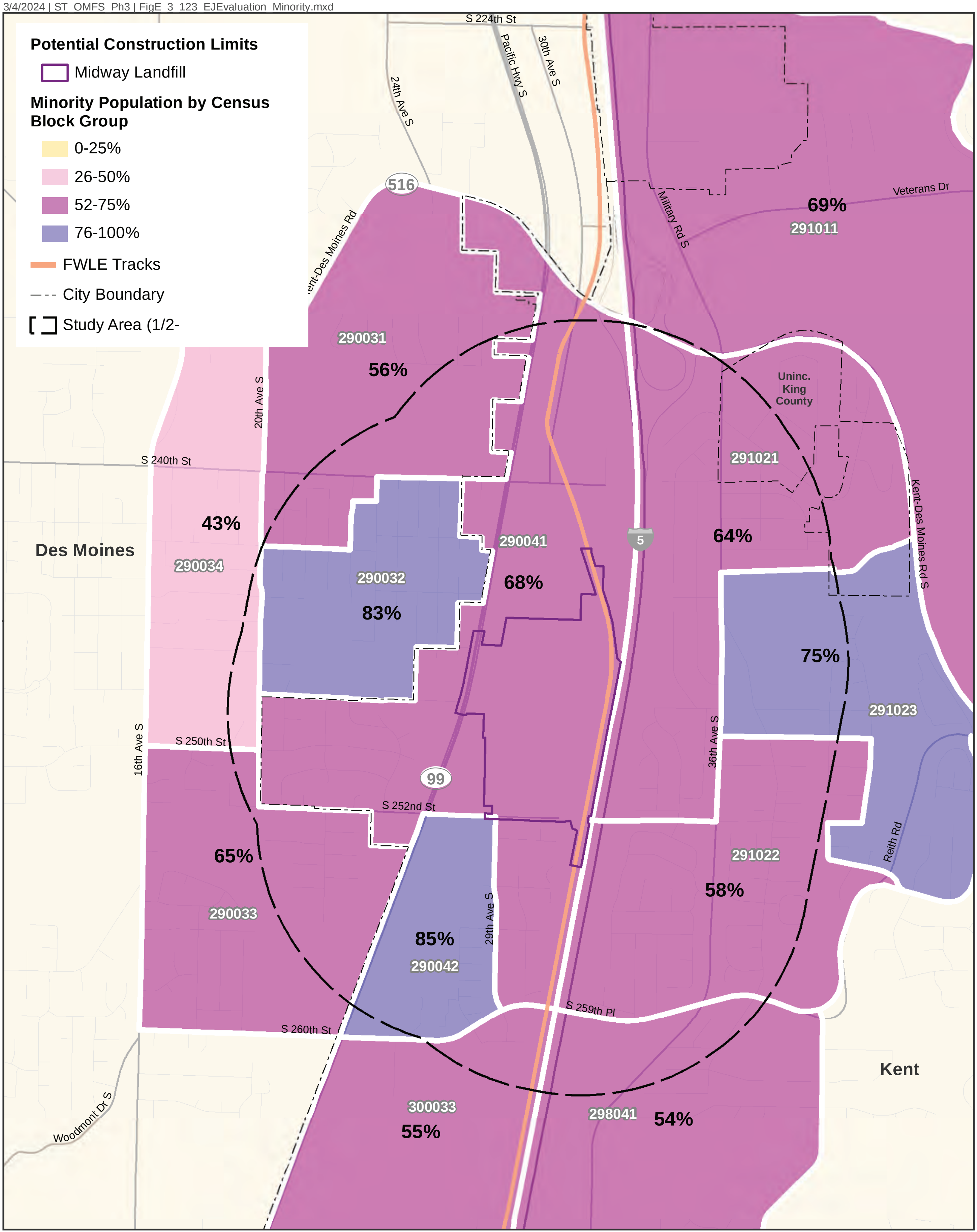

Potential Construction Limits
South 344th Street
Mainline
Minority Population by Census Block Group
0-25%
26-50%
52-75%
76-100%
Mainline Tracks
Test Track
FWLE Tracks
City Boundary
Study Area (1/2-
300061 79%
300062 87%
300063 66%
302031 84%
Uninc. King County 46% 299012
303131 46%
304071 23%
303141 67%
Federal Way
303132 87%
303133 73%
304072 69%
303043 69%
304061 72%
304062 27%
Uninc. King County
40 mph Alignment
55 mph Design Option
I-5 alignment
Enchanted Parkway alignment
S 312th St
S 316th St
S 317th St
S 320th St
S 324th St
S 330th St
SW 330th St
S 336th St
S 348th St
S 349th St
S 356th St
23rd Ave S
25th Ave S
20th Ave S
16th Ave S
9th Ave S
11th Pl S
28th Ave S
Pacific Hwy S
Enchanted Pkwy S
Gateway Center Blvd S
Military Rd S
Weyerhaeuser Way S
1st Way S
99
5
18
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

N
0 0.25 0.5 Miles

FIGURE E.3-2
Minority Populations
South 344th Street Alternative

OMF South

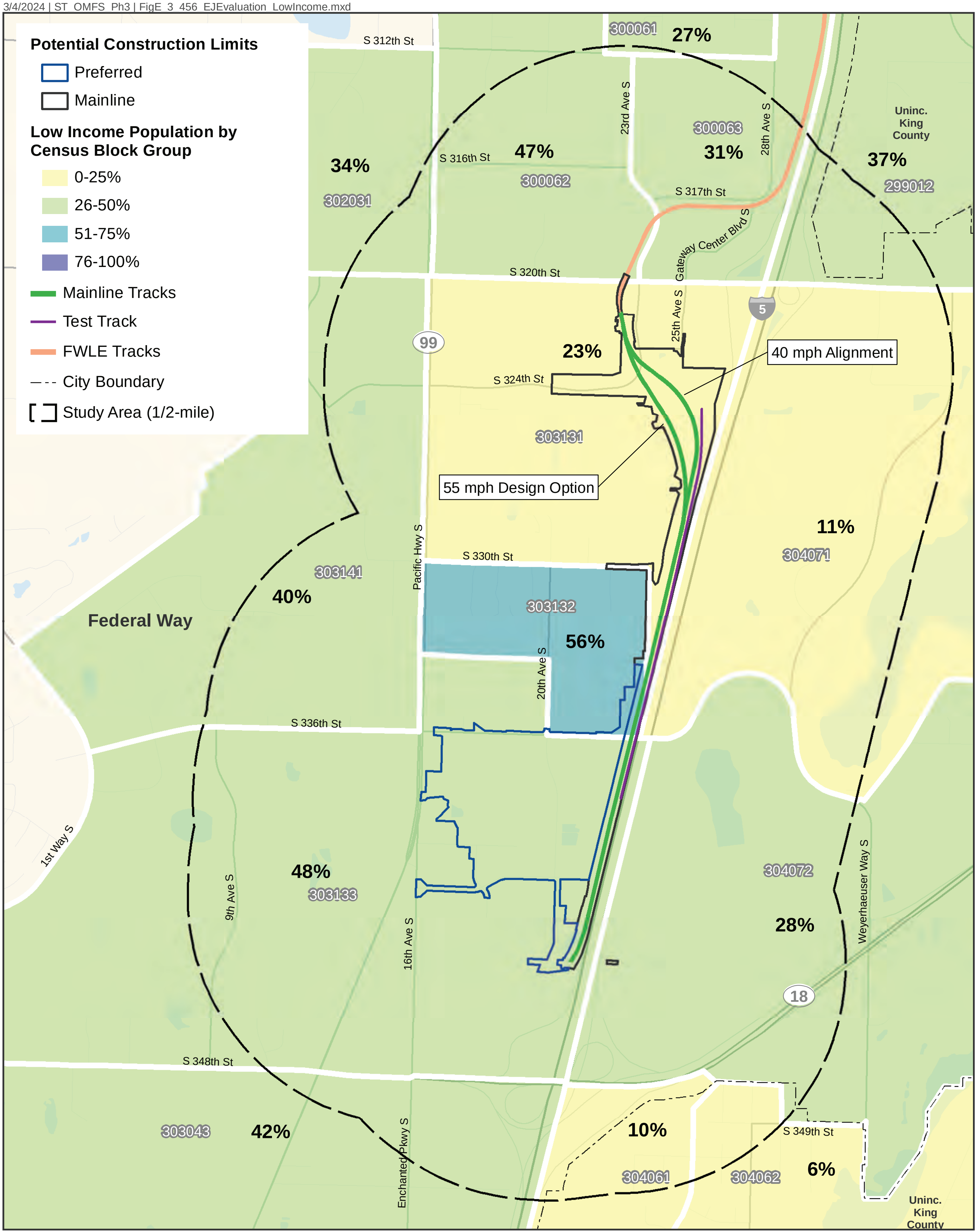

Potential Construction Limits
Midway Landfill
Minority Population by Census Block Group
0-25%
26-50%
52-75%
76-100%
FWLE Tracks
City Boundary
Study Area (1/2-
S 224th St
Pacific Hwy S
30th Ave S
24th Ave S
516
Kent-Des Moines Rd
Military Rd S
Veterans Dr
69%
291011
290031
56%
Uninc. King County
20th Ave S
291021
S 240th St
43%
Des Moines
290034
290032
83%
290041
68%
5
64%
Kent-Des Moines Rd S
75%
291023
16th Ave S
S 250th St
99
36th Ave S
S 252nd St
65%
290033
291022
58%
Reith Rd
85%
29th Ave S
290042
S 259th Pl
S 260th St
Kent
Woodmont Dr S
300033
55%
298041
54%
N
0
0.25
0.5 Miles

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

FIGURE E.3-3
Minority Populations
Midway Landfill Alternative

OMF South

3/4/2024 | ST_OMFS_Ph3 | FigE_3_456_EJEvaluation_LowIncome.mxd


Potential Construction Limits
Preferred
Mainline
Low Income Population by Census Block Group
0-25%
26-50%
51-75%
76-100%
Mainline Tracks
Test Track
FWLE Tracks
City Boundary
Study Area (1/2-mile)
S 312th St
300061
27%
23rd Ave S
300063
31%
28th Ave S
Uninc. King County
37%
299012
S 316th St
47%
300062
34%
302031
S 317th St
Gateway Center Blvd S
S 320th St
25th Ave S
5
99
23%
40 mph Alignment
S 324th St
303131
55 mph Design Option
11%
304071
Pacific Hwy S
S 330th St
303141
40%
303132
Federal Way
56%
20th Ave S
S 336th St
1st Way S
48%
303133
9th Ave S
16th Ave S
304072
Weyerhaeuser Way S
28%
18
S 348th St
303043
42%
Enchanted Pkwy S
10%
304061
304062
S 349th St
6%
Uninc. King County

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

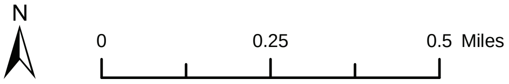
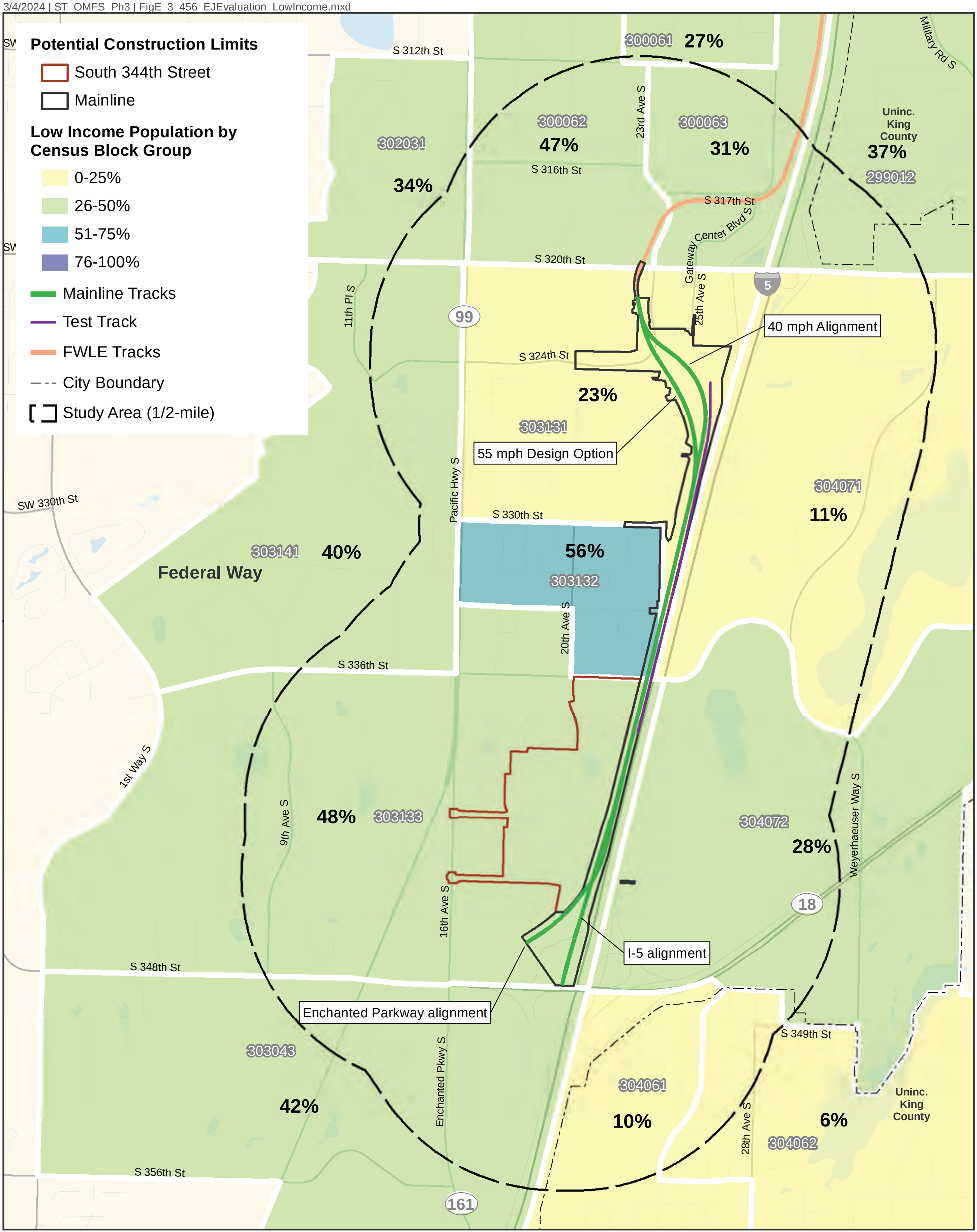

N
0
0.25
0.5 Miles

FIGURE E.3-4
Low-Income Populations
Preferred Alternative

OMF South

3/4/2024 | ST_OMFS_Ph3 | FigE_3_456_EJEvaluation_LowIncome.mxd


Potential Construction Limits
South 344th Street
Mainline
Low Income Population by Census Block Group
0-25%
26-50%
51-75%
76-100%
Mainline Tracks
Test Track
FWLE Tracks
City Boundary
Study Area (1/2-mile)
S 312th St
300061
27%
Military Rd S
300062
47%
23rd Ave S
300063
31%
Uninc. King County
37%
299012
302031
34%
S 316th St
S 317th St
Gateway Center Blvd S
S 320th St
5
11th Pl S
99
25th Ave S
40 mph Alignment
S 324th St
23%
303131
55 mph Design Option
304071
11%
SW 330th St
Pacific Hwy S
S 330th St
303141
40%
56%
Federal Way
303132
20th Ave S
S 336th St
1st Way S
9th Ave S
48%
303133
304072
28%
Weyerhaeuser Way S
18
16th Ave S
I-5 alignment
S 348th St
Enchanted Parkway alignment
S 349th St
303043
Enchanted Pkwy S
304061
10%
28th Ave S
6%
Uninc. King County
304062
42%
S 356th St
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

N

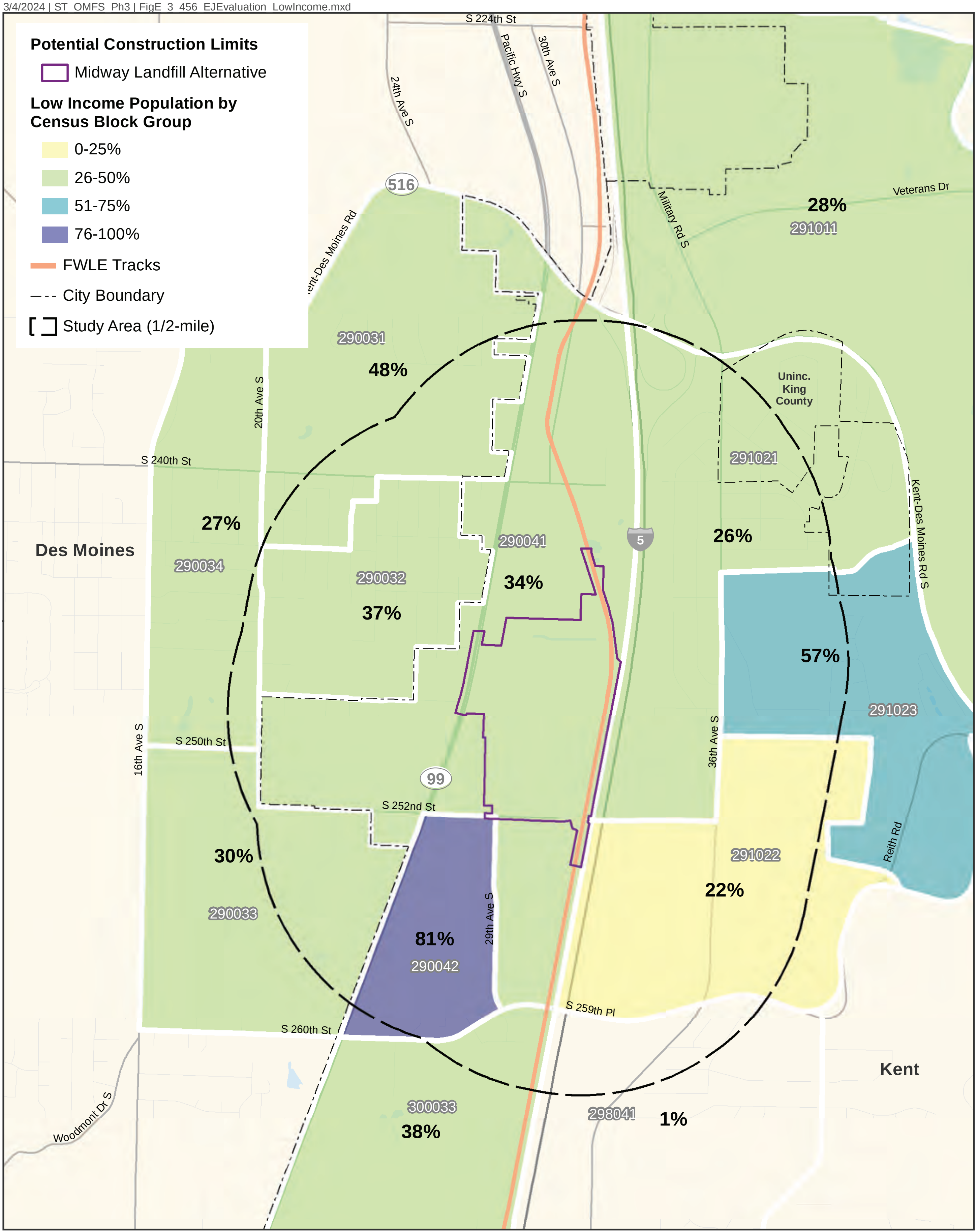
0 0.25 0.5 Miles

FIGURE E.3-5

Low-Income Populations
South 344th Street Alternative

OMF South

3/4/2024 | ST_OMFS_Ph3 | FigE_3_456_EJEvaluation_LowIncome.mxd


Potential Construction Limits
Midway Landfill Alternative
Low Income Population by Census Block Group
0-25%
26-50%
51-75%
76-100%
FWLE Tracks
City Boundary
Study Area (1/2-mile)
S 224th St
Pacific Hwy S
30th Ave S
24th Ave S
516
Kent-Des Moines Rd
Military Rd S
Veterans Dr
28%
291011
290031
48%
20th Ave S
Uninc. King County
291021
S 240th St
27%
Des Moines
290034
290041
5
26%
290032
34%
37%
57%
291023
16th Ave S
S 250th St
36th Ave S
99
S 252nd St
30%
291022
22%
290033
29th Ave S
81%
290042
Kent-Des Moines Rd S
Reith Rd
S 259th Pl
S 260th St
Kent
Woodmont Dr S
300033
38%
298041
1%
N
0
0.25
0.5 Miles

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023); U.S. Census Bureau ACS (2020).

FIGURE E.3-6
Low-Income Populations
Midway Landfill Alternative

OMF South

ACS data report a 5-year average for a small sample size, which potentially results in high margins of error. To supplement the ACS demographic data, additional demographic data from public elementary schools within the study area were reviewed. Demographic information from local public elementary schools is used because the attendance boundaries are smaller than public middle and high schools, and they tend to approximate the boundaries of the study area more precisely.

The study areas for the Preferred and South 344th Street alternatives is entirely within the Federal Way School District, while the study area for the Midway Landfill Alternative is split between the Federal Way and Highline school districts. This assessment focuses on minority and low-income populations within the three elementary schools (Internet Academy, Sunnycrest Elementary, and Parkside Elementary) located within the study areas. Table E.3-3 summarizes environmental justice characteristics for elementary schools within the study area for each build alternative.

Table E.3-3 Public Schools within Build Alternative Study Areas

School Name	School District	Study Area	Total Students	Minority Population	Low Income Population
Internet Academy	Federal Way School District	Preferred and South 344th Street Alternatives	895	633 (71%)	507 (57%)
Sunnycrest Elementary	Federal Way School District	Midway Landfill Alternative	505	434 (86%)	402 (80%)
Parkside Elementary	Highline School District	Midway Landfill Alternative	415	346 (83%)	310 (75%)
Total Students			**1,815**	**1,413 (78%)**	**1,219 (67%)**

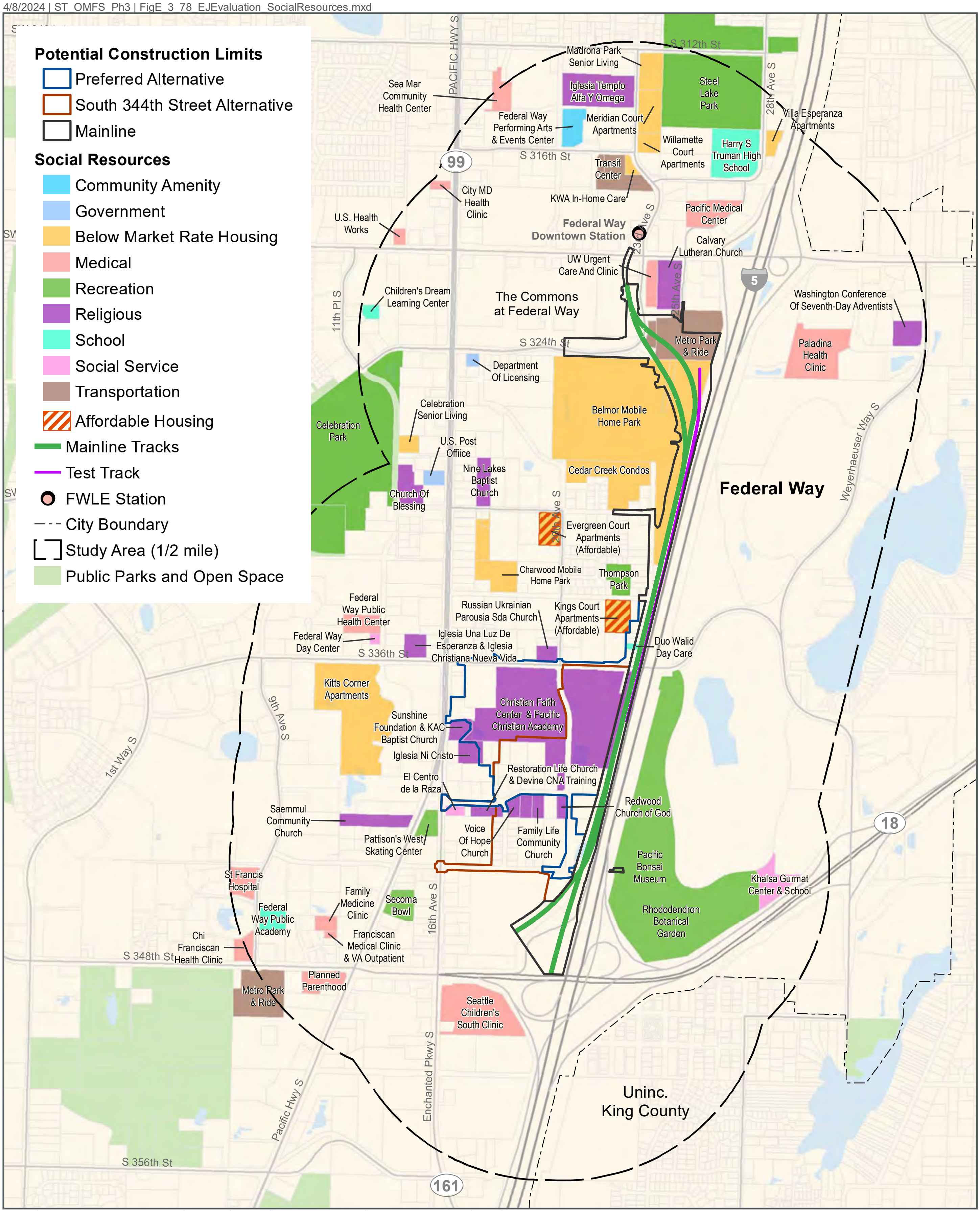
Source: Washington State Office of Superintendent of Public Instruction (OSPI), 2021-2022. Washington State Report Card.

The Internet Academy is a public virtual school that is part of Federal Way Public Schools and is located within the study areas for the Preferred and South 344th Street alternatives. The proportions of low-income and minority populations for the Internet Academy are higher than the populations present within the Preferred and South 344th Street alternatives study area based on ACS information (Table E.3-1). Parkside Elementary and Sunnycrest Elementary are located within the Midway Landfill Alternative study area. Similarly, the proportions of low-income and minority populations at both elementary schools are higher than the proportions of low-income and minority populations within the Midway Landfill Alternative study area based on ACS information (Table E.3-1). This suggests that low-income and minority populations may be more prevalent in these areas than indicated by ACS information.

3.2 Community Facilities

For the purpose of this environmental justice assessment, community facilities are defined as facilities that likely provide substantial services or assistance to minority and low-income populations. Examples include social and human health services, homeless shelters, affordable housing developments, schools, and places of worship. The specific community facilities identified within each study area for each OMF South project alternative are summarized in the Environmental Justice, Social Resources, Community Facilities, and Neighborhoods section of the Final EIS (Section 3.6). These resources are shown in Figures E.3-7 and E.3-8.

4/8/2024 | ST_OMFS_Ph3 | FigE_3_78_EJEvaluation_SocialResources.mxd


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Social Resources
Community Amenity
Government
Below Market Rate Housing
Medical
Recreation
Religious
School
Social Service
Transportation
Affordable Housing
Mainline Tracks
Test Track
FWLE Station
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
S 312th St
Madrona Park Senior Living
Iglesia Templo Alfa Y Omega
Steel Lake Park
28th Ave S
Villa Esperanza Apartments
Sea Mar Community Health Center
PACIFIC HWY S
Federal Way Performing Arts & Events Center
Meridian Court Apartments
Willamette Court Apartments
Harry S Truman High School
99
S 316th St
Transit Center
City MD Health Clinic
KWA In-Home Care
Pacific Medical Center
U.S. Health Works
Federal Way Downtown Station
23rd Ave S
Calvary Lutheran Church
5
UW Urgent Care And Clinic
25th Ave S
Children's Dream Learning Center
11th Pl S
The Commons at Federal Way
Washington Conference Of Seventh-Day Adventists
S 324th St
Metro Park & Ride
Paladina Health Clinic
Department Of Licensing
Belmor Mobile Home Park
Celebration Senior Living
Celebration Park
U.S. Post Office
Nine Lakes Baptist Church
Cedar Creek Condos
Federal Way
Weyerhaeuser Way S
Church Of Blessing
20th Ave S
Evergreen Court Apartments (Affordable)
Charwood Mobile Home Park
Thompson Park
Federal Way Public Health Center
Russian Ukrainian Parousia Sda Church
Kings Court Apartments (Affordable)
Federal Way Day Center
Iglesia Una Luz De Esperanza & Iglesia Christiana Nueva Vida
S 336th St
Duo Walid Day Care
Kitts Corner Apartments
9th Ave S
Christian Faith Center & Pacific Christian Academy
Sunshine Foundation & KAC Baptist Church
1st Way S
Iglesia Ni Cristo
Restoration Life Church & Devine CNA Training
El Centro de la Raza
Redwood Church of God
Saemmul Community Church
18
Pattison's West Skating Center
Voice Of Hope Church
Family Life Community Church
Pacific Bonsai Museum
St Francis Hospital
Khalsa Gurmat Center & School
Family Medicine Clinic
Secoma Bowl
Federal Way Public Academy
16th Ave S
Rhododendron Botanical Garden
Chi Franciscan Health Clinic
Franciscan Medical Clinic & VA Outpatient
S 348th St
Planned Parenthood
Metro Park & Ride
Seattle Children's South Clinic
Enchanted Pkwy S
Pacific Hwy S
Uninc. King County
S 356th St
161

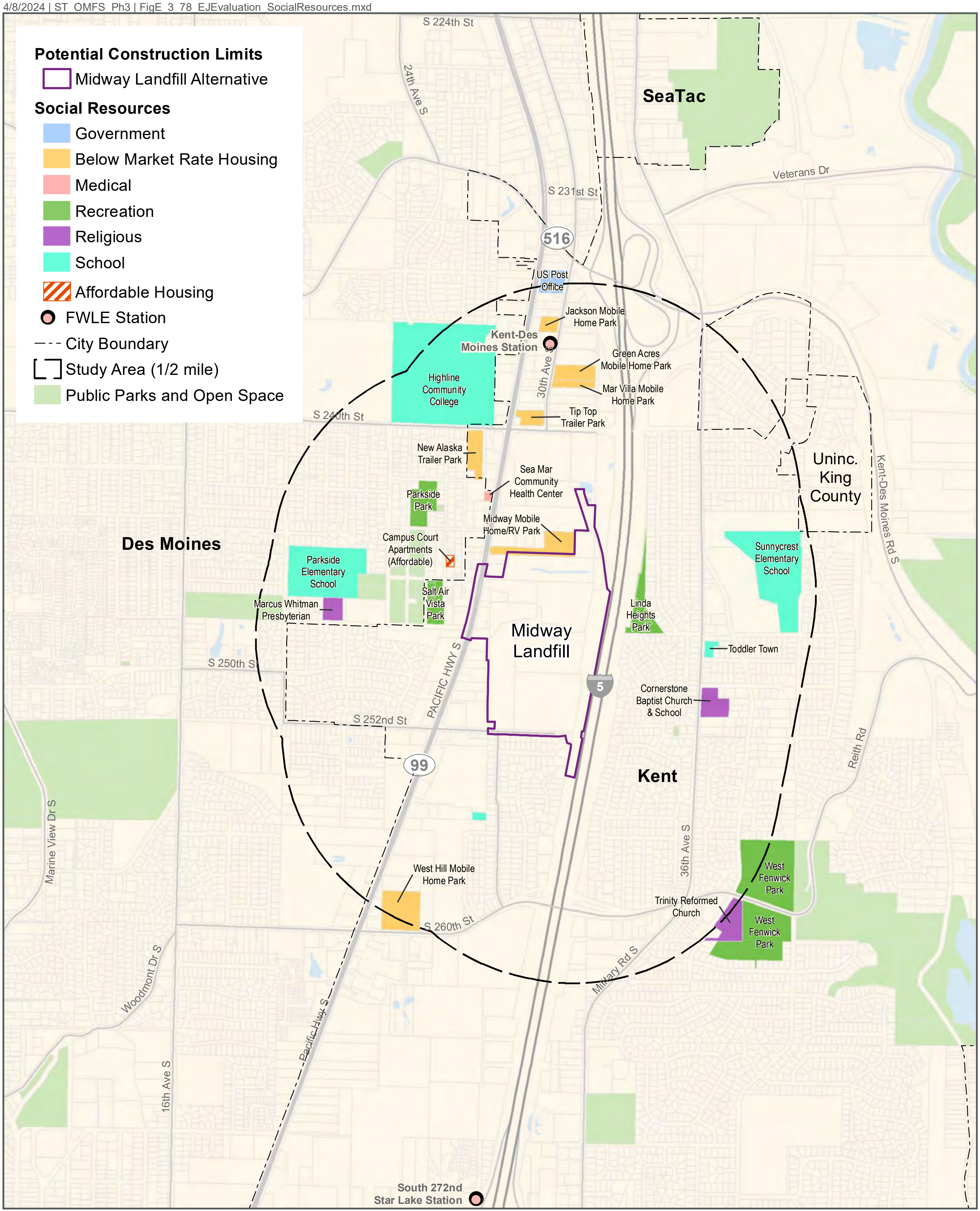
Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2023).

N

0 0.25 0.5 Miles

FIGURE E.3-7
Social Resources
Preferred and South 344th Street Alternatives
OMF South

4/8/2024 | ST_OMFS_Ph3 | FigE_3_78_EJEvaluation_SocialResources.mxd


Potential Construction Limits
Midway Landfill Alternative
Social Resources
Government
Below Market Rate Housing
Medical
Recreation
Religious
School
Affordable Housing
FWLE Station
City Boundary
Study Area (1/2 mile)
Public Parks and Open Space
S 224th St
24th Ave S
SeaTac
Veterans Dr
S 231st St
516
US Post Office
Jackson Mobile Home Park
Kent-Des Moines Station
30th Ave S
Green Acres Mobile Home Park
Mar Villa Mobile Home Park
Highline Community College
S 240th St
Tip Top Trailer Park
New Alaska Trailer Park
Sea Mar Community Health Center
Parkside Park
Midway Mobile Home/RV Park
Uninc. King County
Kent-Des Moines Rd S
Des Moines
Campus Court Apartments (Affordable)
Parkside Elementary School
Sunnycrest Elementary School
Salt Air Vista Park
Marcus Whitman Presbyterian
Linda Heights Park
Midway Landfill
PACIFIC HWY S
Toddler Town
S 250th St
5
Cornerstone Baptist Church & School
S 252nd St
99
Kent
Reith Rd
Marine View Dr S
36th Ave S
West Hill Mobile Home Park
West Fenwick Park
Trinity Reformed Church
West Fenwick Park
S 260th St
Military Rd S
Woodmont Dr S
Pacific Hwy S
16th Ave S
South 272nd Star Lake Station

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2023).

N

0 0.25 0.5 Miles

FIGURE E.3-8
Social Resources
Midway Landfill Alternative
OMF South

The Preferred and South 344th Street alternatives have substantially more community facilities within their study areas than the Midway Landfill Alternative study area. Places of worship account for the majority of these facilities, including those that serve environmental justice populations. Based on communication with schools and social/human service organizations, these community facilities within the Preferred and South 344th Street alternatives study areas also serve low-income and minority individuals.

Affordable housing was identified in the study areas by reviewing information from the U.S. Department of Housing and Urban Development and King County Housing Authority to identify properties and housing developments that provide subsidized housing or housing assistance for low-income and cost-burdened families. Affordable housing in the study areas for the Preferred and South 344th Street alternatives includes Kings Court and Evergreen Court Apartments (each with 30 two- to three-bedroom units open to families, seniors aged 55 and over, and disabled persons). Affordable housing in the study area for the Midway Landfill Alternative includes Campus Court Apartments (12 three-bedroom units open to families, seniors aged 55 and over, and disabled persons) (King County 2024).

Additional nonsubsidized below-market-rate housing within the study area is available through private developments, such as apartment complexes, manufactured or mobile home developments, and RV parks. In the study areas of the Preferred and South 344th Street alternatives, these nonsubsidized below-market-rate housing developments include Meridian Court Apartments, Willamette Court Apartments, Villa Esperanza Apartments, Belmor Mobile Home Park (Belmor), Charwood Mobile Home Park, Celebration Senior Living, and Kitts Corner Apartments. In the study area for the Midway Landfill Alternative, these nonsubsidized below-market-rate housing developments include Green Acres Mobile Home Park, Mar Villa Mobile Home Park, Jackson Mobile Home Park, Tip Top Trailer Park, New Alaska Trailer Park, Midway Mobile Home/RV Park, and West Hill Mobile Home Park. These social resources are depicted in Figures E.3-7 and E.3-8 above.

4 OUTREACH TO MINORITY AND LOW-INCOME POPULATIONS

Sound Transit conducted public outreach during the OMF South early scoping period and throughout the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) EIS processes and will continue to perform targeted outreach throughout the project development process.

Sound Transit is required to provide meaningful opportunities for minority, low-income, and limited-English-proficiency groups to engage in the planning process by (1) the agency's community engagement procedures, (2) EO 12898 and EO 14096, (3) U.S. DOT Order 5610.2C, and (4) FTA Circular C 4703.1. Title VI of the Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin. These directives make environmental justice a part of the decision-making process by identifying and addressing disproportionate and adverse human health and environmental effects of Sound Transit's programs, policies, and activities on minority and low-income populations.

Sound Transit conducted a preliminary demographic analysis to identify low-income, minority, and limited-English-proficiency populations. Based on this analysis, Sound Transit used the following strategies to engage these populations during the early scoping and scoping periods described below:

- Provided translated text on posters in Spanish, Korean, and Russian.
- Provided translated meeting handouts in Spanish, Korean, and Russian.
- Publicized events online and in print with language-specific media publications.
- Provided translated text on the online open house web pages as well as the embedded Google Translate tool, which can translate text into over 100 languages.

The following sections describe in more detail Sound Transit's outreach efforts to engage minority and low-income populations. The text also summarizes what Sound Transit heard from the community in response to the proposed project. All of the in-person outreach efforts described below offered opportunities for the public to engage with Sound Transit project staff to ask questions and offer ideas and comments. As the project moves forward, Sound Transit will continue to engage community leaders, jurisdictions, and social service providers to seek input, assess outreach methods, and identify additional ways to reach low-income, minority, and limited-English-proficiency populations. A summary of all public outreach efforts is documented in Appendix B, Public Involvement and Agency Coordination.

4.1 Scoping Outreach

4.1.1 Early Scoping

In March 2018, Sound Transit published the Tacoma Dome Link Extension and Operations and Maintenance Facility South Early Scoping Information Report (Sound Transit 2018). Early scoping was intended to initiate the public conversation before the start of environmental studies and was conducted for both projects concurrently. The public comment period for early scoping was from April 2 to May 3, 2018.

To support early scoping, Sound Transit held three community open houses in Tacoma, Federal Way, and Fife to ask for public, tribal, and agency input on the project's Purpose and Need statement, the Tacoma Dome Link Extension (TDLE) "representative project alignment" and other alternative alignments, and alternative locations for an OMF in the south corridor. All public meeting locations were accessible to persons with disabilities. Alternative formats and translation services were available. In addition, an online open house was available during the early scoping period to share information and receive feedback about the project using social media tools. All materials presented at the community open house were posted on the online open house.

Sound Transit advertised the community open houses through a variety of methods, including:

- Postcards to over 52,160 households and businesses, including both owners and renters
- Online and print advertisements in 12 publications, including RussianTownSeattle.com and KoreaTimes.com
- Posters at 150 locations in the corridor, including translated versions in Spanish, Korean, Vietnamese, Khmer, and Russian
- Two news releases and five email update notices to members of the public who signed up for updates on the project website
- Social media posts on Sound Transit’s Facebook account
- Project website

To reach minority populations, advertisements were published in El Siete Dias, Korea Daily, Korean Times Seattle, Northwest Vietnamese News, and Tu Decides.

In September 2018, Sound Transit conducted a series of stakeholder interviews, briefings, and tabling events around initial route and station concepts for TDLE. Although the OMF South project was not the focus of this outreach, Sound Transit presented information about OMF South, and staff were available to answer questions and provide updates about the project.

During the outreach associated with early scoping, Sound Transit received approximately 2,160 email comments between late January and early February 2019, prior to the start of the scoping period. Major themes for pre-scoping comments included opposition to the S 240th Street and SR 99 site, support for the Midway Landfill site, and concerns about business displacements and community impacts.

4.1.2 SEPA Scoping

Sound Transit initiated formal SEPA scoping for OMF South in early 2019. Unlike early scoping, which invited input on the OMF South and TDLE projects, the SEPA scoping process described here solely addressed the OMF South project.

During scoping, Sound Transit asked for comments on the proposed range of alternatives, the purpose and need for the project, environmental effects and benefits to be analyzed, probable significant adverse environmental impacts, potential mitigation measures, and permits, licenses, or other approvals that may be required. The comment period for scoping was from February 19 to April 1, 2019. This period exceeded the 30 days required under SEPA regulations and allowed additional time for public, agency, and Tribal comment.

During this period, two public scoping meetings were held to inform and obtain input from the community (one each in Federal Way and Kent). All public meeting locations were accessible to persons with disabilities. Alternative formats and translation services were available. Staff were present to share information, answer questions, and receive input, and written comment forms and computers were available to access the online comment form at the public scoping meetings, along with a court reporter who took verbal comments. In addition to the online open house, comments could be submitted through emails to the project scoping inbox (OMFsouthscoping@soundtransit.org), regular mail, and leaving voicemails on a transcription line. Buell Realtime Reporting is the professional service used to transcribe the voicemails.

Sound Transit advertised the in-person scoping meetings and online open house through a variety of methods, including:

- Newsletters to over 74,000 households and businesses, including both owners and renters
- Online and print advertisements in 10 publications, including Korea Daily and Tu Decides to reach minority populations
- Posters at over 300 locations in the corridor
- Two news releases and four email update notices
- Social media posts
- Project website

During the outreach associated with SEPA scoping phase, Sound Transit asked for comments on:

- Site options and locations
- Social, economic, environmental, and transportation impacts
- The draft Purpose and Need statement

Sound Transit received approximately 730 emails, 480 online open house communications, 180 in-person communications, 50 voicemail messages, and 20 letters. Within these communications, approximately 2,500 comment statements were made. The scoping summary report contains a full record of these comments. The report is available at https://www.soundtransit.org/get-to-know-us/documents-reports/operations-maintenance-facility-south-scoping-summary-report.

Comments related to low-income or minority populations included the following:

- The Federal Way Public Schools District asked that Sound Transit build the OMF South on one of the Midway Landfill sites to lessen community impacts, including those to residents, businesses, and faith-based organizations. The District noted that its students draw from a diverse community, with 60 percent qualifying for a free or reduced fee lunch and 20 percent who are learning English as a second language. The District asked Sound Transit to consider the impacts to these families in its analysis.
- About 185 comments mentioned employment, business, or economic-related impacts. Several comments expressed concern about business and job displacements, the relative cost of OMF site alternatives, and impacts to planned economic growth in the South Sound.
- About 40 comments were concerned with potential impacts to low-income populations and displacement of affordable housing by the OMF sites. Additionally, some potentially impacted businesses submitted comments concerning financial hardships that might occur if they were relocated.
- South 240th Street and SR 99 site: Commenters were concerned about impacts to nearby small businesses and affordable housing, including the Midway Mobile Home Park, and how their removal would affect low-income populations. About 150 comments concerned impacts to Highline College and its students, and about 20 comments involved the

displacement of the mobile home park. This site alternative was not carried forward for further consideration.

- South 316th Street and Military Road site: Many commenters were concerned about residential displacements and neighborhood impacts. Comments mentioned zoning inconsistencies and noise concerns in a residential area, in addition to displacement of low-income or minority populations. This site alternative was not carried forward for further consideration.

In the fall of 2020, Sound Transit conducted several stakeholder interviews with representatives of social service agencies and community groups to solicit input on how to best communicate with them in the future. These agencies and community groups included the Federal Way Black Collective, the Voice of Hope Church, the KAC Baptist Church, and the Multi-Service Center in Federal Way.

Sound Transit conducted focused OMF South outreach in November and December 2019, which included a series of drop-in presentations and engagement sessions to provide the public with opportunities to learn more about the OMF South project and offer suggestions on how public engagement could be improved. Sound Transit also launched an online open house and survey for the project, which was available from November 13 through December 6, 2019. The online open house site included a landing page translated into Khmer, Korean, Russian, Spanish, and Vietnamese, with instruction on how to use Google Translate to navigate the site. The site also included content in each of these languages.

4.2 2021 SEPA Draft EIS Outreach

In conjunction with the release of the 2021 SEPA Draft EIS, Sound Transit hosted an online open house between March 5 and April 19, 2021. Information presented on the online open house website included project background and history, details about the environmental review process, analysis of the three OMF South build alternatives with maps and statistical comparisons, and the project timeline. The online open house was fully translated into Spanish, Korean, and Russian and included the Google Translate function so users could translate webpage text into additional languages. Users were able to submit a comment on the 2021 SEPA Draft EIS findings via a comment from on the online open house.

In addition to the online open house, Sound Transit hosted two online public hearings during the 45-day comment period. The hearings provided attendees the opportunity to engage with Sound Transit staff, submit written questions for answers from a panel of Sound Transit staff, or provide verbal public comments on the 2021 SEPA Draft EIS. While all members of the public were invited to provide comments, in an effort to center equity and provide access to people who have historically been excluded from public processes, Sound Transit invited attendees who identified as people of color, people with disabilities, and anyone working with an interpreter the opportunity to speak first before opening the floor to the rest of the attendees.

Sound Transit received, in total, approximately 280 communications during the 2021 SEPA Draft EIS comment period. A majority of these communications were from the general public, and the remainder were from government sources, such as Tribes, agencies, jurisdictions, and elected officials, and from affected businesses and community groups.

Most of the communications from the public expressed a preference for or against a specific alternative site. In general, most comments supported the Midway Landfill Alternative and/or opposed the South 344th Street Alternative. The most common general themes in the public comments, outside of statements for or against a particular alternative, concerned impacts to the community or neighborhood due to displacements of residents, businesses, and employees as well as impacts to natural resources such as streams, wetlands, and habitat.

After the end of the comment period, Sound Transit collected and considered the comments received and prepared a Comment Summary Report (Sound Transit 2021). After considering the potential impacts disclosed in the 2021 SEPA Draft EIS and the comments received from Tribes, agencies, and the public, including the Environmental Justice Analysis, the Sound Transit Board of Directors identified the South 336th Street Alternative as the Preferred Alternative (Motion M2021-81, December 2021).

4.3 NEPA Scoping

FTA and Sound Transit published a NEPA Notice of Intent in the Federal Register on July 19, 2023. The notice initiated a 30-day comment period where agencies, Tribes, and members of the public were invited to comment on the proposed scope of the NEPA EIS, particularly on changes made to the proposal since the 2021 SEPA Draft EIS.

The only substantive comment related to low-income and minority populations received during scoping was from EPA, which concerned guidance on the methods and tools used to produce the environmental justice assessment. Specifically, EPA encouraged the use of EJScreen, which is EPA's environmental justice screening and mapping tool. EPA also provided recommendations specific to the Comprehensive Environmental Response, Compensation, and Liability Act, climate change, air and water quality, and water resource impacts.

4.4 2023 NEPA Draft/SEPA Supplemental Draft EIS Outreach

The NEPA Draft/SEPA Supplemental Draft EIS was published on September 22, 2023. There was a 45-day comment period, during which Tribes, agencies, and members of the public were invited to comment. The comment period ended November 6, 2023. Comments are summarized in Chapter 5, Comment Summary, of the Final EIS, and the full text of the comments received and the responses are in Appendix L, Comments and Responses, of the Final EIS.

Public engagement for the comment period included an online open house that lasted the duration of the comment period. The public could visit the website to review what had changed since the 2021 SEPA Draft EIS, review a summary of the findings of the NEPA Draft/SEPA Supplemental Draft EIS and supporting materials, along with submitting comments via an online comment form. In addition to English, the website was also available in Korean, Russian, and Spanish. The website contained accessibility features including screen reader-friendly content and detailed alternative text. Digital factsheets and documents throughout the site were made into accessible PDFs. A total of 1,321 people visited the online open house including:

- 1,241 visitors to the English site
- 72 visitors to the Spanish site
- Two visitors to the Korean site
- Six visitors to the Russian site

Additionally, there were two public meetings: one in-person and one online. The first portion of the meetings included a presentation from Sound Transit staff followed by a live question-and-answer segment. In addition, the in-person meeting began with an open-house format for attendees to engage with Sound Transit staff. The second portion was a public hearing that allowed participants to formally provide comments on the Draft EIS. The comments were captured by a court reporter. Both meetings used standard accessibility features. The online meeting featured live captioning (in English) and was screen-reader accessible. Sound Transit offered simultaneous interpretation in American Sign Language, Spanish, Korean, and Russian at the online and in-person meetings. The in-person meeting also included translated materials in Spanish, Korean, and Russian. Sound Transit staff communicated the language and accessibility features throughout the public meetings and hearings to ensure attendees understood how to fully participate. Languages available for interpretation were based on the demographic data of the study area.

FTA and Sound Transit received a total of 58 communications during the comment period. As before, most commenters were members of the general public. The most common general themes in the public comments, outside of statements for or against a particular alternative, concerned impacts to the community or neighborhood due to displacements of residents, businesses, and employees as well as impacts to natural resources, such as streams, wetlands, and habitat.

4.5 Additional Targeted Outreach and Community Feedback

As part of the environmental review process, Sound Transit prioritized and targeted outreach to populations that have been historically underrepresented in previous public engagement processes. In 2021 and 2023, Sound Transit partnered with community-based organizations to distribute information regarding the Draft EISs and request quality control for translated content.

Organizations that Sound Transit has partnered with include El Centro de la Raza, Voice of Hope Church, Federal Way Black Collective, Korean Women’s Association, the Multi-Service Center, KAC Baptist Church, and Centro Rendu. Project materials, including the online open house, the guide to the Draft EIS, and comment forms, were fully translated into Spanish, Korean, and Russian to ensure language access. Interpretation in Spanish, Korean, and Russian was provided for the online public meetings and hearing.

The OMF South project team attends events held by community organizations in the project area to connect with audiences that may not receive project information otherwise. By attending these events, Sound Transit builds relationships and establishes an ongoing presence in communities in the project area, provides project information and answers questions, and offers ways to stay engaged through project email updates. The project team has focused on attending events in traditionally underserved communities and providing in-language project information. Examples include the Kent Farmers Market and the Federal Way Farmers Market.

Outreach and engagement with property owners has occurred throughout the environmental review process. In 2019 and 2020, Sound Transit distributed fliers to businesses and residential homes neighboring the proposed OMF South site alternatives to provide them with information about the OMF South project. In early January 2021, Sound Transit mailed a letter to potentially affected property owners. The letter notified each property owner of potential effects to their property and offered to meet with them. Information provided at a briefing for property owners included an overview of the project background, environmental review process, and property acquisition and relocation process. The project team called potentially affected businesses to offer briefings to learn more about the project, the property acquisition and relocation process, and how to comment on the 2021 SEPA Draft EIS.

Sound Transit has continued to meet with potentially affected and neighboring property owners to answer questions regarding current designs and continues to offer briefings upon request. Project representatives also met with the following property owner groups to provide project updates and answer questions:

- Belmor leadership and residents
- Pacific Christian Academy
- Christian Faith Center
- KAC Baptist Church
- GarageTown

The primary topics heard through these outreach efforts were around the opportunity for living-wage jobs and concerns over impacts to businesses, employees, and residents. Other comment themes included concerns about noise and vibration impacts along the proposed mainline guideway, effects on social and community cohesion, and concerns about construction duration and extent of impacts.

Sound Transit has and continues to meet regularly with residents of Belmor, which is a residential mobile home community potentially impacted by the OMF South project. The community engagement team has provided four separate briefings to residents and sent multiple mailers during formal comment periods, including mailings to advertise resident briefings, a frequently asked questions flyer to respond to common concerns around the project process and relocation, and notifications regarding potential early acquisition of a portion of the mobile home park.

In these meetings, the residents have been provided information on the OMF South project, potential site selection, the EIS, and the acquisition and relocation process. As some mobile homes would be acquired by Sound Transit as real property, these briefings have primarily centered on the acquisition and relocation process, including how displaced residents would have a fully dedicated assigned agent working with them throughout the process. In addition to the scheduled briefings, many more individuals have contacted Sound Transit’s Community Outreach Team via email and letters to inquire about the project and potential impacts to their community.

Feedback heard during engagement with the Belmor community included:

- Questions on why Sound Transit identified a route that will impact so many senior citizens on fixed incomes
- Questions about which units would be displaced
- Concern about losing access to the golf course and other Belmor amenities
- Changes to OMF South project schedule, which makes people feel more in limbo and “trapped”
- Concerns about where residents would be able to afford to move
- Concerns from some residents about having mortgages and new mobile homes
- Concerns that some of the older mobile home units (built in the 1970s or earlier) are either not eligible or feasible to be moved
- Concerns about the park ownership (Hynes Group) not communicating with the residents

5 PROJECT IMPACTS, BENEFITS, AND MITIGATION

Section 5.1 summarizes the potential for adverse effects on minority or low-income populations for the project alternatives along with potential avoidance, minimization, and mitigation measures specific to those impacts. Sections 5.2 through 5.4 describe indirect impacts, cumulative impacts, and project benefits, respectively.

5.1 Direct Impacts and Mitigation Measures

5.1.1 No-Build Alternative

Under the No-Build Alternative, no impacts from the project to environmental justice populations are expected and benefits to environmental justice populations would not occur. For the purposes of the Final EIS, the No-Build Alternative assumes that by the design year 2042, FWLE and all planned Sound Transit 3 projects, including TDLE, are built along with the other public and private projects planned within the study area. If TDLE is constructed as proposed, the mainline track associated with the Preferred and South 344th Street alternatives would be built later in time.

Under the No-Build Alternative, Sound Transit would not have the capacity to receive, test, commission, store, maintain, and deploy the expanded fleet of LRVs needed to support existing and planned future expansions of the Link light rail system at planned service levels under Sound Transit 3. As a result, light rail operations would be less efficient than they would otherwise be with the facility, and Sound Transit would not be able to meet the expected ridership demand.

Reduced service levels would limit benefits to environmental justice populations who use the system. Based on 2018–2019 survey data, approximately 43 percent of Sound Transit ridership across all modes (Link light rail, Regional Express bus, and Sounder) are minorities, many of whom use transit for more than commuting purposes. Approximately 22 percent of minority riders and 13 percent of non-minority riders made less than $33,000 annually, indicating the importance of transit availability to lower income riders.

5.1.2 Build Alternatives

For the project alternatives analyzed in the Final EIS, Table E.5-1 summarizes impacts, mitigation measures, and where project impacts and benefits would affect minority and low-income populations. As shown in Table E.5-1, the project would not adversely impact many elements of the environment. These elements are not further analyzed. For elements of the environment where the project potentially causes adverse effects to minority and low-income populations, a more detailed discussion of the potential impacts and avoidance, minimization, and mitigation measures for these resources is provided in sections below the table (Section 5.1.2.1, Transportation; Section 5.1.2.2, Acquisitions, Displacements, and Relocations; Section 5.1.2.3, Economics; Section 5.1.2.4, Visual and Aesthetic Resources; and Section 5.1.2.5, Social Resources, Community Facilities, and Neighborhoods). All identified project impacts have proposed in-kind mitigation measures. Further information can be found in Chapter 3 of the Final EIS (Affected Environment, Environmental Impacts, and Mitigation Measures).

Table E.5-1 Summary of Potential Impacts and Mitigation

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Transportation[1]	• No long-term impacts on freight, transit, parking, or nonmotorized facilities are anticipated. • The alignment of the mainline tracks for the Preferred and South 344th Street alternatives would be constructed immediately adjacent to the southbound I-5 clear zone within the I-5 right-of-way. While portions of the mainline alignment would maintain clear zone standards, there may be locations where the minimum widths cannot be met. • All the build alternatives would require demolition activities and earthwork that would generate truck trips during the construction effort. Depending on the subsurface construction design option chosen, the Midway Landfill Alternative could require up to 564 round trip truck trips per day during the most intense periods of site preparation activities.	• There would be avoidance and minimization measures to address potential traffic congestion during construction, such as developing a traffic management plan and avoiding traffic disruptions during peak travel times. • In locations where the mainline tracks for the Preferred and South 344th Street alternatives reduce the available clear zone below standards, Sound Transit would reestablish a clear zone by regrading or installing guardrails, barriers or impact attenuators. These measures would not adversely affect transportation safety in the study area.	• There are no adverse transportation impacts expected for the Preferred and South 344th Street alternatives. • Construction truck trips would be substantially greater for the Midway Landfill Alternative, which has a high percentage of environmental justice populations within its study area. • While I-5 and the arterials surrounding the Midway Landfill Alternative have the capacity to accommodate the additional truck traffic, the large number of daily truck trips over several years necessary for site preparation could exacerbate existing traffic congestion along some roadway segments and be perceived by the community as an adverse impact. • Construction traffic could cause noise and visual impacts to residents adjacent to the project site and haul routes. See the Visual and Aesthetics Resources and Noise and Vibration sections of this table for more detail.	• OMF South would support the system-wide expansion of light rail as called for in the Sound Transit 3 plan, including expansion into the south corridor from Federal Way to Tacoma. As a result, improved regional connectivity and mobility would accrue to a larger extent for minority and low-income residents as a primary and affordable means of transportation. • The Preferred Alternative would replace 20th Avenue S with an extension of 18th Place S, which would include a multi-use path for pedestrians and bicyclists.

Notes:

(1) See Section 5.1.2.1 for more detail on transportation impacts and mitigation.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Acquisitions, Displacements, and Relocations[2]	OMF South would acquire public and private property for the mainline track and OMF site. As a result of these acquisitions, some residences, businesses, and public uses would be displaced. • Preferred Alternative with 40 mph Alignment displacements: 86 residences, 11 businesses, and 1 religious facility. • Preferred Alternative with 55 mph Design Option displacements: 92 residences, 11 businesses, and 1 religious facility. • South 344th Street Alternative with 40 mph Alignment displacements: 91 residences, 17 businesses, and 4 religious facilities. • South 344th Street Alternative with 55 mph Design Option displacements: 97 residences, 17 businesses, and 4 religious facilities. • Midway Landfill Alternative displacements: 4 businesses, 0 residences, and 0 religious facilities; the least impacts of all alternatives. Most of the residential displacements for the Preferred and South 344th Street alternatives would be mobile homes at Belmor.	• Consistent with the Uniform Relocation Act, residents and businesses displaced by the project would receive compensation and relocation assistance in accordance with Sound Transit's adopted real estate property acquisition and relocation policy, procedures, and guidelines (Sound Transit 2002 and 2011). • There may be opportunities for relocation of some residents, social resources, and businesses in the project vicinity, including limited relocation opportunities within Belmor for residents of the potentially impacted mobile home park. • For residential relocations, Sound Transit relocation specialists would work with affected residents to help them relocate nearby to a dwelling that is as comparable to their current dwelling as possible. • Sound Transit would ensure that comparable housing is made available, whether the displaced resident owns or rents their home. Aside from the level of advisory services required by each displaced resident, the mitigation provided to these populations would be the same as for the general population, regardless of low-income or minority status. Compensation for rent differentials includes additional considerations for low-income households.	• Minority and low-income populations would be impacted by the acquisition, displacement, and relocation of residences and businesses. Sound Transit would ensure that comparable housing is made available, whether the displaced resident owns or rents their home.	• None.

Notes:

(2) See Section 5.1.2.2 for more detail on acquisitions impacts and mitigation.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Land Use	• All alternatives would require acquisitions and conversion of existing land uses (commercial, single-/multi-family residential, public/institutional, vacant) to a transportation-related land use. • Construction activities would not affect land use patterns in the study area.	• No mitigation would be required.	• No impacts.	• None.
Economics[3]	• Direct economic impacts include business and employee displacements, associated potential tax impacts, and changes in development patterns and regional freight mobility. • The Preferred Alternative would result in 12 business (including religious facilities) displacements and 126 employee displacements[4]. • The South 344th Street Alternative would result in 21 business displacements (including religious facilities) and 212 employee displacements. • The Midway Landfill Alternative would result in 4 business displacements and 43 employee displacements. • Construction activity may disrupt current economic activity by increasing traffic delays and may result in other negative impacts, such as increased noise adjacent to the construction site. • Construction would bring revenue into the economy with the jobs that it produces, and the money spent by the construction employees in the surrounding community.	• Long-term operation of OMF South is not anticipated to result in adverse economic effects that would require mitigation. • Relocation assistance for business displacements is discussed in Final EIS Section 3.3, Acquisitions, Displacements, and Relocations. • Construction mitigation plans would be developed to address the needs of businesses that may be affected during construction.	• Based on the demographic characteristics of the study areas, some displaced businesses are likely minority owned and include minority and/or low-income employees.	• By supporting the development of light rail service, OMF South indirectly provides improved access to employment centers and expanded employment opportunities for minority and low-income persons residing in the project corridor and the Puget Sound region. • Project would result in the creation of approximately 610 permanent living-wage jobs at the OMF site and would include classroom space to be compatible with future apprentice programs. • Construction could generate $3.2 billion to $6.8 billion in economic output and support hundreds of jobs throughout the region. Sound Transit includes project labor agreements and has a DBE program to support hiring persons of color, with a goal to eliminate barriers, create opportunities, and build capacity for underrepresented and women-own businesses.

Notes:

(3) See Section 5.1.2.3 for more detail on economic impacts and mitigation.

(4) The number of displaced employees is based on the business building size (King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers and not on an actual survey of businesses. The analysis for estimating employees assumes that the businesses are not abandoned or vacant.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Social Resources, Community Facilities, and Neighborhoods[5]	• All OMF South build alternatives include residential and commercial property acquisitions and land use conversions. • The Preferred Alternative would displace residential units within Belmor, disrupting social cohesion. It would also adversely affect social resources, including displacement of the Christian Faith Center, which includes a child-care center and the Pacific Christian Academy school, and 11 businesses, including a home-based daycare. • The South 344th Street Alternative would have the most impacts on social resources of the build alternatives. It would have the same impacts as the Preferred Alternative on Belmor and would also displace 4 religious facilities and 17 businesses. • The Preferred Alternative and the South 344th Street Alternative with the 40 mph Alignment would relocate one golf hole and shorten the associated fairway at the northeast corner of the Belmor private golf course. The 55 mph Design Option would affect an additional hole and associated fairway. Both mainline design options would also alter the golf course path. • The Midway Landfill Alternative would displace 4 businesses. • Community resources and neighborhoods in proximity to construction activities would be impacted by increased truck traffic, localized impacts to air and visual quality, and increased noise and vibration.	• Specific design features, BMPs, and mitigation measures would be used to minimize adverse impacts to social resources, community facilities, and neighborhoods. • Generally, Sound Transit identified that there is a sufficient supply of housing in the study area and adequate space to relocate religious facilities, childcare centers, and other businesses that serve environmental justice populations. • Access to community facilities would be maintained during construction to the extent practicable. • Sound Transit would relocate the golf hole(s) and golf course path. • Avoidance, minimization, and mitigation measures for long-term operational and short-term construction impacts, including transportation, visual, air, and noise impacts, are described under elements of the environment in in this table.	• Based on the demographic characteristics of the corridor, all build alternatives would displace businesses that serve or employ minority or low-income populations. • The Preferred and South 344th Street alternatives would displace social resources, including religious institutions that serve low-income and minority populations in the study area. • The Preferred Alternative would displace the Christian Faith Center and an associated school and childcare center, which would be challenging to relocate due to its size. • The Preferred Alternative would displace a home-based daycare that offers subsidized childcare and dual language programs.	• Public space on the north side of the Preferred Alternative along S 336th Street to be developed in coordination with the city of Federal Way would include amenities such as multi-use path, seating, landscaping, artwork, and educational signage. • A multi-use path along the extension of 18th Place S for the Preferred Alternative would allow for community connectivity and two-way travel by people walking, rolling, and biking that would be separated from the road by a curb and planting strip.

Notes:

(5) See Section 5.1.2.5 for more detail on social resource impacts and mitigation.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Visual and Aesthetic Resources[6]	• All the build alternatives would change visual conditions by removing existing landscape features and constructing new buildings, retaining walls, and elevated structures. • Preferred and South 344th Street alternatives: Belmor residents near the mainline would experience adverse visual impacts. • Preferred and South 344th Street alternatives: residents along 24th Avenue S would experience adverse visual impacts • The South 344th Street Alternative tail tracks would impact WSDOT Resource Conservation Areas adjacent to the I-5 right-of-way. • Midway Landfill Alternative: residents north and south of the site could experience adverse visual impacts. • Construction could result in a temporary decrease in visual quality.	• Preferred and South 344th Street alternatives: planting of trees and shrubs and architectural treatment of walls would soften visual impacts of the mainline through Belmor and along 24th Avenue S. • Sound Transit would consult with WSDOT and FHWA to develop site-specific measures for impacts to WSDOT Resource Conservation Areas along I-5 through replacement property or other measures. • Midway Alternative: existing fencing and vegetation along with new landscaping would screen views of OMF South for nearby residents.	• There is a high percentage of low-income (56 percent) and minority populations (87 percent) in the block group encompassing the residents along 24th Avenue S. The residents would experience high visual impacts from the Preferred and South 344th Street alternatives from the removal of trees and vegetation and the addition of large-scale project features • There is a high percentage of low-income (34 percent) and minority populations (68 percent) in the block group encompassing the residents north and south of the Midway Landfill Alternative. These residents would experience moderate visual impacts from the Midway Landfill Alternative site. • Construction activities, including truck traffic, could result in temporary decreases in visual quality.	• None.
Air Quality and Greenhouse Gases	• Long-term emissions associated with employee commutes, material deliveries, and on-site vehicle maintenance are not anticipated to exceed air quality standards. • During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities.	• Sound Transit would implement construction BMPs to minimize the impact of construction-related emissions and nuisance dust on existing residential and recreational uses.	• No adverse impacts.	• None.

(6) See Section 5.1.2.4 for more detail on visual and aesthetic resource impacts and mitigation.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Noise and Vibration	• There are no FTA noise impacts or WAC exceedances associated with operation of any of the OMF sites. • Preferred and South 344th Street alternatives: both mainline alignments would result in vehicle traffic noise impacts from removal of the berm along I-5 for about one to three residences. • Preferred and South 344th Street alternatives: The mainline 55 mph Design Option would result in noise impacts to four single-family residences in Belmor for both the Preferred and South 344th Street alternatives. • There are no vibration impacts associated with operation of any of the build alternatives. • Construction may result in temporary noise and vibration impacts for all build alternatives. • Residences at Belmor may experience temporary vibration impacts depending on construction methods used for the Preferred and South 344th Street alternatives.	• In accordance with the Sound Transit Link Noise Mitigation Policy, the project would mitigate all noise and vibration impacts with noise walls or other measures. Based on the current design, noise impacts along the mainline through Belmor would be mitigated with a noise wall. • A construction management plan would be developed during the design phase of the project detailing BMPs to minimize impacts on local businesses and residents, including noise and vibration impacts.	• After mitigation, there would be no operational noise impacts from the project. • Minority and low-income people within close proximity to construction activities would experience temporary noise and vibration impacts during construction.	• None.
Ecosystem Resources	• All build alternatives would have direct long-term impacts on ecosystem resources where permanent features, such as project facilities, overlap ecosystem components, such as wetlands, wetland buffers, streams, stream buffers, or native forest. • Temporary construction-related impacts would occur where wetlands, wetland buffers, streams, stream buffers, or native forest are affected by clearing and ground-disturbing work and would be revegetated following construction.	• For unavoidable long-term impacts on wetlands, streams, and their buffers, Sound Transit would develop compensatory mitigation during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. That could include onsite restoration, replacement sites, and the use of the King County In-Lieu Fee Program or other approved mitigation banks.	• No adverse impacts.	• None.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Water Resources	• All build alternatives would add both pollution-generating impervious surfaces and non-pollution-generating impervious surfaces in the study areas for all project alternatives and would require stormwater management BMPs, such as flow control or treatment. • Construction of all build alternatives could affect surface and groundwater quality by increasing flooding or erosion or cause potential degradation of water quality when runoff is generated in construction areas.	• With the application of required stormwater BMPs, such as flow control or treatment facilities, no temporary or long-term adverse impacts on water resources are expected and no mitigation would be required. • Stormwater pollution prevention and sediment and erosion control plans would be developed that would specify BMPs for managing water runoff, protecting water quality, and preventing erosion	• No adverse impacts.	• None.
Geology and Soils	• The project would be designed to meet current seismic standards and to address any concerns over slope stability, minor settlement, and corrosive soils to prevent long-term impacts. • Construction impacts could include erosion of soils within the construction area and potential impacts on shallow groundwater quality from construction activities that would be addressed with standard BMPs.	• No mitigation would be required.	• No adverse impacts.	• None.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Hazardous Materials	• For all build alternatives, operation of the project could cause long-term impacts on the environment if an accidental release of hazardous materials occurs, such as a fuel spill. • Construction impacts of the Midway Landfill Alternative could include the potential release of contaminated air, soil, and groundwater due to its characterization as a high-risk hazardous materials site.	• Mitigation would be required for construction of the Midway Landfill Alternative, which would include replacement of the landfill cap and other measures.	• Minority and low-income residents adjacent to the construction of the Midway Landfill Alternative could be exposed to the release of contaminated air, soil, and groundwater, due to the landfill's characterization as a high-risk hazardous materials site. Census data indicate that there is a higher percentage of low-income (34 percent) and minority (68 percent) population immediately adjacent to the site than the Sound Transit service district average.	• None.
Public Services	• OMF South is not anticipated to result in adverse impacts to public services.	• No mitigation would be required.	• No adverse impacts.	• None.
Utilities, Energy, and Electromagnetic Fields	• OMF South operation would not result in any long-term adverse impacts to existing utilities in the project corridor. • Construction could result in temporary impacts such as service disruptions due to utility relocations. • There are no potential or adverse electromagnetic field impacts in the study area. • No adverse impacts on energy are anticipated.	• Temporary utility impacts would be avoided or minimized by maintaining required access to utilities and through communication with customers to inform them of planned or potential service disruptions. No mitigation would be required.	• OMF South would not result in any long-term adverse impacts to existing utilities. • Minority and low-income residents within the vicinity of the project could experience temporary service disruptions due to utility relocations.	• None.
Historic and Archaeological Resources	• None of the build alternatives are anticipated to have impacts on historic or archeological resources.	• No mitigation would be required.	• No adverse impacts.	• None.

Table E.5-1 Summary of Potential Impacts and Mitigation (continued)

Type of Impact	Impact Summary for Build Alternatives	Mitigation Summary	Impacts on Minority and Low Income Populations	Benefit(s) to Minority and Low Income Populations
Parks and Recreational Resources	• None of the build alternatives would have long-term impacts on public parks or other public recreation facilities within the study area. • There would not be any direct construction impacts to parks or recreational facilities, but construction of the mainline tracks for the Preferred and South 344th Street Alternatives could cause temporary light, noise, and dust impacts to Cedar Grove Park.	• Construction impacts would be addressed through public outreach and other BMPs to maintain access and minimize light, noise, and dust impacts. No mitigation would be required.	• There would be no long-term adverse impacts on public parks or other public recreational facilities within the study area. • Construction of the mainline tracks for the Preferred and South 344th Street Alternatives could cause temporary light, noise, and dust impacts to Cedar Grove Park, or affect access due to temporary detours, lane closures, or other traffic impacts.	• None.
Section 4(f) and 6(f) Resources	• None of the alternatives would acquire land from or result in the use of any recreational 4(f) or 6(f) resources. • FTA determined that the mainline for the Preferred or South 344th Street alternative would have a *de minimis* impact to the BPA powerlines, which have been determined eligible for the National Register of Historic Places.	• No mitigation would be required.	• No adverse impacts.	• None.

Notes:

BMP = best management practice; BPA = Bonneville Power Administration; DBE = Disadvantaged Business Enterprise; FHWA = Federal Highway Administration; FTA = Federal Transit Administration; I-5 = Interstate 5; OMF = operations and maintenance facility; WSDOT = Washington State Department of Transportation

The following sections focus on the five elements of the environment that would potentially impact environmental justice populations that are identified in Table E.5-1: Transportation; Acquisitions, Displacements, and Relocations; Economics; Visual and Aesthetic Resources; and Social Resources, Community Facilities, and Neighborhoods.

To better understand the demographics of the populations that would be impacted by the project, Sound Transit identified the block groups in which quantifiable impacts would occur. Tables E.5-2 through E.5-4 list the block groups in the study area for each alternative, the percent of minority and low-income populations within each block group, and the potential displacements and visual impacts in each block group. Figures E.3-1 through E.3-3 show the block groups in the study area for each alternative.

Displacements and visual impacts for the Preferred and South 344th Street alternatives occur in three block groups: 530330303131, 530330303132, and 530330303133. As all block groups in this analysis start with the same six digits (530330), the text will herein refer to the block groups without the repeating digits for readability.

The majority of residential displacements (about 83 percent) for the Preferred and South 344th Street alternatives occur in Block Group 303131, within which the proportion of minority and low-income population is similar to the Sound Transit service district average. The remaining residential replacements are within Block Groups 303132 and 303133, which have a higher proportion of minority and low-income populations relative to the Sound Transit service district average. All business and community facility displacements occur in block groups with a higher proportion of low-income and minority populations than the Sound Transit service district average. Most of the businesses displaced by the Preferred and South 344th Street alternatives serve an area larger than the study area, such as the greater Federal Way or Puget Sound area, and some have multiple locations, as described further in Section 5.1.2.3, Economics.

High visual impacts from the Preferred and South 344th Street alternatives would occur along 24th Avenue S in Block Group 303132, which has a higher percentage of low-income and minority populations than the Sound Transit service district. Other high visual impacts would occur in Block Group 303131, which has similar low-income and minority populations as the Sound Transit service district average.

Displacements for the Midway Landfill Alternative are all within Block Group 290041. This block group has a higher percentage of minority and low-income population than the Sound Transit service district average. There are no high visual impacts associated with this alternative. Moderate visual impacts would occur north and south of the site, where there is a higher percentage of low-income and minority populations. Construction traffic impacts from the Midway Landfill Alternative are not shown in the table due to the dispersed nature of the impact; these impacts are described further in Section 5.1.2.1, Transportation.

Table E.5-2 Preferred Alternative Impacts by Block Group

ID	Percent Minority	Percent Low Income	Residential Displacements	Business Displacements	Visual Impacts (High)	Visual Impacts (Medium)
ST District	**42%**	**21%**	**NA**	**NA**	**NA**	**NA**
299012	46%	37%	0	0	No	No
300033	55%	38%	0	0	No	No
300061	79%	27%	0	0	No	No
300062	87%	47%	0	0	No	No
300063	66%	31%	0	0	No	No
302031	84%	34%	0	0	No	No
303043	69%	42%	0	0	No	No
303131	**46%**	**23%**	**71 – 77**	**0**	**Yes**	**No**
303132	**87%**	**56%**	**10**	**0**	**Yes**	**Yes**
303133	**73%**	**48%**	**5**	**11**	**No**	**Yes**
303141	67%	40%	0	0	No	No
304061	72%	10%	0	0	No	No
304062	27%	6%	0	0	No	No
304071	23%	11%	0	0	No	No
304072	69%	28%	0	0	No	No

Table E.5-3 South 344th Street Alternative Impacts by Block Group

ID	Percent Minority	Percent Low Income	Residential Displacements	Business Displacements	Visual Impacts (High)	Visual Impacts (Medium)
ST District	**42%**	**21%**	**NA**	**NA**	**NA**	**NA**
299012	46%	37%	0	0	No	No
300033	55%	38%	0	0	No	No
300061	79%	27%	0	0	No	No
300062	87%	47%	0	0	No	No
300063	66%	31%	0	0	No	No
302031	84%	34%	0	0	No	No
303043	69%	42%	0	0	No	No
303131	**46%**	**23%**	**71 – 77**	**0**	**Yes**	**No**
303132	**87%**	**56%**	**0**	**0**	**Yes**	**No**
303133	**73%**	**48%**	**20**	**17**	**No**	**Yes**
303141	67%	40%	0	0	No	No
304061	72%	10%	0	0	No	No
304062	27%	6%	0	0	No	No
304071	23%	11%	0	0	No	No
304072	69%	28%	0	0	No	No

Table E.5-4 Midway Landfill Alternative Impacts by Block Group

ID	Percent Minority	Percent Low Income	Residential Displacements	Business Displacements	Visual Impacts (High)	Visual Impacts (Medium)
ST District	**42%**	**21%**	**NA**	**NA**	**NA**	**NA**
290031	56%	48%	0	0	No	No
290032	83%	37%	0	0	No	No
290033	65%	30%	0	0	No	No
290034	43%	27%	0	0	No	No
290041	**68%**	**34%**	**0**	**4**	**No**	**Yes**
290042	85%	81%	0	0	No	No
291011	69%	28%	0	0	No	No
291021	64%	26%	0	0	No	No
291022	58%	22%	0	0	No	No
291023	75%	57%	0	0	No	No
298041	54%	1%	0	0	No	No

5.1.2.1 Transportation

Long-term transportation impacts are relatively similar for all three build alternatives; however, construction impacts would differ. During construction, each build alternative would require some preparatory demolition and earthwork that would generate truck trips in addition to material delivery and general construction vehicle activity throughout the duration of construction. Most construction-period traffic would occur during import and export of material to and from the site during site preparation. The Preferred and South 344th Street alternatives would require similar peak daily truck trips during construction. However, the Midway Landfill Alternative would require up to nearly three times the number of truck trips, depending on the subsurface construction design option.

Additionally, construction duration varies between the Preferred and South 344th Street alternatives and the Midway Landfill Alternative. For the Preferred and South 344th Street alternatives, site preparation would take approximately 1 year and 6 months, assuming 12-hour workdays, 6 days per week. For the Midway Landfill Alternative, site preparation could take up to 5 years and 7 months, using the same assumptions.

The extensive site preparation work required for the Midway Landfill Alternative subsurface construction design options would expose the residents within the study area, which has a higher concentration of environmental justice populations than the surrounding community, to construction impacts over a longer period of time. In particular, it would result in higher volumes of construction traffic for exporting and importing the vast quantities of fill material. While I-5 and the arterials surrounding the Midway Landfill Alternative should accommodate the additional truck traffic, the substantial number of daily truck trips necessary for those subsurface construction design options could exacerbate existing congestion in some locations and be perceived as an adverse impact.

Avoidance, Minimization, and Mitigation

OMF South is not anticipated to result in long-term or construction impacts to freight, transit, nonmotorized transportation, or parking. Therefore, no mitigation for those transportation elements is proposed. However, there would be avoidance and minimization measures to address potential traffic congestion during construction, such as developing a traffic management plan and avoiding traffic disruptions during peak travel times.

For all build alternatives, a construction transportation management plan would be developed to address potential traffic and transportation impacts to the community, including minority and low-income populations. The plan would address site access, traffic control, hauling routes, impacts to transit, construction employee parking, impacts to local businesses, and pedestrian and bicycle control in the area. It would be prepared per city of Federal Way or city of Kent requirements and in coordination with WSDOT and FHWA, as applicable. Sound Transit would strive to maintain access to all properties as needed. However, if temporary driveway closures are required, access to these properties would be maintained to the extent practical through alternative routes. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours or whether the parking and users of this access could be accommodated at an alternative location.

Depending on the subsurface construction design option, construction of the Midway Landfill Alternative could require ingress and egress by a substantially greater number of large trucks, over a much longer duration, than for the Preferred or South 344th Street alternatives. To avoid potential traffic impacts on SR 99 from the number of additional trucks, short acceleration and deceleration lanes could be added to the construction entrance to the landfill site to allow outbound trucks to get up to speed and allow inbound trucks to slow down outside of the general-purpose lanes.

5.1.2.2 Acquisitions, Displacements, and Relocations

During the environmental review process, Sound Transit developed preliminary estimates for acquisitions and relocations using conceptual designs for the OMF South build alternatives. As the project continues to progress, these estimates will continue to be refined. This section focuses on residential displacements. Business displacements are detailed in Section 5.1.2.3, Economics, and displacement of social resources is discussed in Section 5.1.2.5, Social Resources, Community Facilities, and Neighborhoods.

The South 344th Street Alternative would have the most residential and business displacements, and the Midway Landfill Alternative would have the least. For both the Preferred and South 344th Street alternatives, most residential displacements would occur within Belmor from the addition of the mainline tracks. Belmor is a manufactured/mobile home community for people aged 55 and older and is comprised of one large parcel (approximately 63 acres) with capacity for over 300 mobile homes and several resident amenities, including a golf course, club house, and pool. Each resident rents the land on which the mobile homes sit, and some of the mobile homes are owned by residents, while others are rented.

Belmor makes up almost one quarter of the area of Census Block Group 303131; more than half of the remaining area is devoted to commercial land uses. Additionally, the population within Belmor likely represents more than half of the total population of the block group. That means that the demographics within the census block group are likely a good representation for the demographics within Belmor. The population in this particular block group is 46 percent minority and 23 percent low income, which are both lower than the average minority and low-income populations in the study areas for the Preferred and South 344th Street alternatives and Federal Way as a whole (Table E.3-1) and similar to the Sound Transit service district average of 42 percent minority and 21 percent low income.

The census data are largely confirmed by information gathered by Sound Transit during targeted outreach with Belmor residents (discussed in Section 4.5 above). Through this outreach, Sound Transit learned that many Belmor residents are retired and living on fixed incomes — though they are not necessarily considered low-income — and that the population is largely English speaking.

In addition to displacements in Belmor from the mainline tracks, the Preferred and South 344th Street alternatives would displace between 15 and 20 additional residences, respectively, associated with the OMF site. For the Preferred Alternative, displaced residences north of S 336th Street include five single-family homes and one four-unit multi-family building. These residences are in a relatively small census block group (303132) that is 87 percent minority and 56 percent low-income, which are above the averages for the Sound Transit service district, the Preferred Alternative study area, and Federal Way (Table E.3-1).

Both the Preferred and South 344th Street alternatives would displace residents along S 340th Street. Displaced residences along S 340th Street are all single-family homes and are in a much larger census block group (303133), so it is more difficult to accurately assign representative demographics. The population in this block group is 73 percent minority and 48 percent low income, both of which are above the averages for the Sound Transit service district, the Preferred, and South 344th Street study areas, and Federal Way (Table E.3-1).

The South 344th Street Alternative includes displacement of residents along 18th Place S in the same census block group (303133) as described above. As noted, these displacements occur in census block groups with a higher percentage of low-income and minority populations than the Sound Transit service district average and Federal Way.

After the Sound Transit Board selects the project to be built and the real estate process moves forward, a detailed residential occupancy survey will be completed for all potentially affected property owners and tenants. The purpose of this survey is to determine specific needs of those being relocated, and it includes questions about income, ethnicity, family size, and replacement preferences.

Avoidance, Minimization, and Mitigation

When developing the OMF South alternatives, Sound Transit used several measures to avoid and minimize potential acquisition impacts. The prospective OMF South sites were analyzed for potential property impacts, and the build alternatives evaluated in this Final EIS were ultimately identified, in part, to avoid or minimize impacts to residents and businesses. During design, the OMF South sites were configured to meet programming requirements while minimizing, to the extent feasible, acquisitions, displacements, and relocations. The mainline tracks have been located near or within public rights-of-way to reduce the number of private property impacts.

For all residential relocations, a qualified relocation agent is assigned to work with each resident through the process of relocation and transition to replacement housing. The goal of the relocation agents is to facilitate a smooth transition to replacement housing. A relocation agent would contact each resident personally to explain relocation assistance, eligibility, and entitlements. For all relocations, a Sound Transit relocation agent would interview the affected individuals to:

- Determine any special needs and requirements.
- Explain the relocation process, entitlements, and payments.
- Offer relocation advisory assistance.
- Offer transportation, if necessary.
- Offer language translation services, as necessary.
- Ensure the availability of at least one comparable property in advance of displacement.
- Provide referral to comparable properties.
- Provide the amount of the maximum replacement housing entitlement and the basis for the determination in writing 90 days or more before the required vacate date.
- Inspect replacement properties to ensure they meet the Uniform Relocation Act's standards for decency, safety, and sanitary acceptability.
- Supply information on other federal, state, and local programs that offer assistance to displaced persons.
- Minimize hardship to persons adjusting to relocation by providing reimbursement for counseling services and advice on other sources of assistance that may be available.
- Recommend obtaining and provide reimbursement for a professional home inspection when purchasing a replacement dwelling.

Sound Transit's property acquisition and relocation handbooks for residential and nonresidential properties detail the agency's compensation and acquisition procedures (Sound Transit 2014a, 2014b). Sound Transit would pay normal expenses of sale, including escrow fees, title insurance, prepayment penalties, mortgage release fees, recording fees, and typical costs incurred as part of conveying title. In addition to compensating owners for property rights, other forms of compensation could include moving expenses, replacement housing payments, nonresidential reestablishment, and other eligible expenses. The relocation agent would also explain and provide the displaced person with information about the process for filing an appeal, should they disagree with any entitlement or decision made regarding their relocation.

Residents who own their home may be eligible for a purchase price differential in addition to the acquisition price paid for their property if the available comparable housing is more than the value of their current property. Additionally, they may be eligible to receive a mortgage interest differential payment if the interest rate on their new mortgage exceeds their present mortgage rate.

Residents who rent their home are eligible for a rent supplement if the rent plus utilities of the selected comparable is higher than their current rent plus utilities. A rent supplement is designed to enable a resident to rent a comparable replacement dwelling for a 3.5-year period (42 months). The resident could elect to receive the full value of the rent supplement at once in order to use it as a down payment to purchase a home and to pay certain incidental expenses to purchase a replacement dwelling. This creates a potential opportunity for someone who is currently renting their home to purchase a home if they are interested.

Additional considerations are given for residents who rent their home and are determined to be low-income based on the Uniform Relocation Act income limits (generally, low income for Uniform Act purposes is income that does not exceed 80 percent of the median family income for the applicable area, as determined by the U.S. Department of Housing and Urban Development). The basis for the calculated entitlement for those residents who rent their homes and are determined to be low income is their rent plus utilities, or 30 percent of their income, whichever is less. This would result in the same or better rental assistance payment as someone who is not determined to be low income. In most cases, 30 percent of their income is less than the current rent plus utilities. This can result in a larger rental assistance payment.

A person would not be required to move unless at least one comparable replacement dwelling is made available. Although property uses may change before construction of OMF South, research indicates that there would be available locations for displaced residents to be relocated within the same general area.

There are several different types of relocation options potentially available for displaced Belmor residents:

- Relocate within Belmor.
- Relocate to another 55-plus park, renting or purchasing a mobile home within that park, or moving their current mobile home to that park.
- Relocate to a family park, renting or purchasing a mobile home within that park, or moving their existing mobile home to that park.
- Rent or purchase a vacant lot and relocate their existing mobile home to the site.
- Relocate to a purchased or rented single-family residence, condominium, or apartment.

Other options could include senior living, retirement community housing, or assisted living facilities.

Relocation of mobile home residents could be challenging because there is little availability in mobile home communities within Pierce or King counties. However, the owners of Belmor own and lease 24 single-wide mobile home units within the project area and have indicated they plan to relocate those impacted units to other areas within Belmor and continue to rent to the tenants who wish to remain.

5.1.2.3 Economics

For all build alternatives, long-term economic impacts are mainly associated with business displacements and employment changes. Religious facilities (e.g., churches) were included in total business displacements for the purpose of analysis in the EIS but impacts to these facilities are detailed in Section 5.1.2.5, Social Resources, Community Facilities, and Neighborhoods.

The South 344th Street Alternative would displace the most businesses and employees, all of which are associated with the OMF site. The Preferred Alternative would displace roughly half as many businesses, and the Midway Landfill Alternative would displace even fewer. As shown in Tables E.5-2 through E.5-4, displacements for all alternatives are within block groups with a higher percentage of low-income and minority populations than the Sound Transit service district. For the Preferred and South 344th Street alternatives, a majority of the business displacements in Federal Way are related to automotive or equipment industries that serve an area that is greater than the study area. Additionally, the Preferred Alternative would displace an in-home childcare center (see Section 5.1.2.5, Social Resources, Community Facilities, and

Neighborhoods below), and the South 344th Street Alternative would displace two specialized facilities — Ellenos Yogurt and GarageTown. The Midway Landfill Alternative would displace an insurance firm, a vison care center, and a paint sales and recycling center.

The effects of potential business displacements are complex. Substantial displacement of local businesses can affect residents and businesses alike. Often the direct impacts for displaced businesses are financial, but there can be other consequences as well. Firm size and community importance may determine the level of impact on employment and to the community. For example, small and minority-owned businesses that rely on a localized customer base may have more difficulty finding substitute locations. Businesses that use machinery or hazardous substances may require large parcels or have additional challenges that may make relocation difficult. Further, a business may have a suitable place to relocate, but the new location could limit access to its existing labor pool.

Similar to residential relocations, a detailed business survey will be completed after the Sound Transit Board selects the project to be built and the real estate process moves forward. The purpose of a business survey is to collect general information that can help determine if businesses are owned, employed, or frequented by environmental justice populations. With the exception of the in-home childcare center (see Section 5.1.2.5, Social Resources, Community Facilities, and Neighborhoods), based on outreach and community input to date, businesses displaced by the project alternatives are not key resources, employers, or gathering places for environmental justice populations. There are similar retail businesses in the area that would be accessible to the community.

Avoidance, Minimization, and Mitigation

For business relocations, adequate commercial and industrial spaces may be available in the market to relocate building owners and tenants displaced as part of the project. Industrial users requiring specific lot sizes and utilities may be more difficult to relocate, including properties such as GarageTown and Ellenos Yogurt that have specific needs, like storage facilities or specialized machinery.

Businesses and nonprofit organizations displaced by the project would be offered relocation assistance, advisory services, and monetary benefits. Qualified relocation agents are assigned to work with displaced business throughout the process of locating a replacement property and making the transition to the new location. The goal of the relocation agent is to assist the displaced business or nonprofit organization in locating a replacement site and successfully completing their move.

A relocation agent would personally visit each displaced business to explain the following:

- Explain relocation services and payments available, eligibility requirements, and procedures for obtaining assistance.
- Determine the relocation needs and preference for the operation by completing an occupancy survey form.
- Offer language translation services, as necessary.
- Provide advice on other sources of assistance and technical help.
- Explain substitute personal property and actual direct loss of tangible personal property so that the business owner can make informed decisions regarding the relocation.

The level of advisory services may be different for each displaced business depending on the complexity of the business operation. Sound Transit would provide information on the availability, purchase price, and rental costs of suitable commercial properties and locations and/or refer the displaced business to real property specialists in the area. The relocation agent would assist a business to become established in a replacement location. Businesses are eligible to receive relocation benefits including moving expenses, reestablishment expenses, or a fixed moving payment. Reestablishment expenses of up to a maximum of $50,000 may include, but are not limited to:

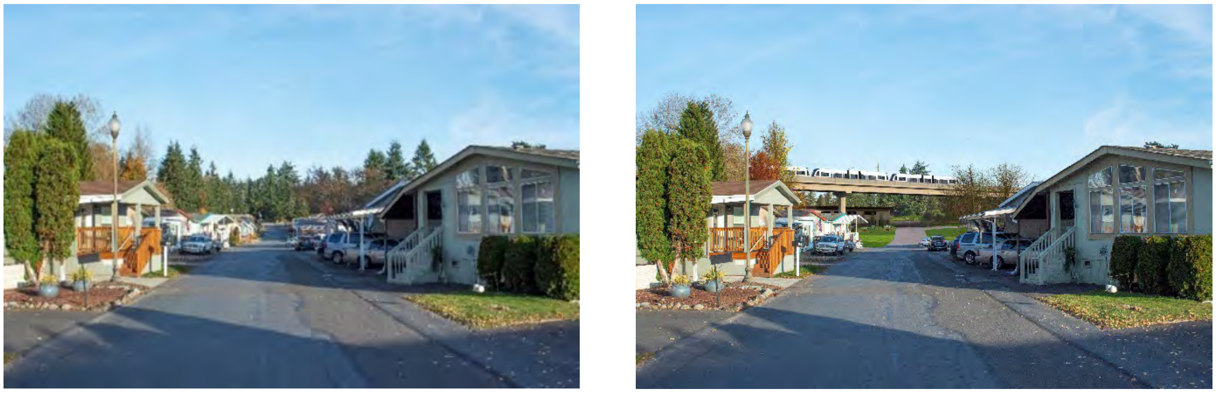
- Repairs or improvements to the replacement real property as required by federal, state, local law, codes, or ordinances.
- Modifications to the replacement property to accommodate the business operation or make replacement structure suitable for conducting the business.
- Construction and installation costs, for exterior signing to advertise the business.
- Redecoration or replacement of soiled or worn surfaces (e.g., carpeting, paneling, or painting).
- Advertising of replacement location.
- Estimated increased costs for 2 years at the replacement site for such items as lease or rental charges, personal or real property taxes, insurance premiums, and utility charges (excluding impact fees).

Additionally, if they prefer, businesses may be eligible for a fixed payment in lieu of moving, site search, and reestablishment expenses. The fixed payment is based on the average net earnings of the business for 2 taxable years immediately preceding the taxable year in which it would be displaced. The fixed payment entitlement is a minimum of $1,000 and a maximum of $40,000.

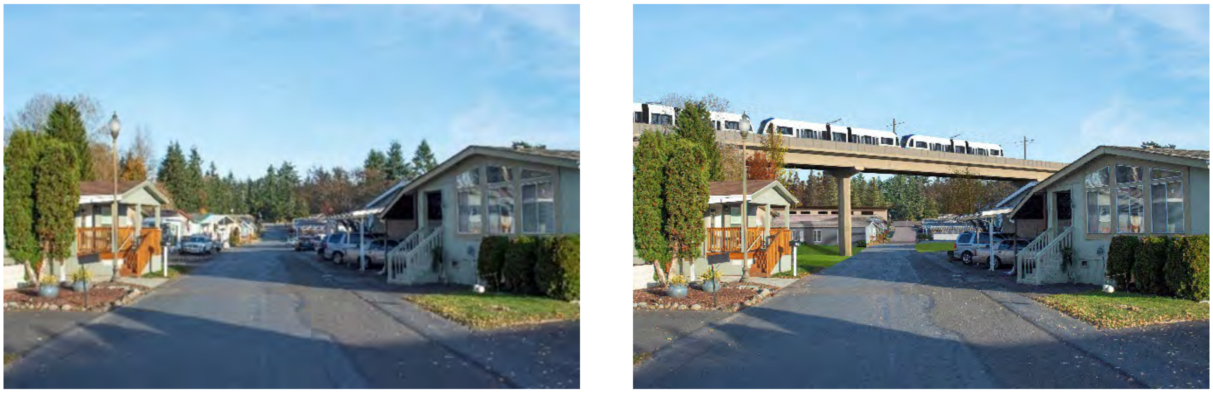
5.1.2.4 Visual and Aesthetics Resources

The Preferred and South 344th Street alternatives would cause visual impacts along the mainline track to adjacent residences. Visual impacts would occur from the removal of trees and vegetation and introduction of the large-scale light rail mainline track. As shown in Tables E.5-2 through E.5-4, visual impacts would occur in two block groups, one with similar percentages of low-income and minority populations to the Sound Transit service district and one with higher percentages. Figures E.5-1 and E.5-2 show visual simulations from these areas.

The Midway Landfill Alternative would have low to moderate visual impacts to residences north and south of the site from prominent buildings, retaining walls, and the lead track. As shown in Table E.5-4, visual impacts would occur in a block group with higher concentrations of minority and low-income populations than the Sound Transit service district.

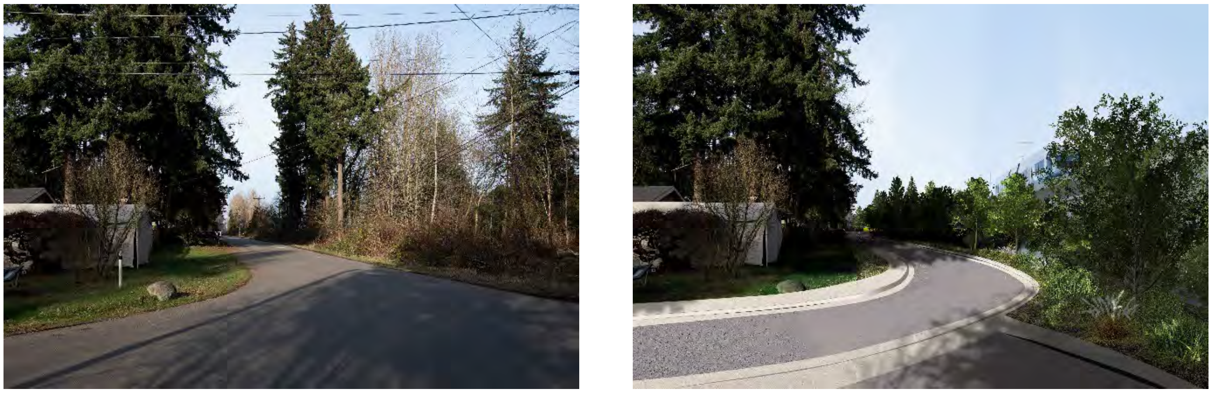


Existing Condition *Simulation of Mainline with 40 mph Alignment*



Existing Condition *Simulation of Mainline with 55 mph Design Option*

Figure E.5-1 Mainline Tracks Looking East from Belmor



Existing Condition *Simulation of Proposed Conditions approximately 10 years after planting*

Figure E.5-2 Mainline Tracks Looking North from 24th Ave S

Avoidance, Minimization, and Mitigation

As described in Final EIS Section 3.7, Visual and Aesthetic Resources, when developing the OMF South build alternatives, Sound Transit worked to minimize the height of structures to avoid and minimize potential visual impacts. As the design advances, Sound Transit would consider site context, adhere to landscape guidelines in the Sound Transit Design Criteria Manual, and include context-sensitive design measures with input from affected communities and jurisdictions.

In addition to the avoidance and minimization measures, Sound Transit would implement mitigation measures in areas near residences to reduce sensitive impacts. These measures would include the following:

1. In areas adjacent to residences, where there is adequate space, add on-site landscaping adjacent to residential areas to help screen views of project components while ensuring safety and security.

2. In areas adjacent to residences, where not enough room exists for landscaping to screen views of retaining or noise walls, Sound Transit would treat the walls with visually interesting elements, such as design treatments that incorporate textures, patterns, color, or climbing vines.

While these mitigation measures would help soften the view of project elements, visual impacts from the Preferred and South 344th Street alternatives would not be fully mitigated at Belmor or along 24th Avenue S due to the large-scale nature of the mainline track and limited opportunities for screening.

5.1.2.5 Social Resources, Community Facilities, and Neighborhoods

Impacts to social resources are primarily related to displacement of religious facilities, which could affect community cohesion in neighborhoods surrounding the OMF South build alternatives. Section 5.1.2.3, Economics, provides additional information about Sound Transit's property acquisition and relocation policies and procedures that would be applied to all displaced social resources and community facilities.

The Preferred Alternative would displace one religious facility, the Christian Faith Center church, which includes an associated day care center (CF Kidz) and separate religiously affiliated school (Pacific Christian Academy). The Christian Faith Center is a large-capacity church; therefore, it could be challenging to relocate a religious facility of this size and displacing it would impact the members of the service population from within and beyond the 0.5-mile study area. Based on outreach with the Christian Faith Center, they serve minority and low-income populations and serve a broad geographic area. In addition to CF Kidz at the Christian Faith Center, the Preferred Alternative would displace an in-home childcare center for children ages 2 to 13. This childcare center offers programs in English and Somali and accepts subsidized payments.

Both the 40 mph Alignment and the 55 mph Design Option would permanently impact the private Belmor golf course. The 40 mph Alignment would modify the northeast corner of the course by relocating one golf hole and shortening its associated fairway. The golf course path in that area would also be altered but would serve the same function. The 55 mph Design Option would permanently affect a second hole and its associated fairway and further alter the cart path. However, its function would be maintained.

The South 344th Street Alternative would displace four religious facilities: Family Life Community Church, Voice of Hope Church, and Redwood Church of God and Tabernacle Temple of Praise, which share a building. Based on project engagement and other research, these churches offer services in multiple languages and serve minority populations. For example, the Family Life Community Church offers services in English and Spanish, and the Voice of Hope Church offers services in Russian. The displacement of religious facilities could affect community cohesion if relocation of these facilities is not able to be accommodated in proximity to the study area; however, because these churches are currently located in commercial or industrial buildings, it is likely that they could be relocated to comparable properties nearby.

During construction, the Preferred and South 344th Street alternatives could also temporarily impact surrounding social resources and religious facilities, such as El Centro de la Raza, the Iglesia Ni Cristo Church, the KAC Baptist Church, and the Russian-Ukrainian Seventh Day Adventist Church. Each of these religious facilities provide church services in languages other than English and their congregations are likely largely made up of minority populations. The mainline design options would also affect the private golf course as described above for the Preferred Alternative.

There would be no long-term or construction impacts to social resources or community facilities within the Midway Landfill Alternative study area. The Midway Landfill Alternative would have the fewest impacts to social resources and community cohesion compared to other build alternatives.

Avoidance, Minimization, and Mitigation

Relocations of social resources, like religious facilities and childcare centers, would be treated similarly to business relocations described in Section 5.1.2.3, Economics. With the exception of the Christian Faith Center, displaced religious facilities may be less complex to relocate due to their smaller size and location in commercial buildings. The Christian Faith Center and Pacific Christian Academy may be challenging to relocate because of their large size.

As discussed in the impact section above, the Preferred Alternative would displace two childcare centers — one at the Christian Faith Center and one in-home facility. At the time of writing, there is one other childcare facility within the 0.5-mile study area. Within an expanded 1-mile buffer, there are five additional childcare facilities, all of which accept subsidized payments. Based on outreach to these facilities, there is available capacity for new children to attend at this time.

As part of the OMF South project, specific design features, BMPs, and mitigation measures would eliminate or minimize impacts to social resources, community facilities, and neighborhoods. These measures are summarized below.

- There would be avoidance and minimization measures to address potential traffic congestion during construction, such as developing a traffic management plan and avoiding traffic disruptions during peak travel times.
- Sound Transit's policies and procedures comply with federal, state, and local property acquisition and relocation policies and, in some cases, provide advisory services to property owners above the minimum requirements of federal and state law.
- In areas adjacent to residents, where there is adequate space, add on-site landscaping adjacent to residential areas to help screen views of project components while ensuring safety and security. In areas adjacent to residences where not enough room exists for

landscaping to screen views of retaining or noise walls, Sound Transit would treat the walls with visually interesting elements, such as design treatments that incorporate textures, patterns, color, or trellises with climbing vines.

- For the Preferred and South 344th Street alternatives, noise barriers are proposed for mitigation along the 55 mph Design Option elevated mainline tracks.

5.2 Indirect Impacts

OMF South is anticipated to result in minimal adverse indirect impacts. As described in more detail in Section 5.4, Project Benefits, OMF South would support system-wide Link light rail expansion for the approved Sound Transit 3 program. With the system-wide expansion, it may be reasonably expected to increase the potential for future private commercial and/or residential development activity near Link stations, which could increase property values near stations and augment tax revenues. However, this activity may also affect the availability of low-income housing opportunities and may result in the loss of affordable housing and/or displacement of low-income people. Housing goals and policies of local jurisdictions will influence future affordable housing options near Link stations. Sound Transit's Equitable Transit Oriented Development Policy encourages affordable housing development on any potential surplus property near future Link stations, which could help mitigate cumulative impacts (Sound Transit 2018).

5.3 Cumulative Impacts

To help inform the cumulative impact analysis, Sound Transit used EPA's EJScreen tool. EJScreen is a mapping tool that combines environmental and demographic socioeconomic indicators. It assesses the following 13 environmental indicators: particulate matter 2.5, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index, toxic release to air, traffic proximity, lead paint, risk management plan facility proximity, hazardous waste proximity, superfund proximity, underground storage tanks, and wastewater discharge. It also includes supplemental indexes to offer a perspective on the community-level vulnerability based on income, employment, limited English speaking, education, and life expectancy.

The EJScreen tool identified that the OMF South study area is in the 80th and 90th percentiles for many of the indexes when compared to national and state data. This indicates that the study area has been historically overburdened and there is a high potential for future projects to have cumulative impacts. Note that the census block results presented by EJScreen are actually census tract values distributed homogeneously across all census blocks within a census tract. As described in Section 3.2 above, this environmental justice analysis uses demographic data at the block group level to provide a more accurate portrayal of environmental justice populations within the project study area, given the localized nature of the project's potential impacts.

Sound Transit analyzed potential direct and cumulative impacts of the OMF South project related to the EJ indicators. These impacts included air quality, traffic, hazardous materials, and wastewater. They are discussed in the Final EIS in Chapter 3, Affected Environment, Environmental Impacts, and Mitigation Measures, and in Chapter 4, Cumulative Effects Analysis. Based on this analysis, with implementation of best management practices, OMF South would not contribute cumulative impacts to the EJScreen environmental indicators

The OMF South project, in addition to the TDLE and FWLE projects and other investments in regional transportation infrastructure, would enable more frequent Link service and improve overall mobility within the region, in addition to improving local connections to economic opportunity, goods, and services. Improved transit service and mobility and access to opportunity would be considered a benefit to low-income and minority populations in the study area and the region as a whole.

If OMF South were constructed at similar times as other large infrastructure projects, residents and businesses could experience increased short-term construction impacts due to cumulative increases in congestion, noise, and access limitations. This would include impacts to communities that have greater a percentage of low-income and minority populations than the Sound Transit service district. However, after mitigation and implementation of avoidance and minimization measures, adverse impacts would be reduced.

As part of the City Center Access project in Federal Way, transportation improvements and stream culvert work would displace Belmor residents in the vicinity of the OMF South mainline tracks for the Preferred and South 344th Street alternatives. Some of these mobile home displacements may overlap with OMF South displacements, or there may be additional displacements. Because the City Center Access project does not have construction funding, it is likely that OMF South would begin the acquisition and relocation process before Federal Way begins project construction. Therefore, the two projects are unlikely to have overlapping construction impacts, but may have cumulative impacts within Belmor, depending on the OMF South mainline track option and the final design for the City Center Access project.

5.4 Project Benefits

Under DOT Order 5610.2C, the benefits of a proposed transportation project may be considered when determining whether any disproportionate and adverse effects on minority and low-income populations would occur. The OMF South project would have indirect and direct benefits.

5.4.1 Indirect Benefits

OMF South would support the system-wide expansion of light rail as called for in Sound Transit 3, including expansion of the Link light rail system north to Everett; south to Tacoma; east to downtown Redmond, south Kirkland, and Issaquah; and west to Ballard and West Seattle, totaling 116 miles with over 80 stations. It would support reliability of the Sound Transit 3 system expansion by providing capacity to meet projected ridership demands. This would, in turn, improve regional connectivity and mobility and provide a reliable means of transportation for populations reliant on public transit, including low-income and minority populations. This would include improved access to jobs, social services, and medical care. Conversely, if OMF South were not built, maintenance of the LRV fleet would be reduced, which could lead to less system reliability and a poor rider experience, which may discourage ridership.

While all populations within the Sound Transit service area would realize these benefits to the same extent, they could accrue to a higher degree for minority and low-income residents as a primary and affordable means of transportation. As described in Section 5.1.1, 2018–2019 survey data identified that approximately 43 percent of Sound Transit ridership across all modes (Link light rail, Regional Express bus, and Sounder) are minority, many of whom use transit for more than commuting purposes, and approximately 22 percent of minority riders and 13 percent of non-minority riders made less than $33,000 annually. Additionally, data from the American Public Transportation Association (2008) indicate that in 2007, approximately 60 percent of all transit passengers in the United States were minorities. Data from a 2006 report (Center for Housing Policy 2006) illustrated that families with annual household incomes between $20,000 and $50,000 have transportation costs as high as or higher than housing.

5.4.2 Direct Benefits

5.4.2.1 Economic and Employment Benefits

Benefits to all populations, including environmental justice populations, would accrue through the addition of new jobs to build and operate the project. Sound Transit would require project labor agreements that include:

- Commitment to labor stability and a local workforce
- Apprenticeship and employment goals for people of color and women
- Non-discrimination and fairness in employment
- Requirement that 21 percent of all hours be set aside for persons of color (actual Sound Transit practices have resulted in 32 percent of all hours being held by persons of color)

Additionally, Sound Transit would implement its Disadvantage Business Enterprise (DBE) program that:

- Requires that 18.2 percent of all construction and architecture/engineering consultant dollars be set aside for DBE contracts (i.e., contracts with small businesses that are at least 51 percent owned by individuals who are socially and economically disadvantaged).
- Strives to eliminate barriers, create opportunities, and build capacity for underrepresented and women-owned businesses.

Additionally, as described in Final EIS Section 3.5, Economics, the increased purchase and sale of goods and services within the community to facilitate construction and the positive economic effects of construction workers' purchases in food and retail within the community would benefit businesses that are owned by environmental justice populations in the surrounding area.

The OMF South project would also generate about 610 living-wage jobs to operate the facility. The facility would include classroom space so that it is forward-compatible with future apprentice programs.

5.4.2.2 Community Cohesion

The design of the OMF South Preferred Alternative includes elements to support community cohesion within the surrounding neighborhood, which includes a higher percentage of low-income and minority populations than the Sound Transit service district. The Preferred Alternative would include a public space on the northern side of the site along South 336th Street to activate the area. Improvements would be coordinated with Federal Way and the community to help determine the most beneficial and desired uses and could include a multi-use pathway and other amenities, such as seating, landscaping, artwork, and educational signage.

Additionally, the Preferred Alternative would include a multi-use path, separated from the road by a curb and planting strip, along the extension of 18th Place S to allow for two-way travel by people walking, rolling, and biking. This would provide enhanced north-south access adjacent to the site to the communities in the study area to replace the current in-road designated greenway along 20th Avenue S.[2]

---

[2] A greenway is a bicycle facility that consists of shared-lane markings and guide signs along mostly residential or other low-speed or low-volume roads.

6 CONCLUSION

FTA and Sound Transit conducted this environmental justice analysis to identify, analyze and address potential disproportionate and adverse human health and environmental effects of the OMF South project on environmental justice communities. FTA will make the final environmental justice determination for the project following selection by the Sound Transit Board of a project site to be built. As described in Section 2, Methods and Approach, FTA's determination considers who may be affected; whether the net results will be disproportionately high after consideration of the totality of the circumstances, including project impacts, mitigation, and benefits; and whether adverse impacts would be predominantly borne by environmental justice populations. The determination also includes whether there would be a denial of, reduction in, or significant delay in the receipt of benefits by minority or low-income populations. To determine whether adverse impacts would be predominantly borne by environmental justice populations, FTA considers:

- Whether the adverse effects on environmental justice populations exceed those borne by non-environmental justice populations.
- Whether cumulative or indirect effects would adversely affect an environmental justice population.
- Whether mitigation and enhancement measures will be taken for environmental justice and non-environmental justice populations.
- Whether there are off-setting benefits to environmental justice populations as compared to non-environmental justice populations.

This environmental impact analysis for environmental justice populations concludes:

- Sound Transit conducted a robust, meaningful community engagement program that included a demographic analysis to identify low-income and minority populations. The study area includes block groups with concentrations of minority and low-income populations that are higher than the Sound Transit service district average.
- All alternatives would have limited cumulative and indirect impacts, as described in sections 5.2, Indirect Impacts, and 5.3, Cumulative Impacts.
- All build alternatives would result in potential direct impacts, as described in Table E.5-1. Direct impacts would be in areas with both similar and higher percentages of low-income and minority populations than the Sound Transit service district:
    - For the Preferred and South 344th Street alternatives, the majority of residential displacements occur in a block group that has low-income and minority populations similar to the Sound Transit service district. The Midway Landfill Alternative avoids residential displacements.
    - For all alternatives, business displacements occur in block groups that have higher percentages of low-income and minority populations than the Sound Transit service district. The same is true for displacement of social resources associated with the Preferred and South 344th Street alternatives.
    - For the Preferred and South 344th Street alternatives, high visual impacts occur in block groups that have both similar and higher percentages of low-income and minority populations than the Sound Transit service district. The Midway Landfill Alternative has moderate visual impacts in a block group with higher percentage of low-income and minority populations.

- Sound Transit would mitigate impacts for all populations through the application of measures presented in Chapter 3 of the Final EIS and summarized above in Table E.5-1 and Section 5, Project Impacts, Benefits, and Mitigation. Mitigation and enhancement measures would be applied equally between environmental justice and non-environmental justice populations. The design measures, best management practices, and other mitigation measures would address and reduce the project impacts; however, the visual impacts from the Preferred and South 344th Street alternatives would not be fully mitigated because of the scale of the mainline track.
- The project is anticipated to have direct and indirect benefits. Direct benefits include (1) enhanced community connectivity for the Preferred Alternative through public space and a multi-use trail integrated into the site design that would benefit the community the project is within, (2) construction jobs with project labor agreements and a DBE program to support hiring of minority populations, and (3) creation of new jobs to operate the facility that could benefit both environmental justice and non-environmental justice populations. Indirect benefits include supporting the Sound Transit 3 system expansion by providing capacity to ensure transit reliability, access, connectivity, frequency, and improved rider experience. There would be no denial of, reduction in, or significant delay in the receipt of benefits by minority or low-income populations.
- After consideration of the totality of the circumstances, including mitigation, offsetting direct and indirect benefits, and impacts, the net results of the project would not have disproportionate and adverse effects on minority and low-income populations as described under EO 12898, EO 14096, and DOT Order 5610.2C.

REFERENCES

American Public Transportation Association. 2008. 2007 Public Transportation Fact Book. Available at: https://www.apta.com/wp-content/uploads/Resources/resources/statistics/Documents/FactBook/APTA_2008_Fact_Book.pdf.

Center for Housing Policy. 2006. A Heavy Load: The Combined Housing and Transportation Burdens of Working Families. Available at: http://reconnectingamerica.org/assets/Uploads/pubheavyload1006.pdf.

CEQ (Council on Environmental Quality). 2023. Climate and Economic Justice Screening Tool. Version 1.0. Available at: https://screeningtool.geoplatform.gov/en/#12.87/47.38211/-122.29916.

DOT (U.S. Department of Transportation). 2021. Updated Order on Environmental Justice Order 5610.2C. Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. May 14, 2021.

EPA (Environmental Protection Agency). 2022. EJScreen Mapper. Version 2.2. Available at: https://ejscreen.epa.gov/mapper/.

FTA (Federal Transit Administration). 2012. Environmental Justice Policy Guidance for Federal Transit Administration Recipients. August 15, 2012.

King County. 2024. King County Housing Authority Interactive Map – Find a Home. Available at: https://www.kcha.org/housing/map. Accessed April 4, 2024.

OSPI (Washington Office of Superintendent of Public Instruction). 2022. Washington State Report Card data. Available at: https://washingtonstatereportcard.ospi.k12.wa.us/.

Presidential EO (Executive Order) 12898. 1994. Executive Order 12898 of February 11, 1994. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. 59 FR 7629.

Presidential EO 14096. 2023. Executive Order 14096 of April 21, 2023. Revitalizing Our Nation’s Commitment to Environmental Justice for All. 88 FR 25251.

Sound Transit. 2014a. Property Acquisition and Residential Relocation Handbook. Adopted October 2014. Available at: https://www.soundtransit.org/sites/default/files/documents/property-acquisition-and-residential-relocation-handbook.pdf.

Sound Transit. 2014b. Property Acquisition and Non-Residential Relocation Handbook. Updated July 2015. Available at: https://www.soundtransit.org/sites/default/files/Non-Residential_handbook_2014w.pdf. Sound Transit. 2018. Resolution No. R2018-10: Equitable Transit-Oriented Development (TOD) Policy. Available at: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2018/Resolution%20R2018-10.pdf.

Sound Transit. 2021. Operations and Maintenance Facility South Draft Environmental Impact Statement Comment Summary Report. Available at: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-deis-comment-summary-report-20211110.pdf. Accessed December 23, 2022.

U.S. Census Bureau. 2022. 2016–2020 ACS 5-year Estimates. Available at: https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2020/5-year.html.

WSDOT (Washington Department of Transportation). 2023. Environmental Manual, Chapter 458, Social and community effects and Chapter 460, Environmental justice.

Operations and Maintenance Facility South

ATTACHMENT A

EJScreen Reports

Federal Transit Administration

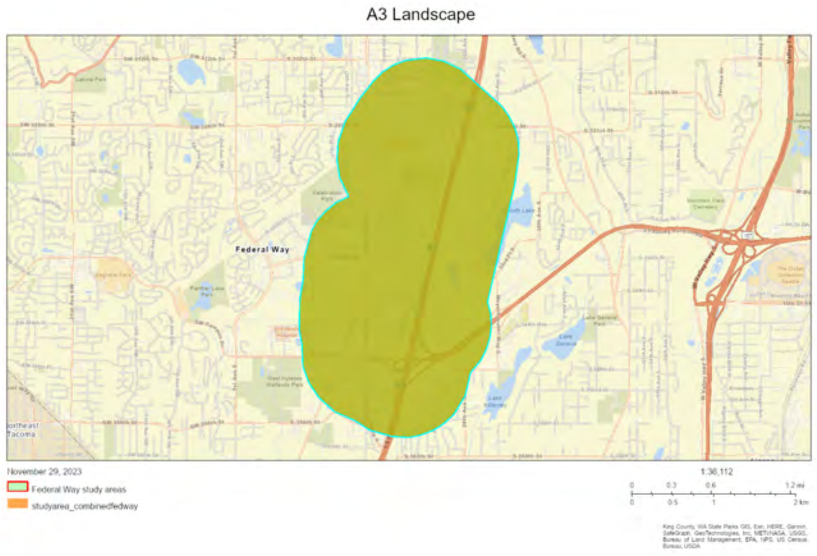
SOUNDTRANSIT

EJScreen Community Report

This report provides environmental and socioeconomic information for user defined areas, and combines that data into environmental justice and supplemental indexes.

Federal Way, WA

the User Specified Area
Population: 8,283
Area in square miles: 3.50


A3 Landscape
Federal Way
Northeast Tacoma
November 29, 2023
Federal Way study areas
studyarea_combinedfedway
1:38,112
0 0.3 0.6 1.2 mi
0 0.5 1 2 km
King County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	56%
Spanish	18%
French, Haitian, or Cajun	1%
Russian, Polish, or Other Slavic	4%
Other Indo-European	4%
Korean	4%
Chinese (including Mandarin, Cantonese)	1%
Vietnamese	3%
Tagalog (including Filipino)	1%
Other Asian and Pacific Island	2%
Other and Unspecified	6%
Total Non-English	44%

COMMUNITY INFORMATION

Low income: 38 percent

People of color: 71 percent

Less than high school education: 11 percent

Limited English households: 17 percent

Unemployment: 5 percent

Persons with disabilities: 13 percent

Male: 55 percent

Female: 45 percent

79 years
Average life expectancy

$32,235
Per capita income

Number of households: 3,596

Owner occupied: 30 percent

BREAKDOWN BY RACE

White: 29%

Black: 19%

American Indian: 0%

Asian: 15%

Hawaiian/Pacific Islander: 3%

Other race: 2%

Two or more races: 11%

Hispanic: 21%

BREAKDOWN BY AGE

From Ages 1 to 4	7%
From Ages 1 to 18	25%
From Ages 18 and up	75%
From Ages 65 and up	15%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	18%
Speak Other Indo-European Languages	28%
Speak Asian-Pacific Island Languages	25%
Speak Other Languages	29%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race. Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

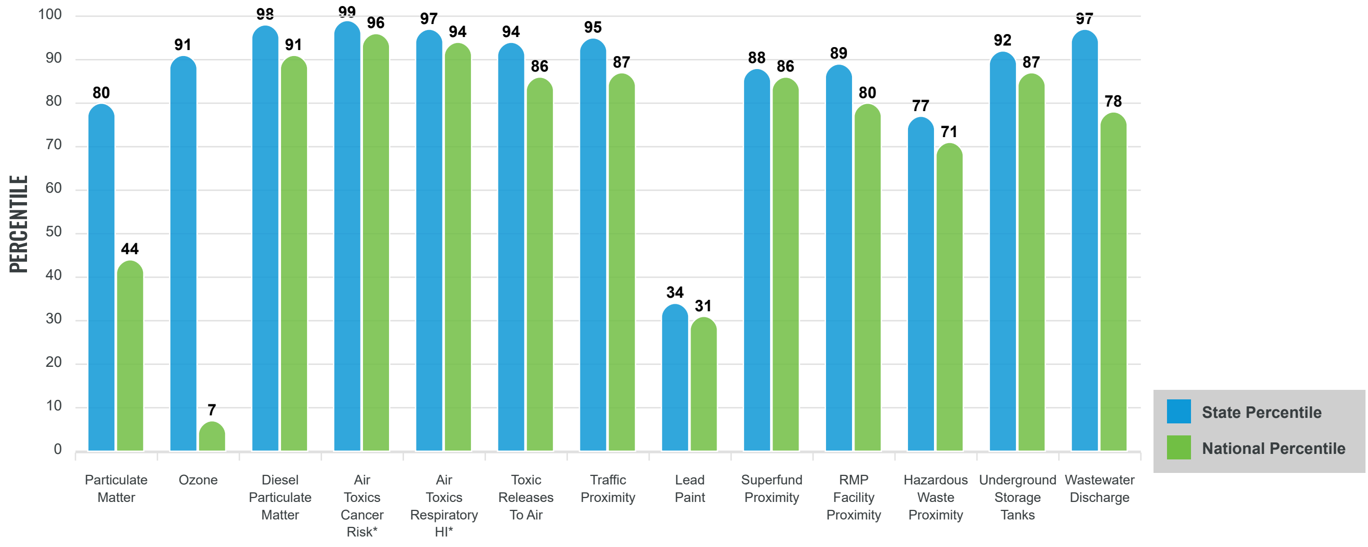
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

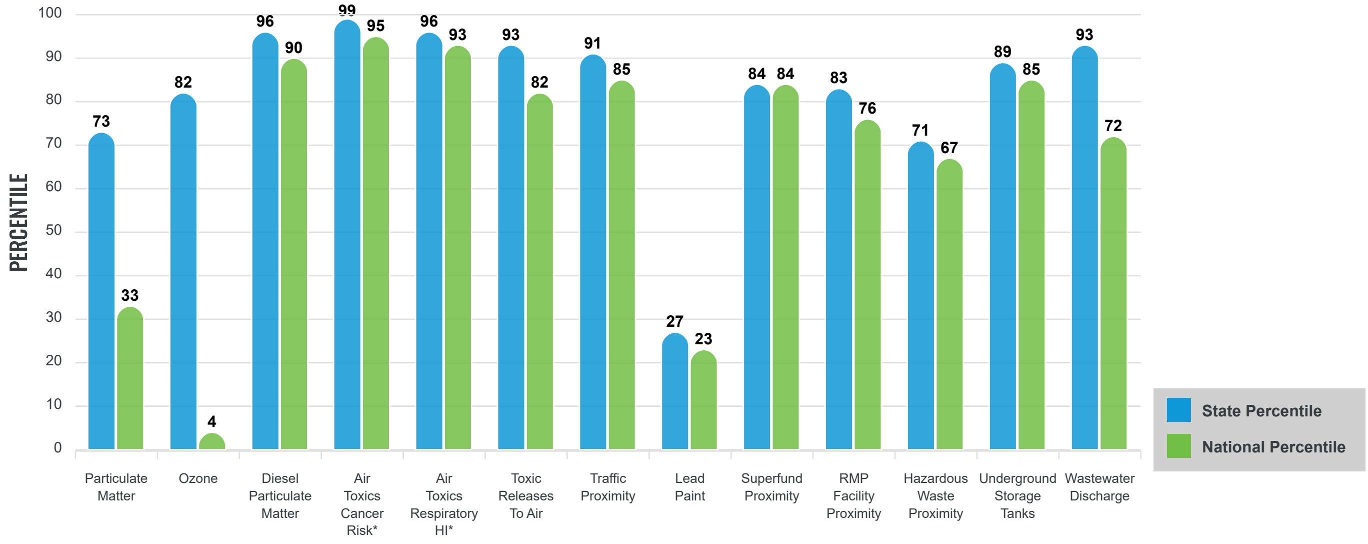
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for the User Specified Area

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu g/m^3$)	6.9	7.02	43	8.08	18
Ozone (ppb)	50.7	49.8	60	61.6	2
Diesel Particulate Matter ($\mu g/m^3$)	0.65	0.355	93	0.261	95
Air Toxics Cancer Risk* (lifetime risk per million)	38	27	37	25	52
Air Toxics Respiratory HI*	0.52	0.39	74	0.31	92
Toxic Releases to Air	1,500	1,800	71	4,600	67
Traffic Proximity (daily traffic count/distance to road)	350	190	87	210	86
Lead Paint (% Pre-1960 Housing)	0.021	0.23	20	0.3	19
Superfund Proximity (site count/km distance)	0.13	0.18	60	0.13	74
RMP Facility Proximity (facility count/km distance)	0.29	0.4	66	0.43	66
Hazardous Waste Proximity (facility count/km distance)	0.47	1.6	44	1.9	48
Underground Storage Tanks (count/km^2)	8.7	6.3	78	3.9	87
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0022	0.024	91	22	55
SOCIOECONOMIC INDICATORS					
Demographic Index	54%	28%	92	35%	78
Supplemental Demographic Index	18%	12%	85	14%	73
People of Color	71%	32%	93	39%	78
Low Income	38%	24%	78	31%	66
Unemployment Rate	5%	5%	58	6%	56
Limited English Speaking Households	17%	4%	95	5%	91
Less Than High School Education	11%	8%	73	12%	59
Under Age 5	7%	6%	67	6%	67
Over Age 64	15%	16%	51	17%	48
Low Life Expectancy	21%	18%	77	20%	61

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund	0
Hazardous Waste, Treatment, Storage, and Disposal Facilities	0
Water Dischargers	32
Air Pollution	1
Brownfields	0
Toxic Release Inventory	0

Other community features within defined area:

Schools	5
Hospitals	0
Places of Worship	5

Other environmental data:

Air Non-attainment	No
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for the User Specified Area

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	21%	18%	77	20%	61
Heart Disease	6.1	5.3	72	6.1	52
Asthma	10.4	10.5	43	10	66
Cancer	6.6	6.3	59	6.1	59
Persons with Disabilities	11.6%	13.1%	43	13.4%	44

CLIMATE INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	6%	11%	55	12%	50
Wildfire Risk	0%	12%	0	14%	0

CRITICAL SERVICE GAPS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	13%	9%	75	14%	56
Lack of Health Insurance	13%	6%	91	9%	78
Housing Burden	Yes	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Footnotes

Report for the User Specified Area

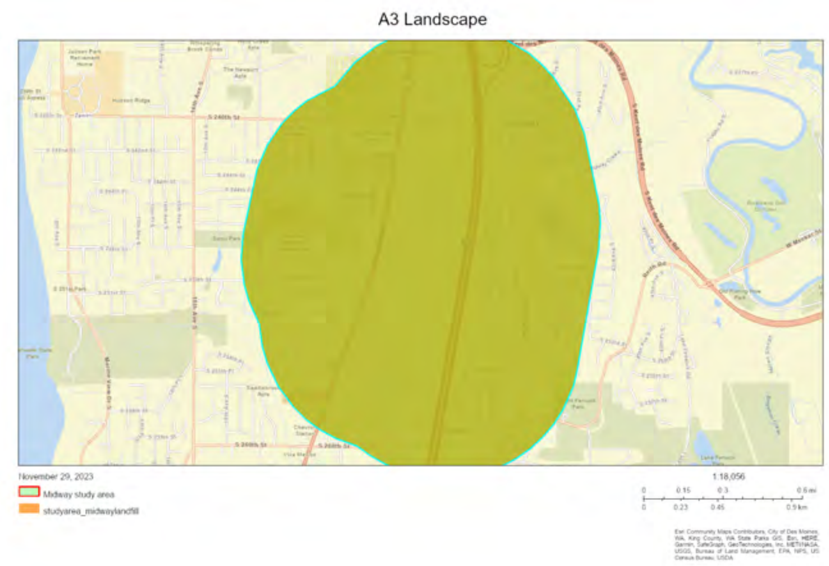
EPA

EJScreen Community Report

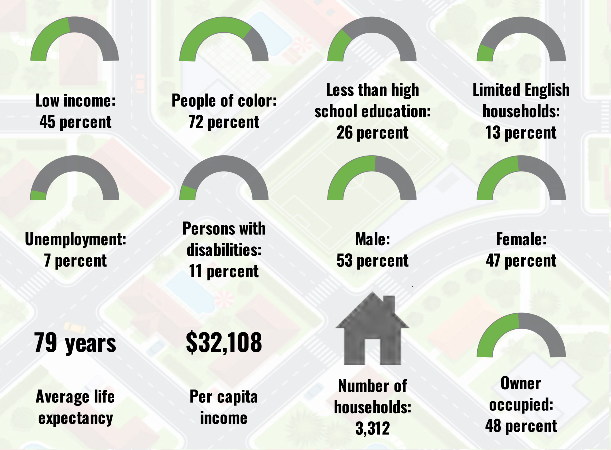
This report provides environmental and socioeconomic information for user defined areas, and combines that data into environmental justice and supplemental indexes.

Kent, WA

the User Specified Area
Population: 11,261
Area in square miles: 1.80



COMMUNITY INFORMATION



Low income: 45 percent

People of color: 72 percent

Less than high school education: 26 percent

Limited English households: 13 percent

Unemployment: 7 percent

Persons with disabilities: 11 percent

Male: 53 percent

Female: 47 percent

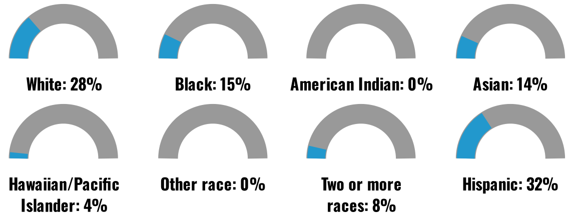
79 years Average life expectancy

$32,108 Per capita income

Number of households: 3,312

Owner occupied: 48 percent

BREAKDOWN BY RACE



White: 28%

Black: 15%

American Indian: 0%

Asian: 14%

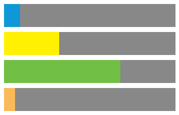
Hawaiian/Pacific Islander: 4%

Other race: 0%

Two or more races: 8%

Hispanic: 32%

BREAKDOWN BY AGE



From Ages 1 to 4	9%
From Ages 1 to 18	32%
From Ages 18 and up	68%
From Ages 65 and up	6%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	68%
Speak Other Indo-European Languages	17%
Speak Asian-Pacific Island Languages	6%
Speak Other Languages	8%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race. Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	41%
Spanish	29%
Other Indo-European	12%
Chinese (including Mandarin, Cantonese)	1%
Vietnamese	3%
Tagalog (including Filipino)	3%
Other Asian and Pacific Island	2%
Arabic	1%
Other and Unspecified	6%
Total Non-English	59%

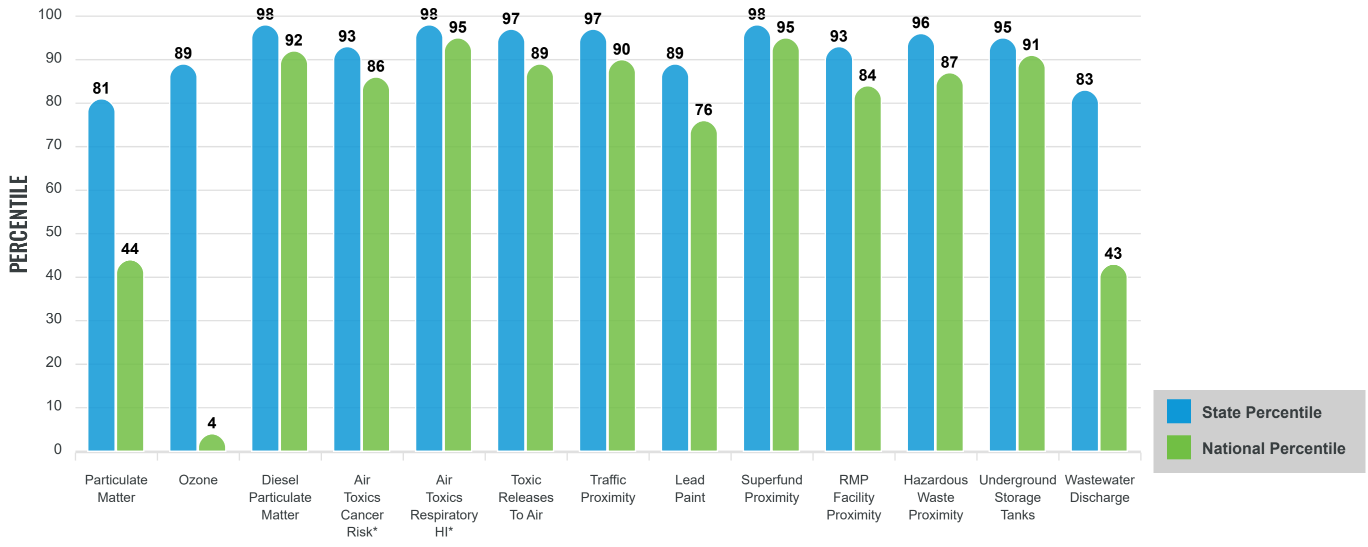
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

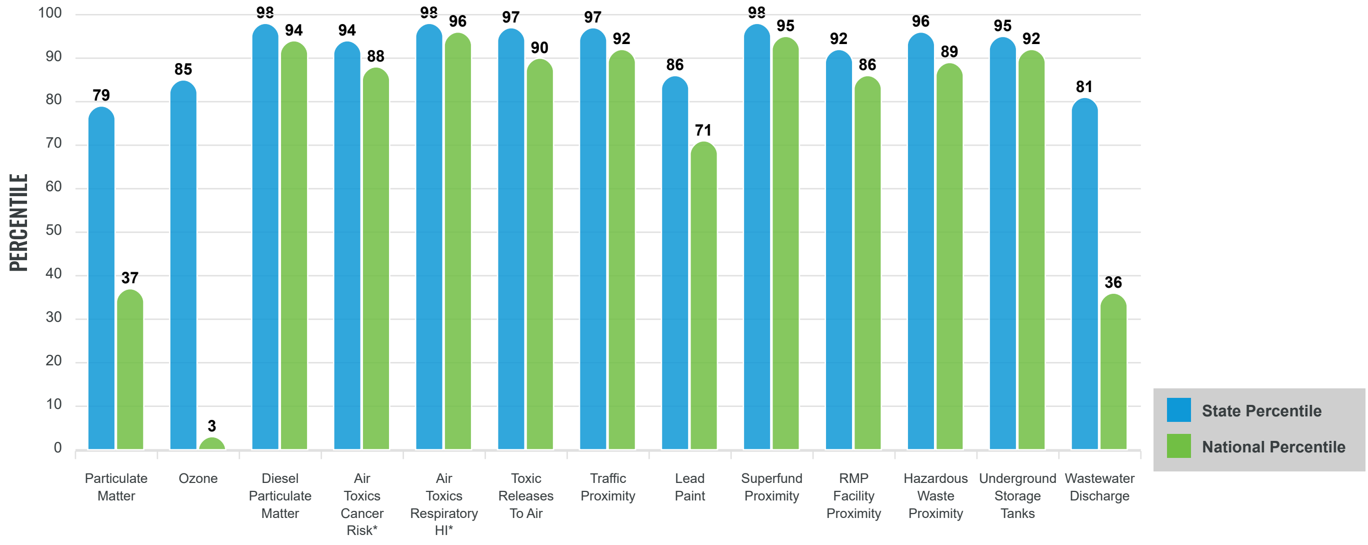
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for the User Specified Area

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu g/m^3$)	6.85	7.02	41	8.08	17
Ozone (ppb)	49.6	49.8	51	61.6	1
Diesel Particulate Matter ($\mu g/m^3$)	0.565	0.355	88	0.261	93
Air Toxics Cancer Risk* (lifetime risk per million)	30	27	37	25	52
Air Toxics Respiratory HI*	0.52	0.39	74	0.31	92
Toxic Releases to Air	2,200	1,800	80	4,600	74
Traffic Proximity (daily traffic count/distance to road)	470	190	91	210	89
Lead Paint (% Pre-1960 Housing)	0.21	0.23	60	0.3	49
Superfund Proximity (site count/km distance)	1.7	0.18	99	0.13	99
RMP Facility Proximity (facility count/km distance)	0.33	0.4	69	0.43	69
Hazardous Waste Proximity (facility count/km distance)	2.6	1.6	81	1.9	78
Underground Storage Tanks (count/km^2)	10	6.3	81	3.9	88
Wastewater Discharge (toxicity-weighted concentration/m distance)	1.3E-05	0.024	51	22	18
SOCIOECONOMIC INDICATORS					
Demographic Index	59%	28%	94	35%	82
Supplemental Demographic Index	23%	12%	93	14%	85
People of Color	72%	32%	94	39%	79
Low Income	45%	24%	87	31%	75
Unemployment Rate	7%	5%	73	6%	70
Limited English Speaking Households	13%	4%	91	5%	88
Less Than High School Education	26%	8%	94	12%	88
Under Age 5	9%	6%	82	6%	82
Over Age 64	6%	16%	14	17%	13
Low Life Expectancy	19%	18%	66	20%	50

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund	1
Hazardous Waste, Treatment, Storage, and Disposal Facilities	1
Water Dischargers	13
Air Pollution	2
Brownfields	1
Toxic Release Inventory	2

Other community features within defined area:

Schools	2
Hospitals	0
Places of Worship	2

Other environmental data:

Air Non-attainment	No
Impaired Waters	No

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for the User Specified Area

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	19%	18%	66	20%	50
Heart Disease	4.9	5.3	39	6.1	26
Asthma	11.1	10.5	71	10	81
Cancer	4.7	6.3	14	6.1	21
Persons with Disabilities	10.8%	13.1%	37	13.4%	37

CLIMATE INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	1%	11%	22	12%	17
Wildfire Risk	0%	12%	0	14%	0

CRITICAL SERVICE GAPS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	7%	9%	52	14%	34
Lack of Health Insurance	15%	6%	95	9%	85
Housing Burden	Yes	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	Yes	N/A	N/A	N/A	N/A

Footnotes

Report for the User Specified Area

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix F: Section 4(f) and Section 6(f) Assessment

SOUND TRANSIT
TRANSIT
140A
Link
154B
SOUND

Federal Transit Administration

SOUNDTRANSIT

June 2024

Table of Contents

1 INTRODUCTION AND REGULATORY FRAMEWORK ... F-1
- 1.1 Study Area ... F-1
- 1.2 Section 4(f) "Uses" ... F-2
- 1.3 Approval of Projects That Use Section 4(f) Property ... F-2
- 1.4 Avoidance Alternatives and Least Harm Analysis ... F-3

2 PROPOSED ACTION ... F-4

3 SECTION 4(F) RESOURCES ... F-5
- 3.1 Public Parks and Recreation Areas ... F-5
  - 3.1.1 Preferred and South 344th Street Alternatives ... F-5
  - 3.1.2 Midway Alternative ... F-6
- 3.2 Wildlife and Waterfowl Refuges ... F-6
- 3.3 Historic Sites ... F-9

4 PROJECT IMPACTS AND POTENTIAL MITIGATION ... F-10
- 4.1 Impacts ... F-10
- 4.2 Mitigation ... F-11

5 RECORD OF COORDINATION ... F-12

6 CONCLUSION ... F-13

Figures

Figure F.3-1 Section 4(f) Resources: Preferred Alternative and South 344th Street Alternative ... F-7

Figure F.3-2 Section 4(f) Resources: Midway Landfill Alternative ... F-8

Tables

Table F.4-1 Public Parks and Recreational Properties Reviewed for Section 4(f) Eligibility: Preferred and South 344th Street Alternatives ... F-11

Table F.4-2 Public Parks and Recreational Properties Reviewed for Section 4(f) Eligibility: Midway Landfill Alternative ... F-11

Acronyms and Abbreviations

APE	area of potential effect
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transportation Administration
LRV	light rail vehicle
NHPA	National Historic Preservation Act of 1966
NRHP	National Register of Historic Places
OMF South	Operations and Maintenance Facility South
RCO	Washington State Recreation and Conservation Office
SHPO	State Historic Preservation Officer
Sound Transit	Central Puget Sound Regional Transit Authority
U.S.C.	U.S. Code

1 INTRODUCTION AND REGULATORY FRAMEWORK

The regulations at Title 23 of the Code of Federal Regulations (CFR), part 774 implement Title 23 of the U.S. Code (U.S.C.) section 138 and Title 49 of the U.S. Code section 303, which were originally enacted as Section 4(f) of the Department of Transportation Act of 1966 and are still commonly referred to as Section 4(f). Under these laws, the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) are generally prohibited from approving projects that would use land from:

> *…a significant publicly-owned park, recreation area or wildlife and waterfowl refuge or any significant historic site, unless there is no feasible and prudent alternative to the use of land from the property and the action includes all possible planning to minimize harm to the property resulting from the use.*

A use is generally defined as a transportation activity that permanently or temporarily acquires land from a Section 4(f) property or that substantially impairs the important activities, features, or attributes that qualify the property as a Section 4(f) resource.

Section 4(f) applies to publicly owned parks and recreation areas that are open to the public; publicly owned wildlife and waterfowl refuges; and historic sites of national, state, or local significance. The Department of Transportation regulations for Section 4(f) define historic properties sites as those properties listed in or eligible for the National Register of Historic Places (NRHP).

This evaluation identifies potential Section 4(f) resources that may be used by the Operations and Maintenance Facility (OMF) South and any associated impacts to those resources. Other disciplines considered in this analysis include Transportation, Acquisitions, Displacements, and Relocations; Land Use; Visual and Aesthetic Resources; Noise and Vibration; Historic and Archaeological Resources; and Parks and Recreational Resources. A discussion of the affected environment, adverse impacts, and potential mitigation measures for each of these is found in Chapter 3 of the OMF South Final Environmental Impact Statement (EIS).

This appendix also considers any impacts under Section 6(f) of the 1965 Land and Water Conservation Fund Act of 1965 (54 U.S.C. section 2003), which prohibits the conversion of properties developed with funding from the Land and Water Conservation Fund to a nonrecreational purpose without approval of the U.S. Department of the Interior's National Park Service. Similar to Section 6(f), documentation and consultation are also required to approve any changes to or conversion of properties directly funded by the Washington State Recreation and Conservation Office (RCO; Title 79A Revised Code of Washington).

1.1 Study Area

The study area for this analysis is the same as the Parks and Recreational Resources analysis used in the Final EIS (Section 3.17), which encompasses the area of potential effect (APE) used for the Historic and Archaeological Resources analysis (Section 3.16).

The Parks and Recreational Resources study area includes existing parks, trails, recreation sites, dedicated open space areas, and adjacent public rights-of-way used for access to these facilities within 0.25 mile of each OMF South site. The study area is of a sufficient size to capture potential impacts from the construction and operation of the OMF South build alternatives (for example, visual effects or noise impacts) that could affect uses of 4(f) resources.

No 6(f) resources or designated wildlife and waterfowl refuges of national, state, or local significance have been identified in the study area. As a result, these resources are not discussed further.

The APE extends from the project elements (mainline, OMF sites, and construction staging areas) to the nearest tax parcel, or a maximum of 200 feet where large tax parcels are adjacent to project elements.

1.2 Section 4(f) "Uses"

Under Section 4(f), a use can be permanent, temporary, or constructive. **Permanent use** would acquire or incorporate all or part of a Section 4(f) property as part of the transportation facility.

Temporary use occurs when the project temporarily occupies any portion of the resource (typically during construction) and substantially impairs the resources. If all the conditions listed below are met, a temporary occupancy of land is not considered to constitute a use under Section 4(f):

- The project would occupy the property less than the time needed for the construction of the project and there will be no change in ownership;
- There are minimal changes to the Section 4(f) resource;
- There are no permanent adverse physical changes or interference with protected activities, features, or attributes of the resource;
- The land is restored to the same or better condition; and
- The federal, state, or local officials with jurisdiction over the resource and the authority over the land agree in writing that the use is not adverse.

Constructive use can occur when the project is near a Section 4(f) resource and has effects that substantially impair the protected activities, features, or attributes of the property. For example, a park property that is primarily a scenic viewpoint could have a constructive use if a transportation project blocks its views.

1.3 Approval of Projects That Use Section 4(f) Property

Although the use of Section 4(f) property is generally prohibited, a transportation use of a Section 4(f) property can be approved if:

- The use of the property meets the requirements for a regulatory exception established under Section 4(f). For instance, a temporary use can be allowed if it meets the temporary occupancy requirements described above,

Or:

- The use will have a *de minimis* impact on the property

Or:

- There is no feasible and prudent avoidance alternative to using the property

And:

- The program or project includes all possible planning to minimize harm to the property resulting from the use.

De minimis impacts are those that do not “adversely affect the activities, features, and attributes” of a Section 4(f) resource. A *de minimis* impact finding can consider any mitigation or enhancement measures that would be implemented, including design measures to avoid or reduce impacts. Before FTA can make this finding, it must send a written notice to the official with jurisdiction over the resource and there must be an opportunity for public notice and comment.

For public parks or recreation properties, a *de minimis* impact finding requires written concurrence from the official with jurisdiction over the property, such as a city or county parks department. There must also be an opportunity for public notice and comment.

For historic and archaeological sites eligible under National Register of Historic Places criteria A, B, or C, a *de minimis* impact finding is allowed if FTA has made a “no adverse effect” [1] finding in compliance with Section 106 of the National Historic Preservation Act of 1966 (see Section 3.16 of the Final EIS, Historic and Archaeological Resources.). Before making a *de minimis* finding, FTA must send a written notice to the State Historic Preservation Office. If the State Historic Preservation Office concurs or does not object, FTA may proceed with its finding. When FTA has made a *de minimis* determination, the project is not required to analyze avoidance alternatives for that Section 4(f) property.

1.4 Avoidance Alternatives and Least Harm Analysis

If a project’s Section 4(f) use is greater than *de minimis*, FTA is required to consider whether there are feasible and prudent alternatives that would avoid the use. Section 4(f) defines a feasible alternative as an alternative that could be built as a matter of sound engineering judgment. An alternative is prudent if:

- It meets the project purpose and need;
- It would not compromise the project to a degree that makes it unreasonable to proceed in light of its stated purpose and need;
- It would not cause extraordinary operational or safety problems;
- It would not cause any other unique problems or severe economic or environmental impacts;
- It would not cause extraordinary community disruption;
- The construction costs would not be of an extraordinary magnitude; and
- There are no other factors that collectively have adverse impacts that present unique problems or reach extraordinary magnitudes.

If the FTA finds that an alternative causes a Section 4(f) use and there is another alternative that is feasible and prudent, then the alternative that causes a Section 4(f) use must be removed from consideration. But if there are no prudent and feasible alternatives that can avoid all Section 4(f) resources, then FTA must choose the alternative that will have the least overall harm in light of the statute’s preservation purpose. This is called the Least Harm Analysis.

---

[1] An adverse effect to an archaeological site eligible for the National Register of Historic Places only under criterion D is not considered a use under Section 4(f) evaluation.

2 PROPOSED ACTION

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct and operate OMF South to meet agency needs for an expanded fleet of light rail vehicles (LRVs) identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). The OMF South project would be used to store, maintain, and deploy approximately 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which is the Federal Way Link Extension. The length and location of these connecting tracks varies by alternative.

Three site alternatives for the proposed project are evaluated in the Final EIS: two in Federal Way and one in Kent. These alternatives are named the Preferred Alternative, South 344th Street Alternative, and Midway Landfill Alternative, respectively.

3 SECTION 4(F) RESOURCES

This Section 4(f) assessment identified and considered potential impacts to publicly owned parks and recreation areas within 0.25 mile of each OMF South build alternative. NRHP-eligible historic properties in the area of impact were also evaluated.

Sound Transit's Section 4(f) evaluation is also informed by the research and coordination for Section 106 of the National Historic Preservation Act of 1966 (NHPA), as described in Section 3.16 of the Final EIS, and the Parks and Recreational Resources analysis (Section 3.17), which identify important features, qualities, and characteristics of potential Section 4(f) resources.

Parks and recreational resources within the study area that potentially qualify as Section 4(f) resources are shown on Figures F.3-1 and F.3-2 and listed in Tables F.4-1 and F.4-2 below. With the exception of the Bonneville Power Association's (BPA's) Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, no previously identified historic period built environmental resources have been listed or found eligible for listing in the Washington Heritage Register and NRHP.

3.1 Public Parks and Recreation Areas

3.1.1 Preferred and South 344th Street Alternatives

Sound Transit identified two parks within the Parks and Recreational Resources study area for the Preferred and the South 344th Street alternatives that qualify as Section 4(f) properties: Cedar Grove Park and Town Square Park. The Pacific Rim Bonsai Museum and Rhododendron Species Foundation and Botanical Garden, located within the study area of the Preferred and the South 344th Street alternatives, would not qualify as a Section 4(f) property because it is owned by a nonprofit organization. In any case, there would be no impacts from the project on this property.

3.1.1.1 Cedar Grove Park, Federal Way

Cedar Grove Park is a 2.7-acre neighborhood park managed by the Federal Way Parks Department. It includes a playground, picnic facilities, grassy open space, paved trails, and a half-court basketball court. It is primarily surrounded by single-family residential homes, buffered by large trees and vegetation, and is accessible via S 333rd Street and various paths through the adjacent neighborhood.

3.1.1.2 Town Square Park, Federal Way

Town Square Park is a 4.1-acre community park constructed in 2014 in the Federal Way City Center and managed by the Federal Way Parks Department. This property is bounded by S 316th Street to the north, 20th Avenue S to the west, 21st Avenue S to the east, and a private parcel to the south. Federal Way improved the park in 2016 to make some features more permanent and add other features requested by the public. The park includes a track zip ride, children's play area, basketball court, parking, picnic area, restrooms, and a seasonal splash park. Federal Way considers Town Square Park to be a recreational resource of local significance, and therefore the park is being considered a Section 4(f) property.

3.1.2 Midway Alternative

In the Parks and Recreational Resources study area for the Midway Landfill Alternative, Sound Transit identified four developed parks and one public open space that qualify as Section 4(f) properties.

3.1.2.1 Parkside Park, Des Moines

Parkside Park is a 4.4-acre neighborhood park managed by Des Moines Parks and Recreation. The park features a paved trail system that is accessible per the American with Disabilities Act, providing access to all portions of the park. It also has a multiuse paved sport court, fitness equipment, picnic tables, and benches. Mature trees frame the central open lawn and active recreation areas. The park is located at 2518 S 244th Street in Des Moines.

3.1.2.2 Parkside Wetlands, Des Moines

Parkside Wetlands is a 14-acre natural area managed by Des Moines Parks and Recreation. The park includes trails that are interspersed within a dense mix of deciduous and coniferous forest and wetlands. This park is adjacent to Parkside Park on 26th Avenue S in Des Moines.

3.1.2.3 Salt Air Vista Park, Kent

This 2-acre neighborhood park is bordered by the Parkside wetlands on the west and is managed by Kent Parks. It features play equipment, a picnic area, open space, and trails. The park is located at 24615 26th Place S in Kent. It is two blocks west of SR-99. The park was recently renovated and reopened in May 2023.

3.1.2.4 Linda Heights Park, Kent

Linda Heights Park is a 4.2-acre park managed by Kent Parks. It features a half-court basketball, picnic table, play equipment, and public art. The park is adjacent to and east of I-5 and is buffered from the freeway by a wide stand of mature mixed forest. It is an RCO-funded park.

3.1.2.5 West Hill Park, Kent

West Hills Park is a 13-acre site owned by the city of Kent. It is undeveloped with no facilities. The park is adjacent to the Kent Armory and is composed of a grassy field and dense vegetation near the headwaters of Midway Creek.

All existing and designated parks and recreational properties that were reviewed for potential Section 4(f) eligibility are listed in Tables F.4-1 and F.4-2 in Section 4.1 below and shown on Figures F.3-1 and F.3-2.

3.2 Wildlife and Waterfowl Refuges

No designated wildlife and waterfowl refuges of national, state, or local significance exist in the study area.

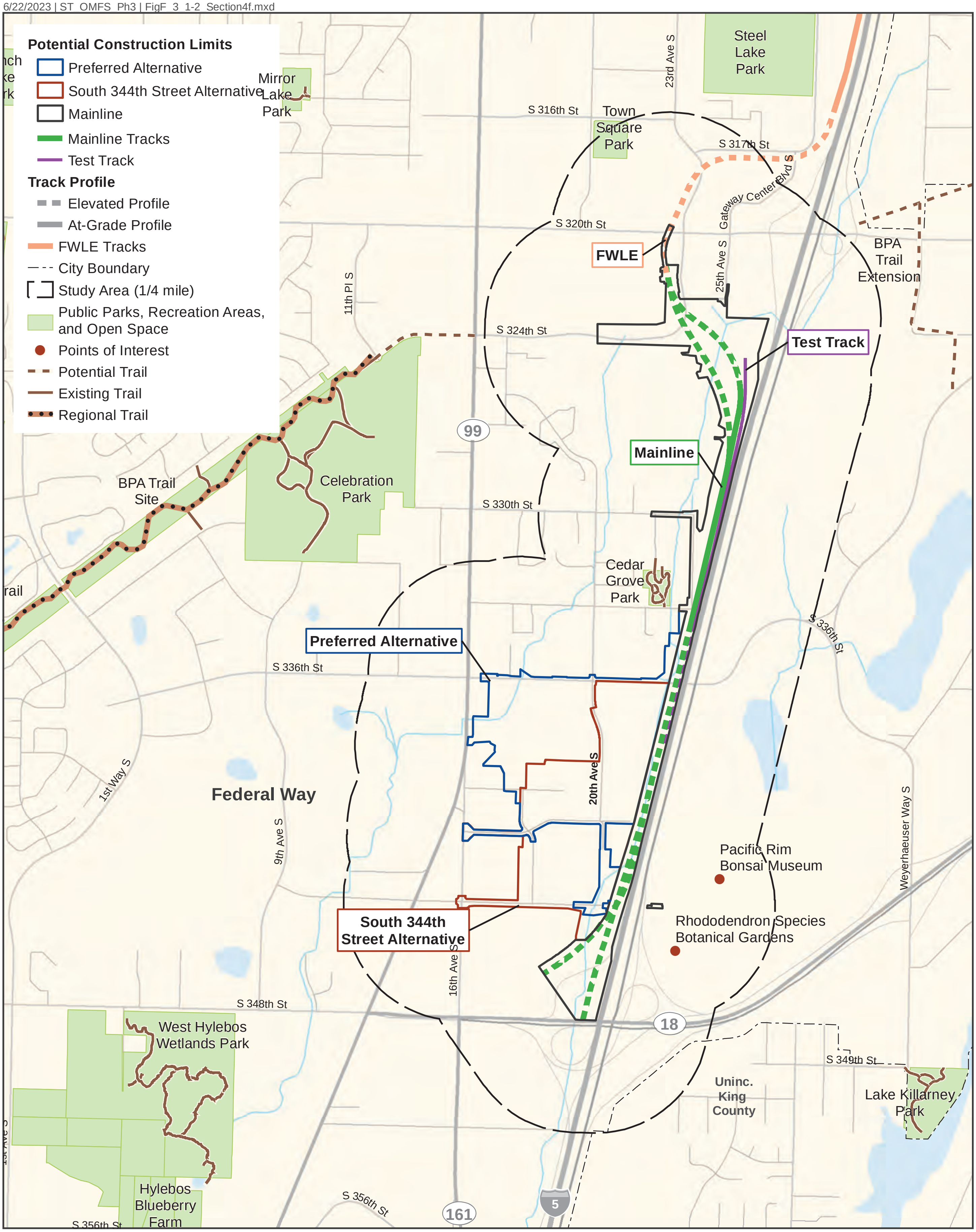

Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Study Area (1/4 mile)
Public Parks, Recreation Areas, and Open Space
Points of Interest
Potential Trail
Existing Trail
Regional Trail
Mirror Lake Park
Steel Lake Park
Town Square Park
S 316th St
23rd Ave S
S 317th St
Gateway Center Blvd S
S 320th St
FWLE
25th Ave S
BPA Trail Extension
11th Pl S
S 324th St
Test Track
99
Mainline
BPA Trail Site
Celebration Park
S 330th St
Cedar Grove Park
Preferred Alternative
S 336th St
S 336th St
1st Way S
Federal Way
9th Ave S
20th Ave S
Pacific Rim Bonsai Museum
Weyerhaeuser Way S
Rhododendron Species Botanical Gardens
South 344th Street Alternative
16th Ave S
S 348th St
18
West Hylebos Wetlands Park
S 349th St
Uninc. King County
Lake Killarney Park
Hylebos Blueberry Farm
S 356th St
S 356th St
161
5
N
0
1,000
2,000 Feet

FIGURE F.3-1
Parks and Recreational Resources
Preferred and South 344th Street Alternatives

OMF South

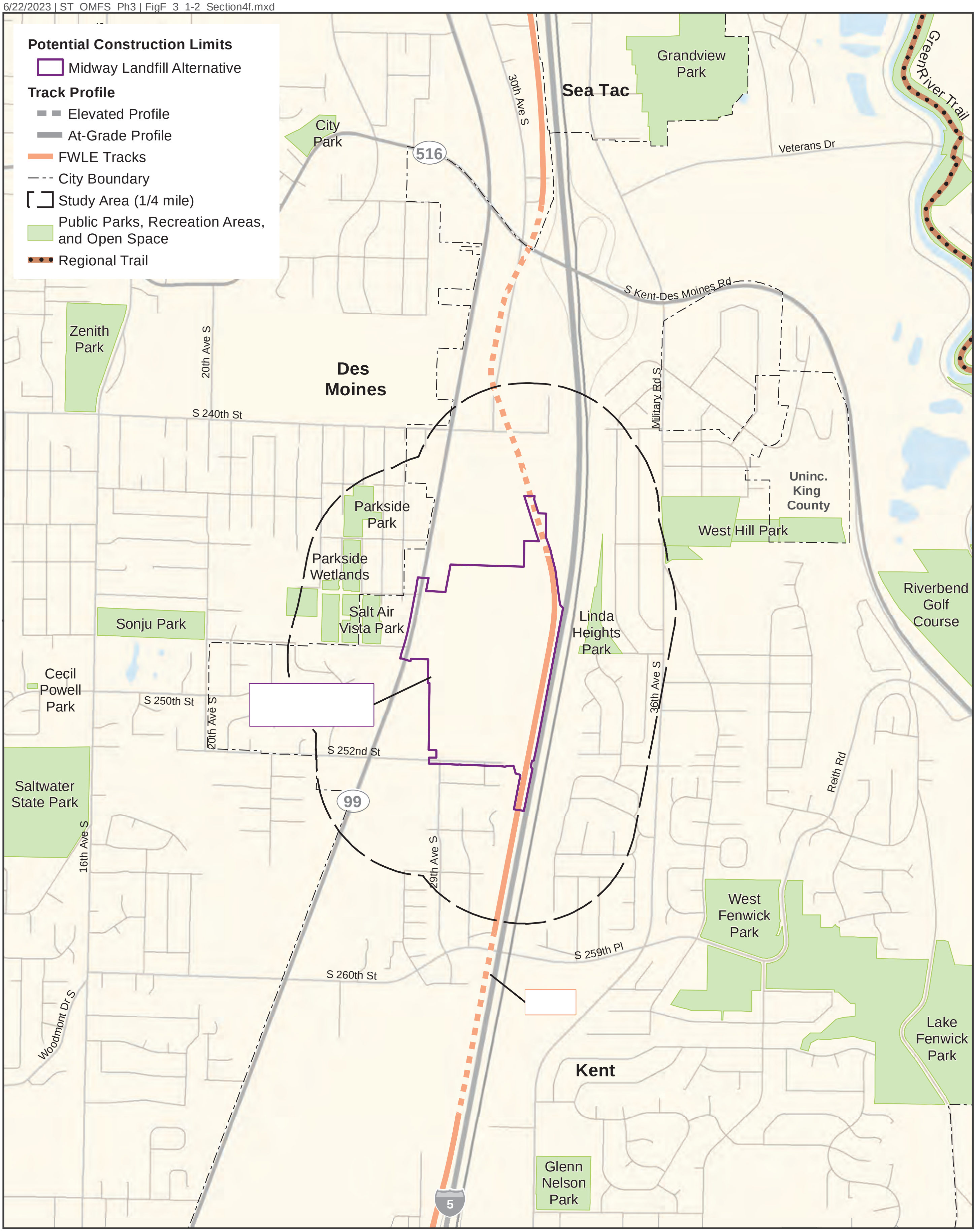

Potential Construction Limits
Midway Landfill Alternative
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Study Area (1/4 mile)
Public Parks, Recreation Areas, and Open Space
Regional Trail
Grandview Park
Green River Trail
Sea Tac
30th Ave S
City Park
516
Veterans Dr
S Kent-Des Moines Rd
Zenith Park
20th Ave S
Des Moines
Military Rd S
S 240th St
Uninc. King County
West Hill Park
Parkside Park
Parkside Wetlands
Salt Air Vista Park
Riverbend Golf Course
Sonju Park
Linda Heights Park
Cecil Powell Park
S 250th St
20th Ave S
36th Ave S
S 252nd St
Reith Rd
Saltwater State Park
99
16th Ave S
29th Ave S
West Fenwick Park
S 259th Pl
S 260th St
Woodmont Dr S
Lake Fenwick Park
Kent
Glenn Nelson Park
5
N
0
1,000
2,000 Feet

FIGURE F.3-2

Parks and Recreational Resources
Midway Landfill Alternative

OMF South

3.3 Historic Sites

Evaluation of historic sites under Section 4(f) relates directly to evaluation of resources and impacts through the NHPA Section 106 process, the method by which a cultural resource's significance is determined for a federal undertaking. The results of the Section 106 analysis are a critical part of determining the applicability and outcome of the Section 4(f) use determination. Historic sites protected under Section 4(f) include “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.”

Section 3.16 of the Final EIS, Historic and Archaeological Resources, provides information on historic properties in the OMF South build alternatives APE. A total of 86 historic-period, built-environment resources were surveyed in the APE, of which 58 resources were old enough to meet minimum age criteria for NRHP eligibility consideration. Based on the survey results, FTA determined that there are two resources (Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines) that are eligible for listing in the NRHP in the APE. See Appendix G4, Historic and Archaeological Resources Technical Report, of the Final EIS for the correspondence from FTA and DAHP.

In 2020, BPA conducted its own Section 106 consultation with the State Historic Preservation Officer (SHPO) for the relocation of electrical transmission towers within the OMF South APE that would be impacted by the project. These towers included those along the Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. BPA also determined that the transmission lines were eligible for listing in the NRHP, a finding with which SHPO concurred with in a letter dated August 19, 2021 (See Appendix G4).

4 PROJECT IMPACTS AND POTENTIAL MITIGATION

This section summarizes the potential impacts to Section 4(f) properties in the study areas for the OMF South project alternatives. Impacts include acquisition and conversion of properties to a transportation use, changes to access to a Section 4(f) property, and proximity impacts that could impair use of the property (which federal regulations refer to as a "constructive use"). Where this evaluation concludes there will be no Section 4(f) use, it means the project alternatives would not adversely affect Section 4(f) resources.

4.1 Impacts

The following analyses from the Final EIS were reviewed to determine whether project alternatives would result in a Section 4(f) use: Transportation (Section 3.2), Acquisitions, Displacements and Relocations (Section 3.3), Visual and Aesthetics (Section 3.7), Noise and Vibration (Section 3.9), Historic and Archaeological Resources (Section 3.16), and Parks and Recreational Resources (Section 3.17).

The mainline for the Preferred and South 344th Street alternatives would require the relocation of BPA powerlines. FTA and BPA determined, and SHPO concurred, that raising the transmission lines to accommodate the OMF South project would have no adverse effect on historic properties under Section 106. Due to this, FTA has determined that the Preferred and South 344th Street alternatives would have a *de minimis* impact under Section 4(f).

All other Section 4(f) resources are far enough away (300 feet or more) from the OMF South site alternatives and mainline that they would not experience any proximity-related impacts from the operation of OMF South. While LRVs travelling along the mainline could cause moderate noise impacts to some adjacent residents, those impacts would be mitigated, and would not affect 4(f) resources farther away.

The following minor, temporary effects to potential Section 4(f) resources in the study area may occur:

- Construction of the mainline tracks for the Preferred and South 344th Street alternatives could impact sensitive receptors within 250 feet of daytime pile driving activities, which may be necessary for construction of the elevated mainline. The project would require some utility locations on S 333rd Street, which borders Cedar Grove Park to the south. During construction, S 333rd Street could be affected by detour or lane closures east of the park, but the park would still be accessible from the west or north.
- For the Midway Landfill Alternative, there would be an increase in the number of construction truck trips along SR 99 and I-5, which border the site on the west and east, respectively, and are located between the site and the parks. The number of truck trips would vary depending on the subsurface design option, but it is expected that park properties would experience limited construction effects due to the existing traffic, noise, vibration, and visual effects from the normal operation of those roadways.
- It is possible some parks in the study area could be exposed to construction vehicle emissions, airborne dust, and noise impacts during construction. However, these effects are expected to be minor and temporary since the project would be held to comply with construction best management practices and permit conditions to minimize and control dust and vehicle emissions and to comply with local noise ordinances.
- Cedar Grove Park within the Preferred and South 344th Street alternative study area would be within the closest proximity to construction activities, at approximately 300 feet from

mainline construction, just beyond the range of noise impacts from pile driving activities, which may be necessary for construction of the elevated mainline. While construction noise and activities would be perceptible from the park, the impacts would be temporary and transitory in nature, and would not prevent use of the playground, basketball court, or other amenities that make the park an eligible 4(f) resource. The other parks, as mentioned above, would be outside the range of impacts described in the Final EIS or separated from the site by SR-99 and I-5, which would provide effective buffers from construction activities.

Based on review of these analyses in the Final EIS, none of the alternatives would require any land from any of the park properties for either construction or operation of OMF South, and no construction activities or operational activities of the project would rise to the level of a permanent, temporary, or constructive use under Section 4(f).

Because no wildlife or waterfowl refuges are in the study area, no such resources would be impacted.

Tables F.4-1 and F.4-2 list the park properties within the study area of the build alternatives, including the preliminary Section 4(f) determination.

Table F.4-1 Public Parks and Recreational Properties Reviewed for Section 4(f) Eligibility: Preferred and South 344th Street Alternatives

Park/Resource and Ownership	Size (acres)	Type or Function	Facilities	Potential Section 4(f) Resource	Section 4(f) Determination
Cedar Grove Park, City of Federal Way	2.6	Developed park	Trail walking, nature viewing, picnic area, play area	Yes	No use
Town Square Park, City of Federal Way	3.9	Developed park	Play areas, basketball, picnic area, splash park	Yes	No use
Pacific Rim Bonsai Museum and Rhododendron Botanical (privately owned)	22	Developed park	Walking, scenic viewing	No	Privately owned; Section 4(f) does not apply

Table F.4-2 Public Parks and Recreational Properties Reviewed for Section 4(f) Eligibility: Midway Landfill Alternative

Park/Resource and Ownership	Size (acres)	Type or Function	Facilities	Potential Section 4(f) Resource	Section 4(f) Determination
Parkside Park, City of Des Moines	4.4	Developed park	Trail walking, multiuse sport court, fitness equipment, picnic tables and benches	Yes	No use
Parkside Wetlands, City of Des Moines	14	Developed park	Trail walking, nature viewing	Yes	No use
Salt Air Vista Park, City of Kent	2	Developed park	Trail walking, play equipment, picnic area, open space	Yes	No use
Linda Heights Park, City of Kent	4.2	Developed park	1/2 court basketball, picnic table, play equipment, open space	Yes	No use
West Hill Park, City of Kent	13	Undeveloped	Grassy field, no facilities	Yes	No use

4.2 Mitigation

As no impacts to Section 4(f) properties have been identified, no mitigation measures are anticipated.

5 RECORD OF COORDINATION

In letters to SHPO and BPA dated October 27, 2023, FTA determined that there would be no adverse effect to the BPA power lines, and disclosed that FTA was considering a *de minimis* impact finding under Section 4(f). SHPO concurred with FTA’s no adverse effect determination and acknowledged FTA’s Section 4(f) *de minimis* impact determination in a letter dated October 31, 2023. These correspondences are in Appendix G4, Historic and Archaeological Resources Technical Report, of the Final EIS. No other Section 4(f) properties would be affected. Due to this, no other formal consultation between FTA, Sound Transit, and agencies with jurisdiction over the Section 4(f) properties in the study area has occurred.

6 CONCLUSION

Section 4(f): Based on the analysis in the Final EIS, there would be a *de minimis* impact to the BPA powerlines with the Preferred and South 344th Street alternatives. None of the alternatives would require any land from any other Section 4(f) properties for either construction or operation of OMF South, and no other impacts would rise to the level of a Section 4(f) use. Because none of the alternatives would have more than a *de minimis* use on Section 4(f) properties, no mitigation for these individual properties is proposed.

Section 6(f): No 6(f) resources or designated wildlife and waterfowl refuges of national, state, or local significance have been identified in the study area. As a result, no mitigation for these resources is proposed.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix H: Supporting Information for Other Technical Analyses

Federal Transit Administration

SOUNDTRANSIT

June 2024

Appendix H: Supporting Information for Other Technical Analyses

Appendix H1	Potentially Affected Parcels
Appendix H2	Land Use Technical Appendix
Appendix H3	Visual and Aesthetic Resources Technical Appendix
Appendix H4	Air Quality and Greenhouse Gas Emissions Technical Appendix
Appendix H5	Water Resources Technical Appendix

References

Operations and Maintenance Facility South

Appendix H1: Potentially Affected Parcels

Federal Transit Administration

SOUNDTRANSIT

Table of Contents

APPENDIX H1: POTENTIALLY AFFECTED PARCELS H1-1

Figures

Figure H1-1 Potentially Affected Parcels: Mainline Track Options H1-6
Figure H1-2 Potentially Affected Parcels: Preferred Alternative H1-7
Figure H1-3 Potentially Affected Parcels: South 344th Street Alternative H1-8
Figure H1-4 Potentially Affected Parcels: Midway Landfill Alternative H1-9

Tables

Table H1-1 Potentially Affected Parcels by Alternative H1-2

APPENDIX H1: POTENTIALLY AFFECTED PARCELS

The Operations and Maintenance Facility (OMF) South project would require property acquisitions, displacements, and relocations of existing uses. This appendix lists potentially affected parcels associated with each build alternative based on current conceptual designs and the existing conditions at the time the analysis was conducted. The properties listed and mapped in this appendix are intended to be used for comparison across alternatives and should not be interpreted as the final determination regarding property acquisitions because the list will be updated as the project design is refined. Accordingly, the number and type of displacements could vary between what is disclosed in this Draft Environmental Impact Statement and what is ultimately required.

For the purposes of this analysis, potentially affected parcels are presented as a combined number that considers two types of property acquisitions — partial and full acquisitions — described below:

- **Partial acquisitions**, which would acquire part of a parcel but not displace the current use. In some instances, businesses or residential units on a parcel would be displaced. Partial acquisitions also include permanent guideway and maintenance easements.
- **Full acquisitions**, which would acquire the full parcel and displace the current use. Full acquisitions include parcels that might not be fully needed for the project but would be affected to the extent that existing uses would be substantially impaired, such as by loss of parking or access. This includes parcels that would be acquired for construction activities, although in some cases all or part of the parcel would be available for other use or for redevelopment after construction is complete.

In addition to the potential property acquisitions, the project would also require temporary construction easements (TCEs) and use of public right-of-way, which are not listed in this appendix. TCEs would be needed for roadway improvements, culvert replacements, staging areas, construction access, and other temporary construction activities. When construction is complete, these properties would be restored to their previous conditions or better. The temporary construction activities would not substantially disrupt or permanently displace existing uses.

Property impacts were determined using King County Assessor's information and aerial imagery. Table H1-1 presents the potentially affected parcels for each of the OMF South build alternatives. The parcels listed in Table H1-1 are also shown in Figures H1-1 through H1-4, according to the alternative. Parcels are identified in the figures using Map ID numbers which were created uniquely for this project. These Map ID numbers correlate with the King County parcel ID numbers listed in Table H1-1, along with other parcel information including address and generalized land use.

Table H1-1 Potentially Affected Parcels by Alternative

Map ID	Parcel ID	Address	Generalized Land Use	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
OMF001	2222049113	XXX S 240TH ST	Vacant			X
OMF001.1	2222049228	XXX S 240TH ST	Vacant			X
OMF002	5514000060	XXX PACIFIC HWY S	Public			X
OMF004	5514000030	XXX PACIFIC HWY S	Vacant			X
OMF005	2122049046	24300 PACIFIC HWY S	Commercial			X
OMF006	2122049068	24481 32ND AVE S	Vacant			X
OMF008	2222049168	XXX S 240TH ST	Public			X
OMF009	2122049021	24650 PACIFIC HWY S	Public			X
OMF011	3602400186	24453 PACIFIC HWY S	Commercial			X
OMF012	3601800160	24615 PACIFIC HWY S	Commercial			X
OMF015	3601800165	24619 PACIFIC HWY S	Commercial			X
OMF016	3601800170	24635 PACIFIC HWY S	Vacant			X
OMF017	3601800320	24635 PACIFIC HWY S	Vacant			X
OMF018	3601800295	24645 PACIFIC HWY S	Church			X
OMF024	2122049025	3100 S 248TH ST	Public			X
OMF025	2122049006	24602 PACIFIC HWY S	Commercial			X
OMF026	2122049170	24620 PACIFIC HWY S	Commercial			X
OMF027	3601800076	24620 PACIFIC HWY S	Commercial			X
OMF028	2122049026	24800 PACIFIC HWY S	Public			X
OMF029	3601800101	24800 PACIFIC HWY S	Commercial			X
OMF030	3601800115	XXX PACIFIC HWY S	Public			X
OMF031	3601800145	24799 28TH AVE S	Public			X
OMF032	2122049033	3000 S 248TH ST	Public			X
OMF033	2122049014	2900 S 252ND ST	Public			X
OMF034	2122049055	24800 PACIFIC HWY S	Public			X
OMF035	2122049156	24805 PACIFIC HWY S	Commercial			X
OMF037	2122049117	24820 PACIFIC HWY S	Public			X
OMF043	2122049137	2926 S 252ND ST	Public			X
OMF050	1950900125	3025 S 252ND ST	Residential - Single-Family			X
OMF050.1	1950900123	XXX S 252ND ST	Vacant			X
OMF051	1950900130	3019 S 252ND ST	Residential - Single-Family			X
OMF052	1950900135	3011 S 252ND ST	Residential - Single-Family			X
OMF053	1950900140	3005 S 252ND ST	Residential - Single-Family			X
OMF054	1950900085	2947 S 252ND ST	Residential - Single-Family			X
OMF055	1950900080	2939 S 252ND ST	Residential - Single-Family			X
OMF056	1950900075	2933 S 252ND ST	Residential - Single-Family			X

Table H1-1 Potentially Affected Parcels by Alternative (continued)

Map ID	Parcel ID	Address	Generalized Land Use	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
OMF057	1950900070	2925 S 252ND ST	Residential - Single-Family			X
OMF058	1950900065	2919 S 252ND ST	Residential - Single-Family			X
OMF059	1950900060	2911 S 252ND ST	Residential - Single-Family			X
OMF060	1950900055	2905 S 252ND ST	Residential - Single-Family			X
OMF061	1950900005	25205 29TH AVE S	Residential - Single-Family			X
OMF078	1951500015	3018 S 253RD ST	Residential - Single-Family			X
OMF078.1	1951500017	XXX S 252ND ST	Vacant			X
OMF079	1951500020	3022 S 253RD ST	Residential - Single-Family			X
OMF098	7622400019	2201 S COMMONS	Commercial	X	X	
OMF099	7622400020	32320 23RD AVE S	Vacant	X	X	
OMF101	7978200526	2500 S 320TH ST	Public	X	X	
OMF102	1621049037	2101 S 324TH ST	Residential - Multi-Family	X	X	
OMF112	7978200260	33201 24TH AVE S	Vacant	X	X	
OMF121	7978200180	2245 S 333RD ST	Residential - Single-Family	X	X	
OMF125	7978200186	2253 S 333RD ST	Residential - Multi-Family	X	X	
OMF126	7978200210	2230 S 336TH ST	Residential - Single-Family	X	X	
OMF127	7978200215	2234 S 336TH ST	Residential - Single-Family	X	X	
OMF128	7978200220	2246 S 336TH ST	Residential - Single-Family	X	X	
OMF129	7978200225	2250 S 336TH ST	Residential - Single-Family	X	X	
OMF138	7978200070	1812 S 336TH ST	Commercial	X		
OMF150	2121049003	33652 20TH AVE S	Church	X	X	
OMF151	2121049004	33645 20TH AVE S	Church	X	X	
OMF152	2121049069	1641 S 336TH ST	Vacant	X		
OMF154	2121049037	33608 PACIFIC HWY S	Vacant	X		
OMF156	2121049026	33832 PACIFIC HWY S	Vacant	X		
OMF164	2121049024	1700 S 340TH ST	Church	X		
OMF165	2121049041	1724 S 340TH ST	Residential - Single-Family	X		
OMF166	2121049042	1800 S 340TH ST	Residential - Single-Family	X	X	
OMF167	2121049040	1816 S 340TH ST	Residential - Single-Family	X	X	
OMF168	2121049039	1828 S 340TH ST	Residential - Single-Family	X	X	
OMF169	2121049047	1920 S 340TH ST	Residential - Single-Family	X	X	
OMF171	3903800110	1626 S 341ST PL	Commercial	X		
OMF172	3903800140	1620 S 341ST PL	Commercial		X	

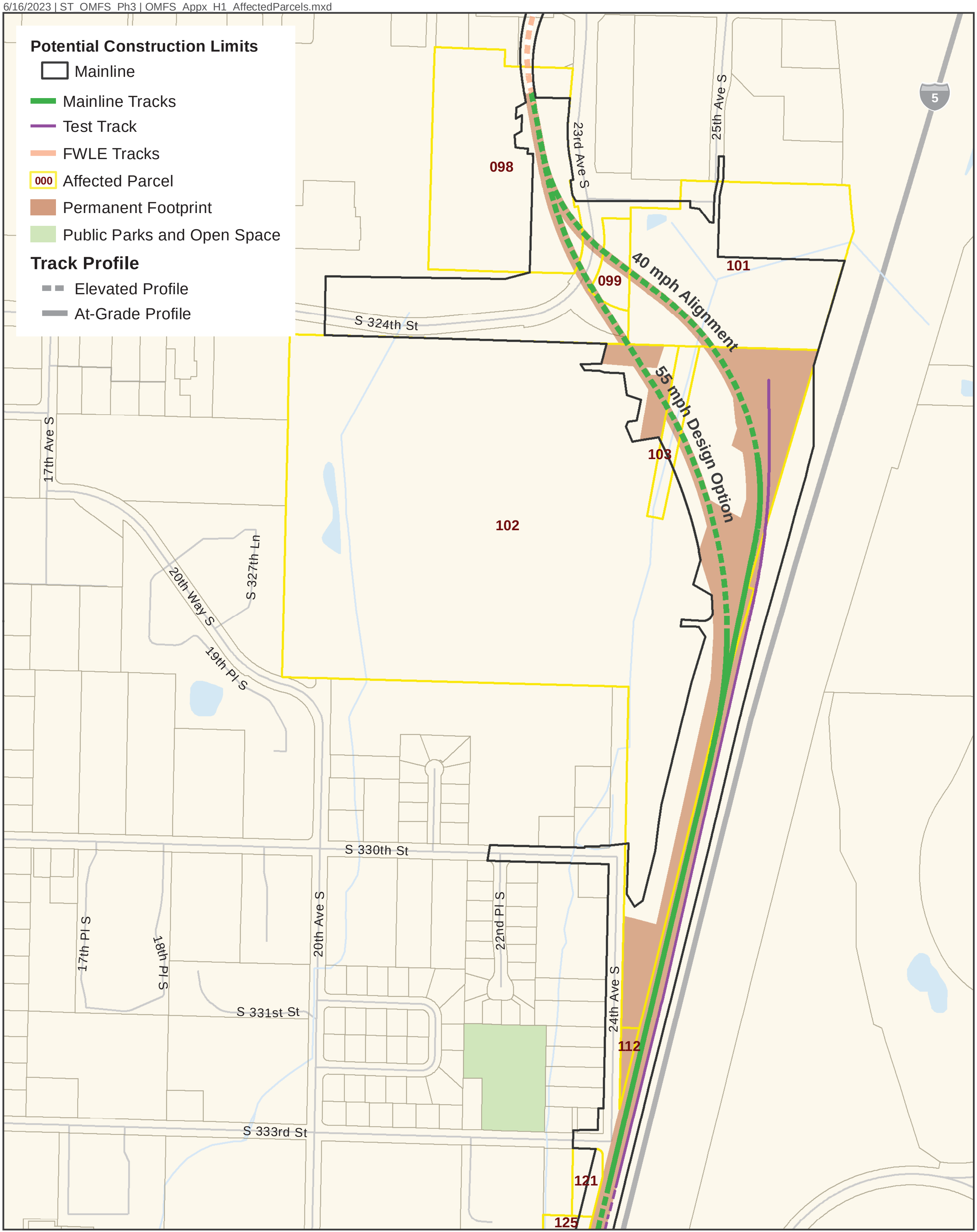
Table H1-1 Potentially Affected Parcels by Alternative (continued)

Map ID	Parcel ID	Address	Generalized Land Use	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
OMF173	3903800130	1710 S 341ST PL	Commercial		X	
OMF174	3903800120	1720 S 341ST PL	Commercial		X	
OMF175	3903800100	34008 18TH PL S	Commercial	X	X	
OMF176	3903800090	1800 S 341ST PL	Commercial	X	X	
OMF177	3903800080	1820 S 341ST PL	Commercial	X	X	
OMF178	3903800070	1908 S 341ST PL	Commercial	X	X	
OMF179	3903800060	1916 S 341ST PL	Vacant	X	X	
OMF180	2121049082	1924 S 341ST PL	Commercial	X	X	
OMF181	2121049061	2102 S 341ST PL	Commercial	X	X	
OMF182	2121049085	2110 S 341ST PL	Commercial	X	X	
OMF183	2121049033	34114 21ST AVE S	Commercial	X	X	
OMF185	2121049048	2025 S 341ST PL	Commercial		X	
OMF186	2121049060	2011 S 341ST PL	Commercial		X	
OMF187	3903800050	1925 S 341ST PL	Church		X	
OMF188	3903800040	1909 S 341ST PL	Church		X	
OMF189	3903800030	1909 S 341ST PL	Vacant		X	
OMF190	3903800020	1707 S 341ST PL	Commercial		X	
OMF191	2693300000	2010 S 344TH ST	Commercial	X	X	
OMF192	2121049072	1936 S 344TH ST	Vacant		X	
OMF193	2121049007	1934 S 344TH ST	Vacant		X	
OMF194	2121049045	1928 S 344TH ST	Commercial		X	
OMF195	2121049044	1910 S 344TH ST	Commercial		X	
OMF196	2121049056	1916 S 344TH ST	Residential - Single-Family		X	
OMF197	4129600005	34204 18TH PL S	Residential - Single-Family		X	
OMF198	4129600010	34212 18TH PL S	Residential - Single-Family		X	
OMF199	4129600015	34220 18TH PL S	Residential - Single-Family		X	
OMF200	4129600020	34228 18TH PL S	Residential - Single-Family		X	
OMF201	4129600025	34234 18TH PL S	Residential - Single-Family		X	
OMF202	4129600030	34242 18TH PL S	Residential - Single-Family		X	
OMF203	4129600035	34250 18TH PL S	Residential - Single-Family		X	
OMF204	4129600040	1824 S 344TH ST	Residential - Single-Family		X	
OMF205	4129600080	34205 18TH PL S	Residential - Single-Family		X	
OMF206	4129600075	34213 18TH PL S	Residential - Single-Family		X	
OMF207	4129600070	34221 18TH PL S	Residential - Single-Family		X	
OMF208	4129600065	34229 18TH PL S	Residential - Single-Family		X	

Table H1-1 Potentially Affected Parcels by Alternative (continued)

Map ID	Parcel ID	Address	Generalized Land Use	Preferred Alternative	South 344th Street Alternative	Midway Landfill Alternative
OMF209	4129600060	34235 18TH PL S	Residential - Single-Family		X	
OMF210	4129600055	34243 18TH PL S	Residential - Single-Family		X	
OMF211	4129600050	34251 18TH PL S	Residential - Single-Family		X	
OMF212	4129600045	34259 18TH PL S	Residential - Single-Family		X	
OMF216	2121049088	1820 S 347TH PL	Vacant	X	X	
OMF217	2121049010	34520 16TH AVE S	Commercial		X	
OMF270	3602400178	24441 PACIFIC HWY S	Commercial			X
OMF271	3602400182	24443 PACIFIC HWY S	Commercial			X
OMF597	2500900030	34404 16TH AVE S	Commercial		X	
OMF598	2500900040	34410 16TH AVE S	Commercial		X	
OMF606	3903800010	1607 S 341ST PL	Commercial	X	X	
OMF607	3903800015	1625 S 341ST PL	Commercial		X	
OMF608	3903800150	1610 S 341ST PL	Commercial	X	X	
OMF669	3601800210	24641 PACIFIC HWY S	Vacant			X

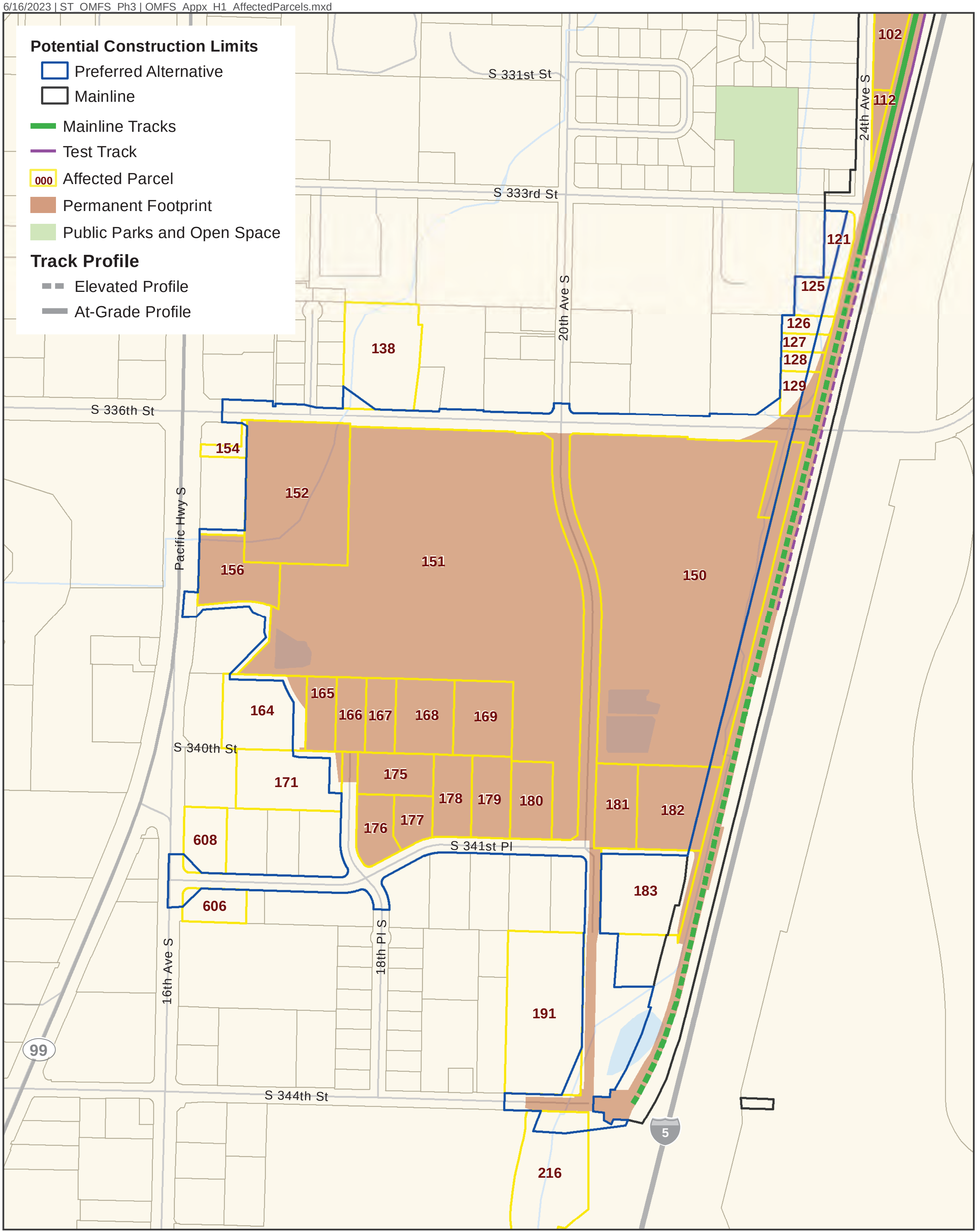
6/16/2023 | ST_OMFS_Ph3 | OMFS_Appx_H1_AffectedParcels.mxd


Potential Construction Limits
Mainline
Mainline Tracks
Test Track
FWLE Tracks
000 Affected Parcel
Permanent Footprint
Public Parks and Open Space
Track Profile
Elevated Profile
At-Grade Profile
5
23rd Ave S
25th Ave S
098
099
101
102
103
112
121
125
40 mph Alignment
55 mph Design Option
S 324th St
17th Ave S
S 327th Ln
20th Way S
19th Pl S
S 330th St
17th Pl S
18th Pl S
20th Ave S
22nd Pl S
24th Ave S
S 331st St
S 333rd St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE H1-1
Potentially Affected Parcels
Mainline Track Options

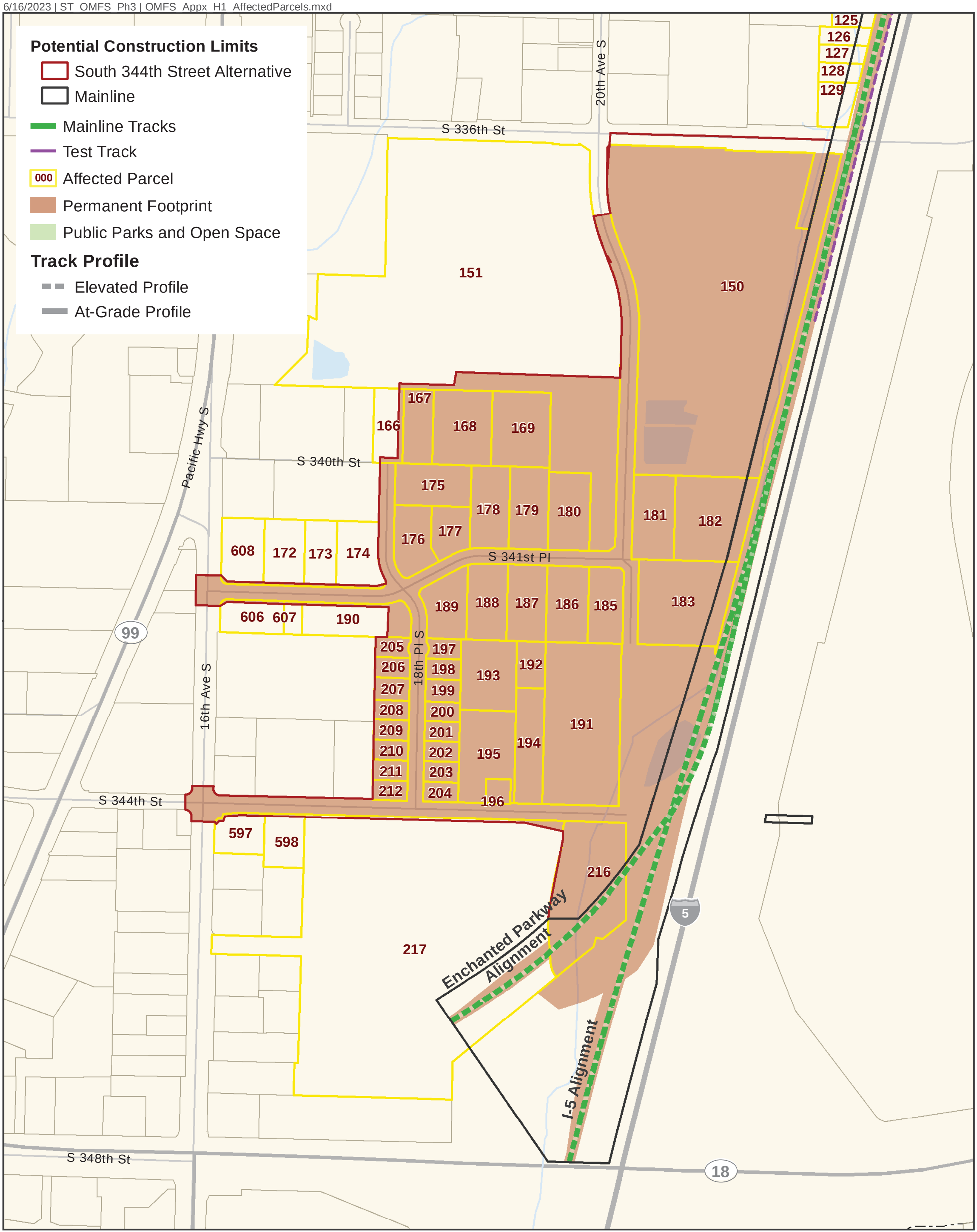
OMF South


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
000 Affected Parcel
Permanent Footprint
Public Parks and Open Space
Track Profile
Elevated Profile
At-Grade Profile
S 331st St
S 333rd St
S 336th St
S 340th St
S 341st Pl
S 344th St
24th Ave S
20th Ave S
Pacific Hwy S
16th Ave S
18th Pl S
99
5
102
112
121
125
126
127
128
129
138
150
151
152
154
156
164
165
166
167
168
169
171
175
176
177
178
179
180
181
182
183
191
216
606
608
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE H1-2
Potentially Affected Parcels
Preferred Alternative

OMF South


Potential Construction Limits
🟥 South 344th Street Alternative
☐ Mainline
Mainline Tracks
Test Track
000 Affected Parcel
Permanent Footprint
Public Parks and Open Space
Track Profile
Elevated Profile
At-Grade Profile
125
126
127
128
129
20th Ave S
S 336th St
151
150
167
166
168
169
S 340th St
Pacific Hwy S
175
178
179
180
181
182
176
177
608
172
173
174
S 341st Pl
189
188
187
186
185
183
606
607
190
99
205
206
207
208
209
210
211
212
197
198
199
200
201
202
203
204
18th Pl S
193
192
191
195
194
196
16th Ave S
S 344th St
597
598
216
217
5
Enchanted Parkway Alignment
I-5 Alignment
S 348th St
18

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

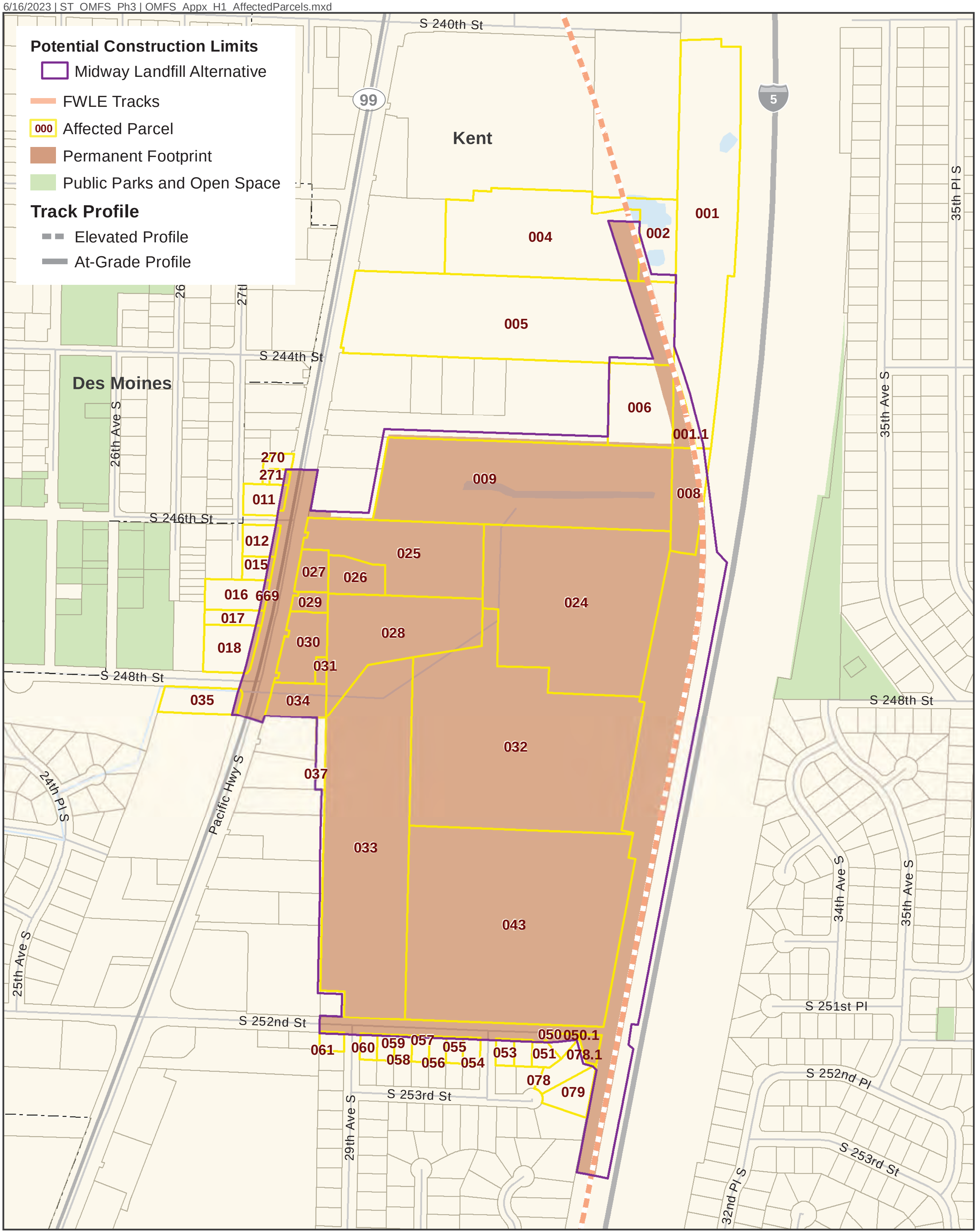
FIGURE H1-3
Potentially Affected Parcels
South 344th Street Alternative

N

0 500 1,000 Feet

OMF South

6/16/2023 | ST_OMFS_Ph3 | OMFS_Appx_H1_AffectedParcels.mxd


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
000 Affected Parcel
Permanent Footprint
Public Parks and Open Space
Track Profile
Elevated Profile
At-Grade Profile
S 240th St
99
5
Kent
Des Moines
S 244th St
S 246th St
S 248th St
S 252nd St
S 253rd St
S 251st Pl
S 252nd Pl
Pacific Hwy S
26th Ave S
25th Ave S
24th Pl S
29th Ave S
32nd Pl S
34th Ave S
35th Ave S
35th Pl S
26
27th
001
002
004
005
006
001.1
008
009
011
012
015
016
669
017
018
024
025
026
027
028
029
030
031
032
033
034
035
037
043
050
050.1
051
053
054
055
056
057
058
059
060
061
078
078.1
079
270
271

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE H1-4
Potentially Affected Parcels
Midway Landfill Alternative

OMF South

Operations and Maintenance Facility South

Appendix H2:
Land Use Technical Appendix

Federal Transit Administration

SOUNDTRANSIT

Table of Contents

APPENDIX H2: LAND USE TECHNICAL APPENDIX H2-1
- 1.1 Methods H2-1
  - 1.1.1 Data Sources H2-1
- 1.2 Resources and Regulatory Requirements H2-1
  - 1.2.1 State and Regional H2-1
  - 1.2.2 Local H2-2
- 1.3 Affected Environment H2-3
  - 1.3.1 Preferred and South 344th Street Alternatives H2-3
  - 1.3.2 Midway Landfill Alternative H2-4
- 1.4 Land Use Tables H2-5
  - 1.4.1 Study Area Zoning H2-5
  - 1.4.2 City of Federal Way and City of Kent Zoning and Permitted Land Use H2-8
  - 1.4.3 Comprehensive Plan Policy Consistency H2-12

TABLES

Table H2-1 Preferred and South 344th Street Alternatives Zones Description and Consistency H2-5

Table H2-2 Midway Landfill Alternative Zones Description and Consistency H2-6

Table H2-3 City of Federal Way Zoning and Associated Permitted and Prohibited Land Uses H2-8

Table H2-4 Midway Landfill Alternative Zoning, City of Kent Permitted and Prohibited Uses H2-10

Table H2-5 Policy Consistency with City of Federal Way Comprehensive Plan H2-12

Table H2-6 Policy Consistency with City of Kent Comprehensive Plan H2-16

Table H2-7 Policy Consistency with Midway Subarea Plan, City of Kent H2-17

Table H2-8 Zones within Half-Mile Study Area: Preferred and South 344th Street Alternatives H2-18

Table H2-9 Zones within Half-Mile Study Area: Midway Landfill Alternative H2-19

Table H2-10 Estimated Acres of Zoning Type to be Acquired H2-20

APPENDIX H2: LAND USE TECHNICAL APPENDIX

1.1 Methods

Environmental impacts associated with land use were assessed by examining data collected from local jurisdictions and local and regional land use plans and policies. Local plans, policies, and zoning were reviewed to determine the proposed project's consistency with local regulations. Geographic information system (GIS) data, aerial photographs, and verification techniques were used to assess land use compatibility. Because comprehensive plan land use and zoning code designations vary in definition depending on the jurisdiction (i.e., the cities of Kent, Federal Way, and Des Moines, as well as King County), land uses were generalized into dominant land use categories to compare them consistently. The generalized land use categories include single-family residential, multi-family residential, commercial/industrial, public/institutional, and vacant. These categories were also used to classify the existing land use for potentially affected parcels for each of the build alternatives.

1.1.1 Data Sources

- City of Federal Way Comprehensive Plan maps and GIS data (land use designations, zones, subarea plan boundaries) (City of Federal Way 2023a)
- City of Kent Comprehensive Plan maps and GIS data (land use designations, zones, subarea plan boundaries) (City of Kent 2011, 2019b, 2022)
- City of Des Moines Comprehensive Plan maps and GIS data (land use designations, zones, subarea plan boundaries) (City of Des Moines 2020)
- King County Department of Assessments parcel GIS data and present land uses (King County 2019)
- Puget Sound Regional Council (PSRC) Demographics and Land Use Vision data and GIS data (PSRC 2017, 2019)

1.2 Resources and Regulatory Requirements

Development of the proposed Operations and Maintenance Facility (OMF) South project would result in direct land use conversions within the footprint of the OMF site for each of the build alternatives. The OMF project could also indirectly influence land use conversions or change land use patterns in surrounding areas. The policies, plans, and documents governing land use in the study area for the proposed project are listed below:

1.2.1 State and Regional

- Washington State Growth Management Act (GMA), originally adopted in 1990, and primarily codified under the Revised Code of Washington (RCW) Chapter 36.70A (Growth Management – Planning by Selected Counties and Cities) and Essential Public Facility under RCW 36.70A.200
- PSRC Vision 2050, adopted 2020 (PSRC 2020)
- PSRC, The Growing Transit Communities Strategy – A Transit Corridor Action Agenda for the Central Puget Sound Region (2013)
- PSRC, Regional Transportation Plan, adopted in May 2018. This plan is an update of Transportation 2040, which was adopted in 2010

- Sound Transit Regional Transit Long-Range Plan, adopted in December 2014 (Sound Transit 2014)
- Sound Transit Equitable Transit Oriented Development (TOD) Policy (Board Resolution No. R2018-10) addresses how the agency should consider potential for TOD development near transit facilities being planned and studied and reflects the requirements of Sound Transit 3 and the RCW 81.112.350, the agency’s enabling legislation (Sound Transit 2018)
- Sound Transit Real Property Excess, Surplus and Disposition Policy (Board Resolution No. R2013-30) (Sound Transit 2013)

1.2.2 Local

- The city of Des Moines Municipal Code is current through Ordinance 1784, passed November 2023
- The city of Kent Midway Subarea Plan was adopted in December 2011
- Kent City Code was most recently amended in December 2023. Title 15 Zoning within the KCC was most recently amended in August 2023 (adopted in May 1983), and Chapter 15.15, High Capacity Transit Facilities, is under Title 15 zoning
- The Federal Way Revised Code – Zoning is current through Ordinance 22-942 which was passed in December 2023 (annual updates are expected)
- The King County Zoning Code was last updated in November 2023 and is expected to have annual updates (originally the code was adopted through Ordinance 11621, Section 1 (part) and Ordinance 10870, Section 2, 1993)
- The 2015 Comprehensive Plan for the city of Federal Way, last amended in 2023
- The 2015 Comprehensive Plan for the city of Kent, last amended in 2022
- The 2015 Comprehensive Plan for the city of Des Moines, referred to as Des Moines 2035, last amended in 2020
- The King County 2016 Comprehensive Plan, last amended in 2022
- City of Kent Change of Use or Occupancy Classification (2016)
- The city of Federal Way Shoreline Master Program, last updated in 2019
- The city of Kent Shoreline Master Program, last updated in 2019
- Highline College Master Plan (adopted 2016)

1.3 Affected Environment

Each OMF South build alternative will be developed within the context of the Washington State GMA. The GMA is a series of state statutes originally adopted in 1990, and the GMA Chapter, Growth Management - Planning by Selected Counties and Cities (codified under RCW Chapter 36.70A) describes the development context. Essentially, the GMA requires higher-growth local governments (cities and counties) to develop comprehensive plans to manage growth through several measures and a series of goals. These measures include the identification and protection of critical areas and natural resource land, designation of urban growth areas, and preparation and implementation of comprehensive plans through capital investments and development goals. The proposed project is within the urban growth boundaries of the cities of Kent and Federal Way.

The GMA also ensures that zoning is consistent with comprehensive plans, and it prohibits local governments from precluding the siting of essential public facilities either through comprehensive plans or zoning (RCW 36.70A.200, section 5). As a “regional transit authority facility,” the proposed project is considered an essential public facility by the GMA (RCW 36.70A.200). Therefore, local jurisdictions would be required to avoid preclusion of the project and would need to accommodate it in their comprehensive plans, land use goals and policies, and development regulations once Sound Transit selects the alternative to be built.

1.3.1 Preferred and South 344th Street Alternatives

The Preferred and South 344th Street alternatives are located in the city of Federal Way. While these alternatives are not located in a subarea plan, they are still covered under the Federal Way Comprehensive Plan.

The Land Use chapter of the comprehensive plan includes policies supporting transit under various comprehensive plan land use designations. These land use designations provide the purposes and goals for different zoning districts (City of Federal Way 2023a). The multi-family land use designation encourages street patterns and amenities that increase transit use. In addition, commercial land uses promote commercial development along street edges. Community business land uses encourage the transformation of the Pacific Highway community business corridors into mixed-use areas including commercial and office and high-quality mid-rise developments (three to seven stories). These areas will be designed to integrate auto, pedestrian, and transit circulation to support traffic flow and safety and ensure quality site and building design and functional and aesthetic compatibility between uses.

The Preferred and South 344th Street alternatives are primarily within the Multi-Family Residential (RM) land use designation, in addition to smaller areas within Commercial Enterprise (CE), City Center Core (CC-C), and Commercial Business (CB) designations (City of Federal Way 2023a). The Federal Way Comprehensive Plan also promotes “creating a city center as an area of concentrated employment and housing served by high capacity transit, public facilities, parks, and open space” (City of Federal Way 2023a). Federal Way has a Regional Growth/Urban Center identified as the “City Center,” which is situated in the same area as the CC-C mixed-use zone.

Federal Way has been designated as a Regional Growth Center by the PSRC (2020), generally due to its potential for urban growth in the region. The mainline tracks extending from the Federal Way Transit Center to the Preferred and South 344th Street alternatives would be located in this CC-C zone. In addition, Federal Way was designated a Countywide Growth Center Candidate by the King County Growth Management Planning Council, making Federal Way eligible to receive PSRC transportation grants (City of Federal Way 2024). The Countywide

Growth Center designation requires Federal Way to prepare a subarea plan that will be adopted as part of its 2024 update to its comprehensive plan. The South Station Subarea Plan is a small geographic long-range plan that is envisioned to serve as a policy guide for future development around the future Federal Way Downtown station (City of Federal Way 2024).

1.3.2 Midway Landfill Alternative

The Midway Landfill Alternative is within the city of Kent's Midway Subarea as identified in their comprehensive plan. This subarea is located in the western portion of Kent along a north-south ridgeline situated between the Duwamish/Green River Valley and the Puget Sound. The subarea shares a boundary with the cities of Des Moines, SeaTac, and Federal Way, as well as unincorporated King County. The Midway Subarea is bound to the north by State Route (SR) 516 and to the south by S 272nd Street. It is less than 5 miles south of the Seattle-Tacoma International Airport, with direct access to Interstate 5 via SR 516 and is approximately 2 miles from the Kent North Valley Industrial Area.

The Midway Subarea Plan was inspired by the prospect of a high-capacity light rail transit system. The overall goal of the plan is to "create a dense, pedestrian-friendly, sustainable community […] around nodes of high-capacity mass transit while maintaining auto-oriented uses between the transit-oriented nodes" (City of Kent 2011). The intent for the area is to transition it from low-density residential and commercial uses to higher-density development within transit station nodes, including a mixture of services, office, and residential uses. The Midway Subarea Plan identifies policies to ensure new development in the Midway Subarea will have transit-supported features; the city is expected to work with Sound Transit during all phases of light rail extension planning to ensure Kent's preferred rail alignment and station location are realized. The plan also outlines policies for pedestrian-friendly development design features by establishing a multimodal circulation network within areas designated Transit Oriented Community. Specific goals within the plan are as follows:

1) Provide a mix of land uses in the hopes of increasing revenues, job opportunities, and housing choices.
2) Reconcile development standards along the border between Kent and Des Moines for consistency.
3) Provide for public transportation in the development of land use policies, development regulations, and implementation strategies.
4) Provide appropriate land uses and regulations that support bus rapid transit within the Pacific Highway corridor.
5) Identify preferred alignments for the light rail and accompanying station and stop locations within Kent and Des Moines.
6) Ensure design that provides a safe and inviting pedestrian environment.

The Federal Way Link Extension (FWLE) light rail alignment and future Kent/Des Moines Station (between S 236th Street and S 234th Street) are located within the Midway Subarea Plan, and the proposed OMF South project would be located within the Pacific Highway South commercial transportation corridor portion of the Midway Subarea Plan. The Pacific Highway South commercial area of the Midway Subarea plan is intended for auto-oriented commercial and light industrial uses. The proposed use (maintenance facility buildings) would be similar in scale and development intensity as light industrial uses and would be consistent with the urban character intended for this area.

1.4 Land Use Tables

The following tables (Table H2-1 through Table H2-10) concern OMF South’s consistency with the primary dimensional standards of zoning codes, land use regulations, and comprehensive plan policies for Kent and Federal Way that would pertain to the project. Tables H2-1 and H2-2 address the Preferred, South 344th Street, and Midway Landfill alternatives’ consistency with the description and intent of the zoning types located within their project footprints. Table H2-3 lists the permitted and conditional uses within the various land use types under each zoning category for the Preferred and South 344th Street alternatives in the city of Federal Way. Table H2-4 lists the permitted and non-permitted uses within the various land use types under each zoning category for the Midway Landfill Alternative in the city of Kent. Tables H2-5 through H2-7 discuss the consistency of the OMF South project with each alternative’s city comprehensive and subarea plans. Lastly, Tables H2-8 and H2-9 list the acreage of each zone within the project alternative study areas, and Table H2-10 displays the acreage of zoning type that would be acquired by each alternative.

1.4.1 Study Area Zoning

Table H2-1 Preferred and South 344th Street Alternatives Zones Description and Consistency

City of Federal Way Zone	Purpose, Select Development Standards	Consistency with Applicable Policies
CC-C: City Center Core	The purpose and intent of establishing a City Center Core is to create a higher density, mixed use designation where office, retail, government uses, and residential uses are concentrated. Other uses such as culture/civic facilities and community services are highly encouraged. Select Development Standards: Height limitation is 75 feet for a light rail or commuter rail transit facility. There is no minimum lot size for light rail or commuter transit facilities, except for 20 feet along single-family residential zones.	Both alternatives would convert approximately 17 acres of CC-C zoned property adjacent to I-5 to construct the mainline tracks. The CC-C zone is in a Regional Growth Center (PSRC 2020) where future land uses encourage concentrated mixed-use development. The addition of the mainline tracks could restrict future development immediately adjacent to the proposed site, but, overall, the small, elongated footprint of the mainline tracks would not preclude development of the CC-C zone as envisioned. This zone lists light rail or commuter rail transit facilities as a permitted land use, which could encompass the use of transportation operation and maintenance facilities. The mainline tracks could possibly provide additional light rail access to this center through the addition of the proposed Tacoma Dome Link Extension light rail service. Light rail facilities would require a Process IV review.
RM-2400 and RM-3600: Multi-Family	The purpose and intent of the multi-family residential land use designation is to provide a range of housing types to accommodate anticipated residential growth. Select Development Standards: The light rail or commuter rail transit facility use is not recognized in the RM zone. The Washington State Growth Management Act prohibits local governments from precluding the siting of essential public facilities through zoning. OMF South is a “regional transit authority facility” and is, therefore, explicitly recognized as an essential public facility in the Growth Management Act (RCW 36.70A.200).	The mainline tracks and a portion of the maintenance and operations facility would occupy approximately 72 acres of multi-family zoning for the Preferred Alternative and approximately 43 acres of multi-family zoning for the South 344th Street Alternative. These multi-family zones are intended to be used to accommodate housing growth and meet a range of housing needs. There are no development standards specified for essential public facilities. However, OMF South would enter into a Development Agreement with the City of Federal Way to ensure consistency with the Comprehensive Plan.

Table H2-1 Preferred and 344th Street Alternative Zones Description and Consistency (continued)

City of Federal Way Zone	Purpose, Select Development Standards	Consistency with Applicable Policies
BC: Community Business	The purpose and intent of the Community Business designation is to support a broad mix of uses. This designation envisions mid-rise, high-quality developments containing a vibrant and compatible mix of well-integrated and designed pedestrian-oriented and auto-oriented uses. Select Development Standards: The light rail or commuter rail transit facility use is not recognized in the BC zone. The Washington State Growth Management Act prohibits local governments from precluding the siting of essential public facilities through zoning. OMF South is a “regional transit authority facility” and is, therefore, explicitly recognized as an essential public facility in the Growth Management Act (RCW 36.70A.200).	The Preferred Alternative would occupy approximately 2 acres of the BC zone adjacent to SR 99 around the guard house entrance. The broad mix of uses planned for this area could incorporate the OMF South project if the area is focused on a mix of commercial and office uses targeted for this zone. The BC zone is urban in character, with no maximum lot coverage. There are no development standards specified for essential public facilities. However, OMF South would enter into a Development Agreement with the City of Federal Way to ensure consistency with the Comprehensive Plan.
CE: Commercial Enterprise	The purpose and intent of the Commercial Enterprise zone is to capture the demand for a diverse mix of industrial, office, and retail sales and services, arrayed in well-integrated, high quality developments. Development Standards: For a light rail or commuter rail transit facility, the height limitation is 50 feet above average building elevation. There is no minimum lot size for light rail or commuter transit facilities, except for 20 feet along single-family residential zones.	The South 344th Street Alternative site and mainline tracks would occupy approximately 36 acres of the CE zone. The southeast corner yards, training track, and stormwater detention facility of the Preferred Alternative would occupy approximately 11 acres of the CE zone. The Preferred and South 344th Street alternatives would be consistent with the commercial uses because the maintenance facility buildings are similar in scale and development intensity as office buildings and warehouses. This zone lists light rail or commuter rail transit facility as a permitted land use, which could encompass the use of transportation operation and maintenance facilities. The highest proposed building is the OMF office building, estimated at 36 feet (this could change as the design progresses). The CE zone is urban in character, with no maximum lot coverage. Light rail facilities would require a Process IV review.

Source: Federal Way Municipal Code (City of Federal Way 2023b)

Note: Acreages were calculated using GIS, overlaying the project boundary on Federal Way zoning GIS data. Additional site development standards detail such as setbacks, landscaping, and parking space requirements are not provided.

Table H2-2 Midway Landfill Alternative Zones Description and Consistency

City of Kent Zone	Purpose, Select Development Standards	Consistency
MCR: Midway Commercial Residential	The purpose and intent of the MCR zoning district is to encourage the location of dense and varied retail, office, or residential activities in support of rapid light rail and mass transit options, enhance a pedestrian-oriented character, and implement the goals and policies of the Midway Subarea Plan. Select Development Standards: Height limitation is 16 stories or 200 feet, minimum lot area is 7,500 square feet, and maximum site coverage is 80 percent (site coverage is defined as including the portion of a lot covered by buildings or structures).	A portion of the lead tracks linking the OMF South to the mainline tracks are proposed for location in the MCR zone (less than 5 acres). Although transportation and utility uses are listed as conditional uses, transit OMFs are listed as prohibited, inconsistent uses. The tracks use would not be considered a mixture of retail, office, or residential uses intended for this zone; however, the proposed use would support the goal to encourage urban development in support of rapid light rail. Development of light rail tracks would be subject to a city of Kent Conditional Use Permit since transportation and utility uses are conditionally allowed. High-capacity transit facilities and their tracks are subject to Kent City Code (KCC) Chapter 15.15, a chapter which primarily outlines design regulations for high-capacity transit facilities. The proposed development would be consistent with the 80 percent maximum site coverage standard since the design would result in less than 3 percent of the site covered by buildings and structures.
CM: Commercial Manufacturing	The purpose and intent of the Commercial Manufacturing district is to provide locations for those types of developments which combine some characteristics of both retail establishments and small-scale, light industrial operations, heavy commercial and wholesale uses, and specialty manufacturing. All transit-related uses are conditional uses.	Most of the project footprint (66 acres) is proposed for location on CM zoning and would not conflict with targeted CM uses since the OMF would be similar in scale and development intensity to light industrial operations intended for the CM Zone. Transit operations and maintenance facilities are listed as a conditional use for this zone. Development of the OMF facility would be subject to a city of Kent Conditional Use Permit since transportation and

Table H2-2 Midway Landfill Alternative Zones Description and Consistency (continued)

City of Kent Zone	Purpose, Select Development Standards	Consistency
	Select Development Standards: Height limitation is two stories or 35 feet, and maximum site coverage is 50 percent (defined as including the portion of a lot covered by buildings or structures). KCC Section 15.04.195 Commercial and industrial land use development standard conditions, includes a variance provision authorizing the economic and community development director to grant one additional story in height, if during development plan review it is found that this additional story would not detract from the continuity of the area. More than one additional story may be granted by the land use and planning board.	utility uses are conditionally allowed. The highest building height, located at the OMF office building, proposed in draft plans (See Appendix C) is estimated at 36 feet (this could change as the design progresses). This proposed building height could necessitate divergence from the code standard due to the 35 feet height limitation for the CM Zone. In addition, the proposed development in total could result in approximately 11 percent of the site being covered, which is below the 50 percent maximum site coverage standard for this zone.
SR-6: Single-Family Residential	The purpose and intent of the single-family residential districts is to stabilize and preserve single-family residential neighborhoods, as designated in the comprehensive plan. It is further the purpose to provide a range of densities and minimum lot sizes in order to promote diversity and recognize a variety of residential environments. Select Development Standards: maximum site coverage is 50 percent, maximum impervious surface is 70 percent, height limitation is 2.5 stories or 35 feet.	The OMF would occupy a small portion of the SR-6 zone (0.4 acres) in the south end of the project site, along the edge of a single-family residential area and I-5. Much of the eastern part of the affected SR-6 zone area would be used to provide a track connection to the mainline tracks. This zone lists transit operations and maintenance facilities as a prohibited use. The work within this zone would consist of roadway improvements and would not include elements of the facility itself. Thus, it is not expected that the OMF Site would conflict with the SR-6 zone purpose of stabilizing and preserving single-family residential neighborhoods. Disruptions from the OMF project could be minimized through building setbacks and landscaped buffers.

Source: Kent City Code (City of Kent 2023)

Note: Acreages were calculated using GIS, overlaying the project boundary on Federal Way zoning GIS data. Additional site development standards detail such as setbacks, landscaping, and parking space requirements are not provided.

1.4.2 City of Federal Way and City of Kent Zoning and Permitted Land Use

Table H2-3 City of Federal Way Relevant Zoning and Associated Permitted and Prohibited Land Uses

City of Federal Way Zoning and Associated Permitted and Prohibited Land Uses Relevant to OMF South	
City Center Core (CC-C) Zone	
Land Use Categories	**Detailed Permitted Land Uses**
Parking Garages	• Above-grade structured parking facilities
Government Facility, Public Parks, Public Transit Shelter	• Government facility • Public parks • Public transit shelter
Public Transportation Facilities	• Light rail or commuter rail transit facility
Public Utility	• Public utility
Personal Wireless Service Facility	• Personal wireless service facility
Multi-Family (including RM 1800, RM 2400 and RM 3600)	
Land Use Categories	**Detailed Permitted Land Uses**
Public Transit Shelter	• Public transit shelter
Public Utility	• Public utility
Government Facility	• Government facility
Public Parks	• Public parks
Personal Wireless Service Facility	• Personal Wireless Service Facility (new freestanding facilities are not allowed). Note: Personal Wireless Service Facility shall be allowed only on existing towers, on publicly used structures not located in public rights-of-way, on existing structures located in the BPA Trail, and on existing structures in appropriate public rights-of-way.
Commercial Enterprise Zoning	
Land Use Categories	**Detailed Permitted Land Uses**
Manufacturing and Production, General	• Manufacturing, fabrication, or assembly of office equipment, machines, furniture, and fixtures; electrical, electronic, communications, and lighting products; appliances, bicycles, automobiles, boats, aircraft, and their component parts; heating equipment; photographic and clock instruments; toys; jewelry; musical instruments; scientific equipment; hand tools; signs; advertising displays; and similar items • Fabrication of clay, glass, ceramic, stone, china, or metal products; metal plating and coating; engraving and stone cutting • Preparation of food products; leather products; textile, fabric, or apparel • For manufacturing and production, limited, see FWRC 19.240.070 • Any manufacturing, fabrication, and assembly uses other than listed herein
Warehouse, Distribution, Storage Facilities, Truck Stops, Automotive Emissions Testing Facilities	• Warehouse and wholesale distribution facilities • Contractor’s yards for storage of commercial equipment, vehicles, bulk building materials, and similar items • Parking lots for storage of recreational vehicles and other oversized vehicles • Commercial vehicle facilities and service yards such as truck stops • Automotive emissions testing facilities

Table H2-3 City of Federal Way Relevant Zoning and Associated Permitted and Prohibited Land Uses (continued)

City of Federal Way Zoning and Associated Permitted and Prohibited Land Uses Relevant to OMF South	
Vehicle, Boat, Equipment, and Outdoor Storage Container Sales, Rental, Service, Repair, Self-Service Storage, Tow and Taxi Lots	• Sales, rental, or leasing facilities for vehicles, trucks, boats, trailers, motorcycles, equipment, outdoor storage containers, and portable moving containers • Mechanical repair, body repair, painting, or related services for vehicles, trucks, boats, trailers, motorcycles, and equipment • Vehicle service station or car wash • Self-service storage facilities • Tow and taxi lots
Public Utility	• Public utility
Government and Public	• Government facility, public parks, public transit shelter
Public Transit Facilities	• Light rail or commuter transit facility
Personal Wireless Services	• Personal Wireless Services Facilities
Community Business Zoning	
Land Use Type	• **Permitted and Conditional**
Vehicle and Equipment Sales, Service, Repair, Rental: Self-Service Storage Facilities	• Vehicle service station or car wash • Retail establishment providing vehicle, boat, or tire sales, service, repair, rental, and/or painting, passenger vehicle rental including moving trucks • Merchandise and equipment rental facilities, excluding heavy equipment rental • Tow or taxi lots • Self-service storage facilities; storage of recreational vehicles
Government Facility, Public Parks, Public Transit Shelter	• Government facility, public parks, public transit shelter
Public Utility	• Public utility
Personal Wireless Service Facility	• Personal wireless service facility

Source: City of Federal Way Title 19 Zoning and Development Code (City of Federal Way 2023b)

Notes:

(1) The city of Federal Way Zoning and Development Code does not specify Permissible, Conditional, Accessory, or Special Uses. Additionally, the zoning regulation does not distinguish between different types of multi-family zoning labels, such as RM 1800 and RM 3600.

(2) OMF South is considered an Essential Public Facility and would be reviewed under FWRC 19.105.020.

Table H2-4 Midway Landfill Alternative Zoning, City of Kent Permitted and Prohibited Uses

Commercial Manufacturing (CM) Zoning	
Transportation, Public, and Utilities Land Use	
Principally Permitted	• Wireless telecommunications facility (WTF) by administrative approval (For WTF towers 90 feet or less for a single user and up to 120 feet for two or more users. All WTFs are subject to applicable portions of KCC 15.08.035.)
Conditional	• Transportation and transit facilities, including high-capacity transit facilities • Transit operations and maintenance facilities • Utility and transportation facilities: electrical substations, pumping or regulating devices for the transmission of water, gas, steam, petroleum, etc. • Public facilities: firehouses, police stations, libraries, and administrative offices of governmental agencies, primary and secondary schools, vocational schools, and colleges • WTF by minor conditional use permit (A conditional use permit for a WTF is required if it is greater than 90 feet for a single user or 120 feet for two or more users. All WTFs are subject to applicable portions of KCC 15.08.035.)
Accessory	• Accessory uses and structures customarily appurtenant to a permitted use (Includes incidental storage facilities and loading/unloading areas.) • Electric vehicle (EV) charging station (Level 1 and 2 charging only) • Rapid charging station
Not Permitted	• Commercial parking lots or structures • Railway and bus depots, taxi stands
Special Use	• None
Midway Commercial Residential (MCR) Zoning	
Transportation, Public and Utilities Land Use	
Principally Permitted	• WTF by administrative approval (For WTF towers 90 feet or less for a single user and up to 120 feet for two or more users. All WTFs are subject to applicable portions of KCC 15.08.035.)
Conditional	• Commercial parking lots or structures • Transportation and transit facilities, including high-capacity transit facilities (High-capacity transit facilities shall be consistent with Chapter 15.15 KCC.) • Railway bus depots, taxi stands • Utility and transportation facilities: electrical substations, pumping or regulating devices for the transmission of water, gas, steam, petroleum, etc. • Public facilities: firehouses, police stations, libraries, and administrative offices of governmental agencies, primary and secondary schools, vocational schools, and colleges • WTF (A conditional use permit for a WTF is required if it is greater than 90 feet for a single user or 120 feet for two or more users. All WTFs are subject to applicable portions of KCC 15.08.035.)
Accessory	• Accessory uses and structures customarily appurtenant to a permitted use • EV charging station (Level 1 and 2 charging only) • Rapid charging station
Not Permitted	• Transit operations and maintenance facilities
Special Use	• None

Table H2-4 Midway Landfill Alternative Zoning, City of Kent Permitted and Prohibited Uses (continued)

Single Family Residential (SR 6) Zoning	
Transportation, Public and Utilities Land Use	
Principally Permitted	• None
Conditional	• Transportation and transit facilities, including high-capacity transit facilities (High-capacity transit facilities shall be consistent with Chapter 15.15 KCC.) • Utility and transportation facilities: electrical substations, pumping or regulating devices for the transmission of water, gas, steam, petroleum, etc. • Public facilities: firehouses, police stations, libraries, and administrative offices of governmental agencies, primary and secondary schools, vocational schools, and colleges • WTF (If on property owned, leased, or otherwise controlled by the city or other government entity subject to KCC 15.08.035(I)
Accessory	• Accessory uses and structures customarily appurtenant to a permitted use (Accessory structures composed of at least two walls and a roof, not including accessory uses or structures customarily appurtenant to agricultural uses, are subject to the provisions of KCC 15.08.160.) • EV charging station (Level 1 and 2 charging only) • Rapid charging station (Only as part of a general conditional use identified in KCC 15.08.030.)
Not Permitted	• Commercial parking lots or structures • Transit operations and maintenance facilities • Railway and bus depots, taxi stands
Special Use	• None

Source: Kent City Code (City of Kent 2023)

1.4.3 Comprehensive Plan Policy Consistency

Table H2-5 Policy Consistency with City of Federal Way Comprehensive Plan

Topic	Goals	Policies	Consistency with Applicable Policies
2.6 Citywide Policies	No goals listed for these policies. This section includes an introduction stating that citywide policies apply to all Federal Way Comprehensive Plan designations. These general policies are intended to maintain the quality of the living and working environment and ensure that the interests, economy, and welfare of the community are considered.	• LUP 8: Designate and zone land to provide for Federal Way's share of regionally adopted demand forecasts for residential, commercial, and industrial uses for the next 20 years. • LUP 10: Support the continuation of a strong residential community.	Policy LUP 8: The addition of OMF South in commercial-oriented and multi-family residential zones would moderately reduce the amount of land available for these uses and if not replaced with additional zones, this could decrease the ability of Federal Way to meet future demand. The mainline tracks and a portion of the maintenance and operations facility of the Preferred Alternative would occupy approximately 54 acres of multi-family zoning. The mainline tracks and a portion of the operations and maintenance facility for the South 344th Street Alternative would occupy approximately 43 acres of multi-family zoning. Policy LUP 10: The Preferred and South 344th Street alternatives would occupy portions of a multi-family residential area (primarily including a mobile home park) which could affect a small portion of the existing residential community. However, the proposed uses would be similar in scale and use to a government facility or public utility, which are permitted in the area. The project areas adjacent to residential areas would include landscaped buffers, building setbacks, and other context-sensitive design features to help blend in with the residential areas.

Table H2-5 Policy Consistency with City of Federal Way Comprehensive Plan (continued)

Topic	Goals	Policies	Consistency with Applicable Policies
2.7 Land Use Designations (Single-Family)	Goal LUG3: Preserve and protect Federal Way's single-family neighborhoods. Goal LUG3.1: Provide a wide range of housing densities and types in the single-family designated areas.	• LUP14: Protect residential areas from impacts of adjacent non-residential uses. • LUP16: Encourage the development of transportation routes and facilities to serve single-family neighborhoods. Special attention should be given to pedestrian circulation.	Policy LUP14: The mainline tracks of the Preferred and South 344th Street alternatives would be located within a small portion of this zone and next to multi-family residential land uses. Sound Transit would take steps necessary to reduce its impact on adjacent parcels through building setbacks, landscaped buffers, and other building design features to support aesthetic compatibility between uses. Policy LUP16: The proposed project would support the expansion of light rail service and operations which supports the development of public transportation routes. The proposed light rail service provided by the Federal Way Link Extension (FWLE) includes a nearby station just north of the project alternatives and this station is expected to serve single-family neighborhoods surrounding the Federal Way alternatives.
2.7 Land Use Designations (Multi-Family)	Goal LUG4: Provide a wide range of housing types and densities. Commensurate with market demand, adopted housing targets, and the community's needs and preferences.	• LUP21: Support multi-family development with transportation and capital facilities improvements. • LUP23: Encourage the establishment of street patterns and amenities that encourage walking, bicycling, and transit use.	Policy LUP21: The OMF site will provide essential facilities for the maintenance of the light rail system which complements planned Transportation Capital Improvements Projects identified in Federal Way (such as the City Center Access Project). In addition, this project helps broaden transit options for multi-family households in the Federal Way area. Policy LUP23: The proposed conceptual design for the Preferred and South 344th Street alternatives would include the vacation of 20th Avenue S between S 336th Street and S 341st Street, which would prevent the planned, but unfunded, shared bicycle lane markings on 20th Avenue S from S 336th Street to S 341st Street from being developed. Alternative facilities could be developed to replicate the connectivity and function of the eliminated north-south connection.
2.7 Commercial Designations (General policies for Commercial, Office, and Commercial Enterprise)	None.	• LUP24: Provide employment and business opportunities by allocating adequate land for commercial, office, and industrial development. • LUP25: Encourage development of regional uses in the City Center.	Policies LUP24 and LUP25: The mainline tracks for the proposed project would require the conversion of a small area of the City Center Core zone (approximately 17 acres) and Commercial Enterprise zone (a range of 5 to 10 acres) to transportation uses. This could moderately reduce the amount of land available for employment and business opportunities, particularly if they are not replaced with additional commercial zones. However, the proposed project is expected to provide employment for up to approximately 610 total staff members. More detail is provided in *Chapter 3.5 Economics.* The proposed project also would support light rail service and operations (particularly by supporting the Tacoma Dome Link Extension and FWLE) which supports the development of regional public transportation routes and is expected to generally support development in the region.

Table H2-5 Policy Consistency with City of Federal Way Comprehensive Plan (continued)

Topic	Goals	Policies	Consistency with Applicable Policies
2.7 Commercial Designations (Commercial Enterprise)	Goal LUG5: Develop a quality commercial enterprise environment characterized by a viable, vibrant, and attractive mix of commercial, retail, office, industrial, and supportive uses and utilize locational and design criteria to ensure compatibility between uses.	• LUP35: Allow a broad range of commercial, retail, office, industrial, and supportive uses to meet the needs of workers and consumers, in well-integrated, well-functioning, high-quality developments. • LUP36: Require development to be compatible and well-integrated into its surroundings and adjacent zones through site and building design and development standards that reduce or eliminate land use conflicts and nuisance impacts; ensure project aesthetics; promote sharing of public facilities and services; and improve vehicular and pedestrian traffic flow and safety, including access control and off-street interconnectivity between adjoining properties where feasible. • LUP38: Do not allow heavy industrial uses on properties that adjoin residential zones.	Policy LUP35: The Preferred Alternative would consist of 12 acres of commercial zoned land, which is 1 percent of commercial zoned land within the city of Federal Way. The South 344th Alternative would consist of 41.6 acres of commercial zoned land, which is 3 percent of commercial zoned land in the city of Federal Way. As such, the proposed project is too small in size to impede the city from accommodating a broad range of commercial, retail, office, and industrial uses. Policy LUP36: While OMF South is expected to produce short-term construction-related impacts on adjacent parcels via noise, visual, etc.; long-term impacts are not expected, as the identified visual, noise, and air quality impacts for the project alternatives would not be severe enough to result in alteration of existing or potential future land uses. Sound Transit will strive to minimize any short-term impacts of constructing OMF South. The OMF project would likely contribute to improved vehicular and pedestrian traffic flow since it supports mode shifts from personal vehicles to transit services. Policy LUP38: OMF South would consist of maintenance facility buildings that are similar in scale and development intensity to light industrial uses. The city of Federal Way has not defined what a heavy industrial use is within the Federal Way Comprehensive Plan or in the city of Federal Way Revised Code (FWRC). The city of Federal Way has defined Industrial uses. Industrial uses allowed within the Commercial Enterprise zone (cited within FWRC 19.240.010 through 19.240.040) include manufacturing and production uses, warehouse, distribution, storage facility, truck stop, and automotive emissions testing facility uses, and commercial photography, communications, product testing, and industrial laundry facility uses. These uses are allowed so long as operations do not cause “inherent and recurring generated noise or vibration perceptible without instruments at any point along a property line, except transportation and delivery operations typically and customarily associated with the use; and provided, that such operations are not audible from a residential zone on a regular or recurring basis” (FWRC 19.240.010 through 19.240.040). According to Section 3.9, Noise and Vibration, there are no noise impacts to adjacent properties from the mainline tracks or OMF Site. The OMF Site would follow the guidelines of LUP38, given there are no noise impacts to residential properties. In addition, Sound Transit would take steps necessary to reduce the impact on adjacent parcels with residential uses through building setbacks, landscaped buffers, and other building design features to support aesthetic compatibility between uses.

Table H2-5 Policy Consistency with City of Federal Way Comprehensive Plan (continued)

Topic	Goals	Policies	Consistency with Applicable Policies
2.7 Commercial Designations (Community Business)	Goal LUG6: Transform Community Business areas into vital, attractive, areas with a mix of uses that appeal to pedestrians, motorists, and residents, and enhance the community's image.	- LUP39: Encourage transformation of the Pacific Highway (SR-99) Community Business corridors into quality retail/commercial mixed-use areas designed to integrate auto, pedestrian, and transit circulation, and to improve traffic flow and safety, including access control and off-street interconnectivity between adjoining properties where feasible. Continue to utilize Community Design Guidelines to ensure quality site and building design and functional and aesthetic compatibility between uses. Integration of pedestrian amenities and open space into retail and office development should also be encouraged. -	Policy LUP39: The project would be designed to ensure quality site and building design and aesthetic compatibility with surrounding uses.
2.10 Phasing	None.	- LUP60: Establish priority areas for public facility and service improvements, especially for transportation based on an adopted Capital Facilities Plan and Transportation Improvement Program. Priority areas should be located where public facility and service improvements are installed and an acceptable level of service is attained.	Policy LUP60: The OMF site will provide essential facilities for the maintenance of the light rail system. The light rail service will be developed to complement existing public transportation services.

Table H2-6 Policy Consistency with City of Kent Comprehensive Plan

Topic	Goals	Policies	Consistency with Applicable Policies
Urban Growth	Goal LU-2: Kent will locate public facilities and services with sensitivity to community needs and environmental conditions.	• Policy LU-2.1: Work with regional and state entities when public capital facilities are considered for location in or near the city to ensure that impacts and benefits are equitably dispersed. • Policy LU-2.2: Promote and support public transit, bicycle, and pedestrian circulation within compact urban settings.	Policy LU-2.1: The proposed OMF project is a publicly funded capital facility supporting light rail in the region. Sound Transit is committed to working with the city of Kent to ensure that impacts are reduced, and benefits of this public capital facility are as equitable as possible. Policy LU-2.2: OMF South would support the expansion and operation of public light rail transit, including FWLE, that will serve urban areas between Seattle and Tacoma, including the cities of Kent and Des Moines.
Commercial	Goal LU-10: Kent will examine the City's commercial districts based on the regional, community and neighborhood needs to support economic vitality and livability.	• Policy LU-11.2: Revise Kent Design and Construction Standards to ensure the public streetscape associated with commercial and mixed-use development is attractive, safe and supports transit, pedestrians, and cyclists.	Policy LU-11.2: The Midway Landfill parcel is located primarily on commercial land at the site of a former landfill.
Natural Resources	Goal LU-17: Kent will recognize the significant role the natural environment plays in shaping a sustainable community by contributing to human health, environmental justice, and economic vitality.	• Policy LU-17.2: Conserve energy resources, improve air and water quality and support healthy lifestyles by establishing well-designed, compact mixed-use land use patterns that provide convenient opportunities for travel by transit, foot, and bicycle.	Policy LU-17.2: The OMF project supports transit-friendly development patterns and would improve light rail service that is anticipated to provide a convenient way to travel for people located near the light rail corridors and stations.
Essential Public Facilities	Goal LU-20: The city shall participate in a cooperative inter-jurisdictional process to determine siting of essential public facilities of a county-wide, regional, or state-wide nature.	• Policy LU-20.1: Proposals for siting essential public facilities within the city of Kent or within the city's growth boundary shall be reviewed for consistency with the city's Comprehensive Plan during the initial stages of the proposal process. • Policy LU-20.2: When warranted by the special character of the essential facility, the city shall apply the regulations and criteria of Kent Zoning Code Section 15.04.150, Special Use Combining District, to applications for siting such facilities to ensure adequate review, including public participation. Conditions of approval, including design conditions, shall be imposed upon such uses in the interest of the welfare of the city and the protection of the environment. • Policy LU-20.3: In the principally permitted or conditional use sections of the zoning code, the city shall establish, as appropriate, locations and development standards for essential public facilities that do not warrant consideration through the Special Use Combining District regulations. Such facilities shall include but not be limited to small inpatient facilities and group homes.	Policies LUP-20.1 to LUP-20.3: OMF South is considered an Essential Public Facility. Most of the Midway Landfill Alternative is proposed for location on Commercial Manufacturing II zoning. The OMF site would be consistent with a recently passed Transit Operations and Maintenance Facilities Interim Zoning Ordinance conditionally allowing OMFs within the Commercial Manufacturing II zone (KCC 15.04.060); consequently, rezoning to the Special Use Combining District likely would be unwarranted. Sound Transit would work with the city to ensure consistency with city policies and plans.

Table H2-7 Policy Consistency with Midway Subarea Plan, City of Kent

Topic	Goals	Policies	Consistency with Applicable Policies
Land Use	Goal MLU-2: Promote a mix of land uses that support local and regional needs in an auto-oriented commercial and light industrial area along the Pacific Highway South commercial transportation corridor not designated Transit Oriented Community.	• Policy MLU-2.1: Allow a mix of retail, light industrial or live/work uses.	OMF South would consist of maintenance facility buildings that are similar in scale and development intensity as light industrial uses and would be consistent with the character intended for this area.
Transportation	Goal MT-3: Integrate high capacity light rail transit service and associated station locations into the urban design and functionality of the street systems.	• Policy MT-3.1: Work with Sound transit during all phases of planning for the extension of light rail into Midway to ensure Kent's preferred rail alignment and station location are realized. • Policy MT-3.6: Ensure proposed development is compatible with future light rail improvements by identifying and preserving rights-of-way necessary for future transportation projects.	OMF South is consistent with policies MT-3.1 and MT-3.6 since the policies are in support of light rail expansion and improvements. The OMF South project is being built to directly support the Sound Transit light rail operations and services in the city of Kent and in the surrounding region. OMF South is being designed to accommodate future light rail improvements.
Inter-jurisdictional Coordination	Goal MIC-2: Continue coordination with regional and state transportation agencies on matters of transportation investments planning and construction.	• Policy MIC-2.1: Coordinate with Sound Transit, King County, METRO, Washington State Department of Transportation, and Puget Sound Regional Council to ensure facilities and services are provided over time.	OMF South is consistent with policy MIC-2.1 since it will ensure coordination between Sound Transit and the city on OMF South planning and construction.

Table H2-8 Zones within Half-Mile Study Area: Preferred and South 344th Street Alternatives

Zone	General Zoning Description	Full Zone Name	Jurisdiction	Total Area (Acres)
BC	Commercial	Commercial Business	Federal Way	140
CE	Commercial	Commercial Enterprise	Federal Way	336
CP-1	Commercial	Corporate Park	Federal Way	364
OP	Commercial	Office Park	Federal Way	233
OP-1	Commercial	Office Park I	Federal Way	92
CB	Commercial	Commercial Business	King County	19
CB-P	Commercial	Commercial Business	King County	4
O-P	Commercial	Office	King County	3
CC-C	Mixed-Use	City Center Core	Federal Way	174
CC-F	Mixed-Use	City Center Frame	Federal Way	150
RM1800	Multi-Family	Multi-Family (1 DU/1,800 sf)	Federal Way	10
RM2400	Multi-Family	Multi-Family (1 DU/2,400 sf)	Federal Way	72
RM3600	Multi-Family	Multi-Family (1 DU/3,600 sf)	Federal Way	197
R-24	Multi-Family	Residential (24 DU/acre)	King County	10
RS7.2	Single-Family	Single-Family (1 DU/7,200 sf)	Federal Way	64
RS9.6	Single-Family	Single-Family (1 DU/9,600 sf)	Federal Way	9
R-4	Single-Family	Residential (4 DU/acre)	King County	70
Total				**1,975**

Sources: The cities of Kent, Federal Way, and Des Moines and King County GIS data.

Notes: The half-mile study area is based on the potential construction limits for each build alternative. The acreage is approximate, calculated using GIS tools. The areas within the project alternative footprint are not included in the information.

Table H2-9 Zones within Half-Mile Study Area: Midway Landfill Alternative

Zone	General Zoning Description	Full Zone Name	Jurisdiction	Total Area (Acres)
W-C	Commercial	Woodmont Commercial	Des Moines	18
CM	Commercial	Commercial Manufacturing	Kent	129
I-P	Commercial	Industrial (with conditions)	King County	4
NB	Commercial	Neighborhood Business	King County	0
T-C	Mixed-Use	Transit Community	Des Moines	12
CC	Mixed-Use	Community Commercial	Kent	10
MCR	Mixed-Use	Midway Commercial Residential	Kent	46
MTC-1	Mixed-Use	Midway Transit Community I	Kent	23
MTC-2	Mixed-Use	Midway Transit Community II	Kent	28
IC	Public/Institutional	Institutional Campus Zone	Des Moines	77
RA-3600	Multi-Family	Residential: Attached Townhouse & Duplex	Des Moines	0
RM-2400	Multi-Family	Multi-Family Residential (1 DU/2,400 sf)	Des Moines	13
MHP	Multi-Family	Mobile Home Park	Kent	11
MR-H	Multi-Family	High Density Multi-Family Residential	Kent	4
MR-M	Multi-Family	Medium Density Multi-Family Residential	Kent	40
R-1	Multi-Family	Urban Residential (1 DU/acre)	King County	1
R-12	Multi-Family	Urban Residential (12 DU/acre)	King County	0
R-4	Multi-Family	Urban Residential (4 DU/acre)	King County	16
R-6	Multi-Family	Urban Residential (6 DU/acre)	King County	2
RS-7200	Single-Family	Single-Family Residential (1 DU/7,200 sf)	Des Moines	143
R-SE	Single-Family	Residential Suburban Estates	Des Moines	26
SR-6	Single-Family	Single-Family Residential (6 DU/acre)	Kent	370
Total				**978**

Sources: The cities of Kent, Federal Way, and Des Moines and King County GIS data.

Notes: The half-mile study area is based on the potential construction limits for each build alternative. The acreage is approximate, calculated using GIS tools. The areas within the project alternative footprint are not included in the information.

Table H2-10 Estimated Acres of Zoning Type to be Acquired

Alternative	Impact Type	Jurisdiction	Zoning Type	Zoning Category	Total Area (Acres)
Preferred	Mainline[1]	Federal Way	CE	Commercial	3
		Federal Way	RM3600	Residential	62
	OMF Site	Federal Way	BC	Commercial	3
		Federal Way	CE	Commercial	14
		Federal Way	RM2400	Residential	1
		Federal Way	RM3600	Residential	55
South 344th Street	Mainline[1]	Federal Way	CE	Commercial	25
		Federal Way	RM2400	Residential	1
		Federal Way	RM3600	Residential	64
	OMF Site	Federal Way	BC	Commercial	1
		Federal Way	CE	Commercial	36
		Federal Way	RM3600	Residential	48
Midway Landfill	OMF Site	Kent	CM	Commercial	69
		Kent	MCR	Mixed Use	25
		Kent	SR-6	Residential	3

Sources: The cities of Kent, Federal Way, and Des Moines and King County GIS data.

Note: The acreage is approximate, calculated using GIS tools, and conservatively assumes full acquisition of all affected parcels.

(1) The mainline tracks would be constructed regardless of which alternative is selected to be built. Under the Midway Landfill Alternative, the tracks would be constructed later, as part of the Tacoma Dome Link Extension project.

Operations and Maintenance Facility South

Appendix H3: Visual and Aesthetic Resources Technical Appendix

Federal Transit Administration

SoundTransit

APPENDIX H3: VISUAL AND AESTHETIC RESOURCES TECHNICAL APPENDIX

The visual analysis assesses the existing visual quality and character of the landscape and then considers how typical viewers may respond to what they see around them. Sound Transit adapted guidelines from the Federal Highway Administration (FHWA) and Washington State Department of Transportation (WSDOT) for this analysis. The FHWA guidelines provide a generally accepted methodology for preparing visual assessments for transportation projects and are appropriate for use on this project. Generally, assessment methods include defining viewsheds from where a build alternative can potentially be seen, characterizing the visual quality in landscape units within the viewshed, and selecting key observation points of the affected areas.

Visual and aesthetic impacts are defined by the extent to which the proposed project would change the environment in terms of visual quality and viewer sensitivity. According to guidance found in the Visual Impact Assessment for Highway Projects (FHWA 1988), the key terms for a visual impact analysis are defined as follows:

Visual quality refers to the evaluation of the visual experience of the public and is described in terms of vividness, intactness, and unity. *Vividness* refers to the way landscape components combine in distinctive and memorable visual patterns. *Intactness* refers to whether the natural and human-built visual patterns form a consistent landscape or whether highly contrasting features intrude into the view. *Unity* refers to the visual coherence and compositional harmony of the landscape considered as a whole. Visual character also informs visual quality; it refers to identifiable visual information, including visual elements and major environmental features.

Based on the considerations listed above, different levels of visual quality have been assigned to describe the viewsheds surrounding the project alternatives:

- **High Visual Quality** describes views with vivid, memorable, distinctive features in a landscape with compositional harmony, or where elements of the landscape fit together in a visual pattern that is free from encroaching visual elements that look out of place.
- **Medium Visual Quality** describes views with some unity or compositional harmony between elements of the landscape, where out-of-place visual elements do not substantially alter the perception of the landscape as a unit. These views lack vivid, memorable features and are generally characterized as common or ordinary.
- **Low Visual Quality** describes views that lack a dominant visual character, where views appear disorganized with features that seem out of place or views have some compositional harmony but include eyesore elements that can dominate one’s perception.

Viewer sensitivity refers to how viewers perceive the environment and what they find important. Viewer sensitivity can be affected by what the viewer is doing; the visual context; and the values, expectations, and interests of the viewer. Viewer exposure, which considers the number of viewers, where viewers are, and how long they are typically in a place, is also important to viewer sensitivity. For example, highway users driving by a site would have less exposure than surrounding neighbors.

For each potential viewer group within the study areas, viewer sensitivity is rated as high, medium, or low. High-sensitivity groups include viewers who highly value a particular view, and low-sensitivity groups include viewers who do not regard the visual setting as important to their activities. For example, residential viewers are typically in high-sensitivity groups, as well as persons driving for pleasure, tourists visiting an area to enjoy scenic features, and individuals engaged in recreation activities in parks or on trails. These viewers have a high awareness and sensitivity to their surroundings. People sightseeing on highways or driving through their neighborhood are considered to have medium to high viewer sensitivity. Commuters and other drivers primarily passing through an area are considered to have lower viewer sensitivity because they often become accustomed (and indifferent) to the views along their travel routes because of repetition and short viewing duration.

A medium sensitivity rating reflects the experience of people who view the visual context as a secondary feature of other activities. These could be people at work or shopping who may value a pleasant environment but are not at a location for the specific purpose of enjoying the scenery. Low viewer sensitivity generally describes the experience of persons engaged in activities that render the quality of their surroundings irrelevant or incidental. For example, drivers and vehicle occupants passing through an area are less sensitive to the visual context because they are focusing on features other than the surrounding landscape and generally have an average to low sensitivity.

Landscape units are geographic units in which visual quality impacts to viewers are assessed. Landscape units are defined both by viewshed area and landscape type and are generally visually homogenous (i.e., one viewshed and one landscape type). The landscape units encompassing the three Operations and Maintenance Facility (OMF) South build alternatives are defined by changes in topography, neighborhoods, streets, building types, and tree cover. The viewsheds within the landscape units range in width from half a block to 0.5 mile from the build alternatives.

Key observation points were selected within each landscape unit to illustrate views that are typical of the build alternatives, locations from where project features are particularly prominent, or views from sensitive viewpoints that would have views of the operating build alternative. At each key observation point, views of existing conditions are compared with simulated views of the build alternatives.

In addition, potential impacts to Resource Conservation Areas (formerly called “Beautification Areas”) along the Interstate 5 right-of-way were reviewed. These areas were originally acquired under the Highway Beautification Act of 1965 by FHWA and WSDOT for the “restoration, preservation and enhancement of scenic beauty adjacent to the highway.”

Operations and Maintenance Facility South

Appendix H4: Air Quality and Greenhouse Gas Technical Appendix

Federal Transit Administration

SOUNDTRANSIT

APPENDIX H4: AIR QUALITY AND GREENHOUSE GAS EMISSIONS TECHNICAL APPENDIX

1.1 Air Quality

Regional impacts on air quality would be caused by criteria air pollutants that would be emitted directly or indirectly as a result of the proposed project. “Criteria air pollutants” are six common air pollutants that can harm health and the environment, cause property damage, and are subject to certain federal air quality standards. Three agencies have jurisdiction over the ambient air quality in the Operations and Maintenance Facility (OMF) South study area: the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency.

1.1.1 Federal Clean Air Act

The Federal Clean Air Act, as amended, is the primary federal law that governs air quality. These laws and related regulations by EPA set standards for the concentration of pollutants in the air, known as the National Ambient Air Quality Standards. National Ambient Air Quality Standards have been established for the six criteria pollutants, which include carbon monoxide; nitrogen dioxide; ozone; particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers and smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$); and sulfur dioxide. In addition, national standards exist for lead and air toxics.

The National Ambient Air Quality Standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Washington State adopts current federal National Ambient Air Quality Standards in state regulations, administered by Ecology. Applicable state and federal ambient air quality standards are shown in Table H4-1.

Based on monitoring information for criteria air pollutants collected over a period of years, Ecology and EPA designate regions as being attainment or nonattainment areas for the criteria pollutants. Once a nonattainment area achieves compliance with the National Ambient Air Quality Standards, the area is considered an air quality maintenance area. Although portions of the Puget Sound region are in maintenance areas for $PM_{2.5}$ and PM_{10}, none of the build alternative sites are located within the $PM_{2.5}$ or PM_{10} maintenance areas.

1.1.2 Washington Clean Air Act

The Washington Clean Air Act, Revised Code of Washington (RCW 70.94), sets forth the state law regarding outdoor air pollution and establishes a system of regional air pollution control authorities to implement federal and state air pollution control regulations. Air pollution control regulations cover the emission of air contaminants that are injurious to health or that unreasonably interfere with the enjoyment of life and property. In general, cities and towns cannot develop their own air pollution regulations. However, they can enact local nuisance provisions and performance standards so long as they are not less stringent than those of the regional authority. Many local governments have enacted general nuisance ordinances, which typically contain provisions aimed at such problems as illegal burning, dust, and noxious odors.

Table H4-1 Ambient Air Quality Standards

Pollutant[1]	National (Primary)	National (Secondary)	Washington State
Carbon Monoxide			
8-Hour Average	9 ppm	NS	9 ppm
1-Hour Average	35 ppm	NS	35 ppm
Ozone			
8-Hour Average	0.07 ppm	0.07 ppm	0.07 ppm
Lead			
Rolling 3-Month Average	0.15 µg/m^3	0.15 µg/m^3	0.15 µg/m^3
Nitrogen Dioxide			
Annual Arithmetic Mean	0.053 ppm	0.053 ppm	53 ppb
1-Hour Average[2]	100 ppb	NS	100 ppb
Particulate Matter (PM_{10})			
24-Hour Average[3]	150 µg/m^3	150 µg/m^3	150 µg/m^3
Particulate Matter ($PM_{2.5}$)			
Annual Arithmetic Mean	9 µg/m^3	15 µg/m^3	12 µg/m^3
24-Hour Average	35 µg/m^3	35 µg/m^3	35 µg/m^3
Sulfur Dioxide (SO_2)			
Annual Arithmetic Mean	NS	NS	0.02 ppm
24-hour	NS	NS	0.14 ppm
3-hour	NS	0.5 ppm	0.5 ppm
1-hour[4]	75 ppb	NS	75 ppb

Notes:
NS = No standard established
µg/m^3 = micrograms per cubic meter
ppm = parts per million
ppb = parts per billion
(1) Annual standards never to be exceeded; short-term standards not to be exceeded more than once a year unless noted.
(2) The 3-year average of the annual 98th percentile of daily maximum 1-hour averages is not to be above this level.
(3) Not to be above this level on more than 3 days over 3 years with daily sampling.
(4) The 3-year average of the annual 99th percentile of daily maximum 1-hour averages is not to be above this level.

1.2 Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels, such as coal, oil, and natural gas.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity.

In the U.S., the main source of GHG emissions is transportation, followed by electricity generation. The dominant GHG emitted is carbon dioxide, mostly from fossil fuel combustion. There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing passenger vehicle travel activity, 3) transitioning to lower GHG-emitting fuels, and 4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued cooperatively.

1.2.1 Washington State Greenhouse Gas Reduction Goals

In 2020, Washington State adopted House Bill 2331 (HB 2331), which revised the state's GHG reduction goals. Under HB 2331, Washington must limit emission of GHGs to achieve the following reductions for the state:

- By 2020, reduce overall emissions of GHGs in the state to 1990 levels.
- By 2030, reduce GHG emissions to 45 percent below 1990 levels.
- By 2040, reduce overall emissions of GHGs in the state to 70 percent below 1990 levels.
- By 2050, reduce overall emissions of GHGs in the state to 95 percent below 1990 levels, and achieve net zero GHG emissions.

In addition, Sound Transit's Sustainability Plan, most recently updated in 2019, commits Sound Transit to integrating efficient operating practices at existing and new facilities, using energy-saving equipment to reduce energy demand, and maximizing intermodal transit connections to reduce automobile travel (Sound Transit 2019). The 2019 update includes goals focused on sustainable building and infrastructure and opportunities for transit-oriented development.

1.2.2 Climate Conditions and Local Air Quality

Washington is located on a windward coast in the mid-latitudes, producing a predominantly marine-type climate west of the Cascade Mountains. East of the Cascades, the climate possesses both continental and marine characteristics. The Puget Sound region's climate is mild, with wet and cloudy winters and cool and comparatively dry summers. In the interior valleys, measurable rainfall is recorded on 150 days each year; in the mountains and along the coast, there is rain 190 days each year.

Prevailing winds are typically from the south or southwest during the winter and from the north or northeast during the summer. Wind speeds are generally sufficient to disperse air pollutants released into the atmosphere. Air pollution is most noticeable in the late fall and winter under conditions of clear skies and light winds.

Typical air pollution sources near the study area include vehicular traffic, commercial and retail businesses, light industry, and residential wood-burning devices. While many types of pollutant sources are present, the largest contributors of criteria pollutant emissions are on-road vehicles, which contribute the majority of the carbon monoxide and ozone precursors. Secondary sources of emissions are commercial and industrial land uses.

Operations and Maintenance Facility South

Appendix H5: Water Resources Technical Appendix

Federal Transit Administration

SoundTransit

APPENDIX H5: WATER RESOURCES TECHNICAL APPENDIX

Listed below are the federal, state, and local regulations that govern the protection or use of water resources in the study area that are applicable to the activities of the Operations and Maintenance Facility South project. Local plans and/or policies that guide the use of water resources in the study area are also included. If a regulation, plan, or policy is updated to a newer version than what is listed below, the most recent version that is legally applicable to the project is used in the environmental analysis.

1.1 Federal

- Clean Water Act:
  - Section 401 (33 United States Code [USC] § 1341) – Water Quality Certification (delegated authority to the Environmental Protection Agency [EPA], Tribe, and/or state)
  - Section 402 (33 USC § 1342) – National Pollutant Discharge Elimination System (NPDES)
  - Section 404 (33 USC § 1344) – Permits for Dredge or Fill
- Coastal Zone Management Act, 16 USC 1451 et seq.
- National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973, 42 USC 4001 et seq.
- Floodplain Management Presidential Executive Order 11988 of May 24, 1977, and its subsequent updates (Executive Orders 13690 and 14030)
- Endangered Species Act Biological Opinion for the Implementation of the National Flood Insurance Program in the State of Washington (National Marine Fisheries Service 2008)
- Safe Drinking Water Act, 42 USC 300f et seq., Chapter 6A
- FTA Region 10 Standard Operating Procedures No. 22 Water Resources

1.2 State

- Water Quality Standards for Surface Waters, Washington Administrative Code (WAC) 173-201A
- Water Quality Standards for Groundwater, WAC 173-200
- Water Pollution Control Act, Revised Code of Washington (RCW) 90.48
- Washington State Hydraulic Code, WAC 220-660
- Flood Control Management Act, RCW 86
- Shoreline Management Act, RCW 90.58, WAC 173-18 and WAC 173-26
- NPDES Western Washington Phase I and Phase II Municipal Stormwater General Permits (Ecology 2019a)
- NPDES Construction Stormwater General Permit (Ecology 2021)
- Stormwater Management Manual for Western Washington (Ecology Manual) (Ecology 2019b)
- Washington State Department of Transportation (WSDOT) Highway Runoff Manual (WSDOT 2019)
- WSDOT Hydraulics Manual (WSDOT 2023)

1.3 Regional

- Sound Transit Link Design Criteria Manual, Revision 5 (Sound Transit 2021)
- Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Partnership 2012)

1.4 Local

1.4.1 City of Federal Way

- Shoreline Management, Federal Way Revised Code (FWRC) 15.05
- Critical Areas, FWRC 15.10
- Surface Water Management, Title 16 FWRC
- Zoning and Development – Environmentally Critical Areas, FWRC 19.145
- King County Surface Water Design Manual (King County 2021a)
- Federal Way Addendum to the King County Surface Water Design Manual (City of Federal Way 2017)
- King County Stormwater Pollution Prevention Manual (King County 2021b)

1.4.2 City of Kent

- Surface Water and Drainage Code, Kent City Code (KCC) 7.07
- Shoreline Master Program, KCC 11.04
- Critical Areas, KCC 11.06
- Surface Water Design Manual (City of Kent 2022)

REFERENCES

Appendix H1

King County. 2019. King County Assessor John Wilson. Available at: https://www.kingcounty.gov/depts/assessor.aspx. Accessed: November 10, 2020.

Appendix H2

City of Des Moines. 2020. Des Moines 2035: Charting Our Course for a Sustainable Future. Adopted 2015. Amended 2020. Available at: https://www.desmoineswa.gov/departments/planning_and_building/plan_development/comprehensive_plan. Accessed January 24, 2024.

City of Des Moines. 2023. City of Des Moines Code. Last amended November 2023.

City of Federal Way. 2019. Shoreline Master Program. Updated 2019. Available at: https://www.codepublishing.com/WA/FederalWay/html/FederalWay15/FederalWay1505.html. Accessed January 25, 2024.

City of Federal Way. 2023a. City of Federal Way 2015 Comprehensive Plan. Amended 2023. Available at: https://www.cityoffederalway.com/content/2015-comprehensive-plan. Accessed January 24, 2024.

City of Federal Way. 2023b. Federal Way Revised Code-Zoning. Last amended December 2023.

City of Federal Way. 2024. South Station Subarea Plan. Available at: https://engagefw.com/southstation. Accessed January 24, 2024.

City of Kent. 2011. City of Kent Midway Subarea Plan. Available at: https://www.kentwa.gov/home/showdocument?id=4893. Accessed July 14, 2020.

City of Kent. 2016. Change of Occupancy Submittal Requirements. Community Development Department.

City of Kent. 2019a. Kent Shoreline Master Program. Amended July 2019. Available at: www.kentwa.gov/home/showpublisheddocument/14993/637302339377330000. Accessed January 5, 2024.

City of Kent. 2019b. Zoning and Comprehensive Plan Maps. ArcGIS. Available at: https://www.arcgis.com/apps/MapSeries/index.html?appid=a8cd81ee741e40b0a7e8e7cdf2ed920b. Accessed: 2020.

City of Kent. 2022. City of Kent 2015 Comprehensive Plan. Amended 2022. Available at: https://www.kentwa.gov/doing-business/economic-development/planning. Accessed January 24, 2024.

City of Kent. 2023. Kent City Code. Amended December 2023. Accessed: 2020.

Fesler, Stephen. 2019. Federal Way Is Planning a Transit-Oriented District. The Urbanist. Available at: https://www.theurbanist.org/2019/12/04/federal-way-planning-a-possible-transit-oriented-district/. Accessed March 13, 2020.

Highline College. 2016. Highline College Master Plan. Available at: https://adminservices.highline.edu/facilities/master-plan/. Accessed November 6, 2020.

King County. 2019. King County Assessor John Wilson. Available at: https://www.kingcounty.gov/depts/assessor.aspx. Accessed November 6, 2020.

King County. 2022. 2016 Comprehensive Plan. Seattle, Washington. Amended 2022. Available at: https://kingcounty.gov/en/dept/executive/governance-leadership/performance-strategy-budget/regional-planning/king-county-comprehensive-plan. Accessed January 25, 2024.

King County. 2023. King County Zoning Code. Updated November 2023.

PSRC (Puget Sound Regional Council). 2013. The Growing Transit Communities Strategy – A Transit Corridor Action Agenda for the Central Puget Sound Region. Available at: https://www.psrc.org/sites/default/files/gtcstrategy.pdf. Accessed November 6, 2020.

PSRC. 2017. Land Use Vision Dataset. Available at: https://www.psrc.org/data-and-resources/data-psrc. Accessed July 14, 2020.

PSRC. 2018. Regional Transportation Plan. Available at: https://www.psrc.org/our-work/rtp. Accessed November 6, 2020.

PSRC. 2019. Vision 2040: The Growth Management, Environmental, Economic, and Transportation Strategy for the Central Puget Sound Region. Available at: https://www.psrc.org/vision-2040-documents. Accessed July 14, 2020.

PSRC. 2020. Vision 2050: A plan for the Central Puget Sound Region. Available at: https://www.psrc.org/sites/default/files/draft-vision2050-plan.pdf. Accessed November 6, 2020.

Sound Transit. 2013. Resolution No. R2013-30: Real Property Excess, Surplus and Disposition Policy. Sound Transit. Available at: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2013/Resolution%20R2013-30.pdf. Accessed July 14, 2020.

Sound Transit. 2014. Regional Transit Long- Range Plan. Adopted December 18, 2014. Available at: https://www.soundtransit.org/sites/default/files/documents/2015123_lrpupdate.pdf. Accessed July 14, 2020.

Sound Transit. 2018. Resolution No. R2018-10: Equitable Transit-Oriented Development (TOD) Policy. Available at: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2018/Resolution%20R2018-10.pdf. Accessed July 14, 2020.

Appendix H3

FHWA. 1988. Visual Impact Assessment for Highway Projects. FHWA-HI-88-054. USDOT, Federal Highway Administration, Washington, DC.

Appendix H4

Sound Transit. 2019. Sustainability Plan – 2019 Update. Available at: https://www.soundtransit.org/get-to-know-us/documents-reports/2019-sustainability-plan. Accessed July 14, 2020.

Appendix H5

City of Federal Way. 2017. Federal Way Addendum to The King County Surface Water Design Manual. Accessed January 2, 2020. Available at: https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/City%20Addendum%20to%202016%20KCSWDM.pdf.

City of Kent. 2022. City of Kent Surface Water Design Manual. Accessed January 29, 2024. Available at: https://www.kentwa.gov/home/showdocument?id=19172. July 21, 2022.

Ecology. 2019a. National Pollutant Discharge Elimination System Western Washington Phase I and Phase II Municipal Stormwater General Permits. Effective August 1, 2019. Modified October 20, 2021.

Ecology. 2019b. 2019 Stormwater Management Manual for Western Washington (Ecology Manual). Available at: https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm.

Ecology. 2021. National Pollutant Discharge Elimination System Construction Stormwater General Permit. Accessed June 29, 2023. Effective January 1, 2021.

King County. 2021a. Surface Water Design Manual. King County Department of Natural Resources and Parks. July 23, 2021. Available at: https://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/surface-water-design-manual/2021/2021-kcswdm-full-manual.pdf.

King County. 2021b. Stormwater Pollution Prevention Manual. Department of Natural Resources and Parks Water and Land Resources Division Stormwater Services Section. July 2021. Available at: https://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-pollution-prevention-manual/2021-stormwater-pollution-prevention-manual.pdf.

National Marine Fisheries Service. 2008. Endangered Species Act – Section 7 Consultation, Final Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation Implementation of the National Flood Insurance Program in the State of Washington. National Marine Fisheries Service Northwest Region. Tracking No.: 2006-00472. September 22, 2008.

Puget Sound Partnership. 2012. Low Impact Development Technical Guidance Manual for Puget Sound. Washington State University Research & Extension Center, Puyallup, WA, and Puget Sound Partnership, Tacoma, WA. Publication No. PSP 2012-3. December 2012. Available at: https://www.ezview.wa.gov/Portals/_1965/Documents/Background/2012_LIDmanual_PSP.pdf.

Sound Transit (Central Puget Sound Regional Transit Authority). 2021. Sound Transit Design Criteria Manual, Revision 5. Seattle, WA. February 2021.

WSDOT (Washington State Department of Transportation). 2019. Highway Runoff Manual. Engineering and Regional Operations, Development Division, Design Office. M31-16.05. April 2019. Available at: wsdot.wa.gov/publications/manuals/fulltext/M31-16/highwayrunoff.pdf.

WSDOT (Washington State Department of Transportation). 2023. Hydraulics Manual. Engineering and Regional Operations Hydraulics Office. M 23-2019. May 10, 2023. Available at: https://www.wsdot.wa.gov/publications/manuals/fulltext/M23-03/HydraulicsManual.pdf.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix I: Biological Assessment

Federal Transit Administration

SoundTransit

June 2024

Executive Summary

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct a new regional operations and maintenance facility (OMF) to serve its systemwide light rail expansions, including those into South King County and Pierce County. The Federal Transit Administration (FTA) and Sound Transit are currently conducting environmental review for the proposed OMF South project. FTA and Sound Transit are studying three alternatives. The Sound Transit Board identified the S 336th Street alternative as the Preferred Alternative in December 2021. The facility will require an expansion of the regional light rail system south from the terminus of the Federal Way Link Extension (FWLE) at the Federal Way Downtown Station to the location of the Preferred Alternative OMF facility site between S 336th Street and S 341st Place in the city of Federal Way, Washington. This Preferred Alternative is the proposed action described in this document as the OMF South project.

In addition to guideway construction and construction of the OMF South facility, the project will include new roadway construction, roadway frontage improvements, culvert removal/replacements, stream realignment, stormwater facilities, and mitigation for wetland, stream and associated buffer impacts.

Major project elements will include the following:

- Construction and operation of the OMF South facility, including the following:
  - Runaround tracks
  - Storage tracks sized for approximately 144 light rail vehicles (LRVs)
  - Maintenance building with service lanes for vehicle maintenance, repair, carwash, cleaning, painting, spare parts storage, operations, and administration
  - Yard area for outside storage
  - Maintenance of Way (MOW) building for indoor maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure
  - Training track that includes all the track installation configurations found in the Link system
  - Link System-Wide Storage (LSWS) building for receiving and indoor storing all parts of the Link light rail system, including LRV parts and components, MOW track and components, and Facilities Station parts and components
  - A traction power substation (TPSS) to boost the power to the overhead catenary system that powers the LRVs
  - Offices, locker rooms, lunchrooms, and other spaces for employees
  - Auto/truck access points
  - Employee, Sound Transit vehicle (nonrevenue vehicle), and visitor parking
  - Construction and operation of lead track connecting the OMF South facility with mainline and test tracks. The lead tracks will be on an elevated guideway. Elevated lead tracks would leave the northeast corner of the site and be approximately 600 feet long. Similarly, a pair of approximately 1,030-foot-long, elevated lead tracks would leave the southeast corner of the site to access the mainline tail tracks.
- Construction and operation of 1.4 miles of mainline track extending from the Federal Way Downtown Station to its end point at S 344th Street. In the future, this track would continue

south as part of the planned Tacoma Dome Link Extension (TDLE) project. The mainline track (guideway) will include at-grade, elevated, retained fill, and retained cut segments.

- Construction of 0.9 mile of test track running parallel and east of the mainline track (along I-5) from S 324th Street to just south of S 336th Street. The test track (guideway) will include at-grade, elevated, retained fill, and retained cut segments. Approximately 0.5 mile of access road will be constructed parallel with and on the west side of the test track.
- Construction of permanent treatment and flow control BMPs, as appropriate, for all new and replaced impervious surfaces
- Roadway improvements including replacements of culverts with fish-passable structures
- Stream relocation and daylighting activities

The project will create in-air noise, and it may increase suspended sediment loads during construction, as well as resulting in removal of forested wetland and riparian habitats. During operation, the project will discharge stormwater into municipal separate stormwater systems and receiving waters and streams in the Hylebos Creek watershed. The project will add 1.27 acres of pollution generating impervious surface (PGIS) area to the Hylebos Creek watershed but will provide water quality treatment for all new and replaced of PGIS, as well as a substantial amount of non-pollution generating impervious surface (NPGIS) in the project area.

The project includes up to three culvert replacements and one culvert removal (stream daylighting) as described below:

- Replacement of two culverts (WDFW Site ID numbers 933224 and 935274) will occur on a headwater tributary to East Fork Hylebos Creek (East Fork Hylebos Creek Tributary 0016A) at the current S 336th Street and S 344th Street stream crossings.
- Replacement of one culvert (WDFW Site ID number 935060) will occur on a headwater tributary to West Fork Hylebos Creek (West Fork Hylebos Creek Tributary 0014C) at the current S 336th Street stream crossing.
- Removal of one culvert (WDFW Site ID number 935271) will occur on East Fork Hylebos Creek Tributary 0016A and adjacent to a Washington State Department of Transportation (WSDOT) stormwater facility north of S 344th Street and within the WSDOT right of way (ROW).

One of these culverts identified above (935271) is currently on the list of WSDOT culverts that must be replaced under a 2013 federal court injunction requiring the correction of state-owned culverts in western Washington that block habitat for salmon and steelhead. The project design includes the removal of this culvert and daylighting the stream channel, plus the replacement of the three City of Federal Way-owned culverts (933224, 935274, and 935060).

The replacement crossing structures will be sized and configured to prevent them from becoming barriers in the future. The structures will be designed using the design criteria from WDFW’s 2013 Water Crossing Design Guidelines. The design of the structures will be determined through hydraulic, geotechnical, and structural engineering evaluations.

The project will remove/replace approximately 890- feet of culverted stream with approximately 520 feet of fish-passable culverts, and it will daylight approximately 570 linear feet of channel. Removing all four barriers will improve access to approximately 3.3 miles of stream habitat.

The project will avoid or minimize potential effects on Endangered Species Act-listed (ESA-listed) species and their habitats. No suitable habitat for ESA-listed terrestrial species is present in the terrestrial zone of effect within the action area, and stream reaches within 1.5 miles of the project limits are largely inaccessible to fish due to humanmade barriers downstream. No critical habitat for any ESA-listed species is present within 1 mile of the project limits. As such, the project is expected to have no direct effects on ESA-listed species or critical habitat. However, contaminants in stormwater runoff discharged to the municipal separate stormwater system and streams in and near the project limits may degrade water quality in downstream waters where ESA-listed fish and critical habitat are present. The proposed treatment strategy will reduce the frequency and intensity of exposure of ESA-listed fish to contaminants that may remain in treated stormwater compared to existing conditions. The aquatic zone of effect within the action area will therefore include East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C extending from the project limits downstream to where the mainstem Hylebos Creek enters the marine waters of the Hylebos Waterway as well as the upstream extents of both streams as a result of improving access to that habitat via removal of fish passage barriers.

The project may contribute to the long-term recovery of ESA-listed fish species by correcting barriers to fish migration in headwater reaches of East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C. After downstream barriers are corrected, these improvements will increase the amount of habitat accessible to anadromous salmonids.

Table ES-1 identifies the species and critical habitat addressed in this biological assessment (BA), and it summarizes the effect determinations. Table ES-2 summarizes project effects on essential fish habitat (EFH) for Pacific salmon, groundfish, and coastal pelagic species. The EFH assessment is included as Appendix A.

Table ES-1 ESA-Listed Species, Critical Habitats, and Recommended Determinations

Species[(1)]	Federal Jurisdiction	ESA Listing Status	Species Effect Determination	Critical Habitat Status	Critical Habitat Effect Determination
Streaked horned lark (*Eremophila alpestris strigata*)	USFWS	Threatened	No Effect	Designated; none in action area	No Effect
Yellow-billed cuckoo, Western U.S. Distinct Population Segment (DPS) (*Coccyzus americanus*)	USFWS	Threatened	No Effect	Designated; none in action area	No Effect
Marbled murrelet (*Brachyramphus marmoratus*)	USFWS	Threatened	No Effect	Designated; none in action area	No Effect
Taylor's checkerspot (*Euphydryas editha taylori*)	USFWS	Endangered	No Effect	Designated; none in action area	No Effect
Gray wolf (*Canis lupus*)	USFWS	Endangered	No Effect	None Designated	Not Applicable
North American wolverine (*Gulo gulo luscus*)	USFWS	Threatened	No Effect	None Proposed	Not Applicable
Bull trout (*Salvelinus confluentus*)	USFWS	Threatened	Not Likely to Adversely Affect	Designated; none in action area	No Effect
Chinook salmon, Puget Sound Evolutionarily Significant Unit (ESU) (*Oncorhynchus tshawytscha*)	NMFS	Threatened	Likely to Adversely Affect	Designated within the action area	Likely to Adversely Affect

Table ES-1 ESA-Listed Species, Critical Habitats, and Recommended Determinations (continued)

Species(1)	Federal Jurisdiction	ESA Listing Status	Species Effect Determination	Critical Habitat Status	Critical Habitat Effect Determination
Steelhead, Puget Sound DPS (*Oncorhynchus mykiss*)	NMFS	Threatened	Likely to Adversely Affect	Designated within the action area	Likely to Adversely Affect
Bocaccio, Puget Sound/ Georgia Basin DPS (*Sebastes paucispinis*)	NMFS	Endangered	Not Likely to Adversely Affect	Designated; none in action area	No Effect
Yelloweye rockfish Puget Sound/Georgia Basin DPS	NMFS	Threatened	Not Likely to Adversely Affect	Designated; none in action area	No Effect
Killer whale, Southern Resident DPS (*Orcinus orca*)	NMFS	Endangered	Not Likely to Adversely Affect	Designated; none in action area	Not Likely to Adversely Affect

Notes:
(1) ESU = evolutionarily significant unit; DPS = distinct population segment

Table ES-2 Effect Determinations for Essential Fish Habitat

Fishery	Effect Determination
Pacific Salmon	May Adversely Affect
Groundfish	May Adversely Affect
Coastal pelagic species	No Adverse Effect

Table of Contents

EXECUTIVE SUMMARY ES-1

1 INTRODUCTION AND PROJECT DESCRIPTION 1

1.1 Background and Consultation History 3

1.2 Project Location 3

1.3 Project Description 3

1.3.1 OMF South Site 5

1.3.2 Light Rail Guideway and Associated Tracks 5

1.3.3 Other Facilities and Structures 12

1.3.4 Transportation Improvements/Modifications 13

1.3.5 Culvert Removal/Replacements 14

1.3.6 Culvert Modifications 17

1.3.7 Mitigation 17

1.3.8 General Construction Activities and Equipment 17

1.3.9 Stormwater Management 18

1.3.10 Construction Schedule 29

1.3.11 Interrelated and Interdependent Activities 29

1.4 Performance Standards and Impact Avoidance, Minimization, and Mitigation Measures 30

1.4.1 Water Quality Protection During Construction 30

1.4.2 General Best Management Practices for Construction Near Sensitive Areas 31

1.4.3 Mitigation for Impacts to Sensitive Areas 31

1.4.4 Design and Operational Best Management Practices 31

1.4.5 Regulatory Controls 32

1.5 Project Action Area 33

1.5.1 Terrestrial Component of the Action Area 37

1.5.2 Aquatic Component of the Action Area 37

2 STATUS AND PRESENCE OF LISTED SPECIES AND DESIGNATED CRITICAL HABITAT IN THE PROJECT ACTION AREA 40

2.1 Species and Critical Habitat Lists and Listing Status 40

2.2 Presence of Federally Listed and Proposed Species in the Project Action Area 44

2.2.1 Bull Trout 44

2.2.2 Puget Sound Chinook Salmon 45

2.2.3 Puget Sound Steelhead 48

2.2.4 Puget Sound/Georgia Basin Bocaccio 50

2.2.5 Puget Sound/Georgia Basin Yelloweye Rockfish 50

2.2.6 Southern Resident Killer Whale 51

2.3 Presence of Federally designated or Proposed Critical Habitat in the Project Action Area 51

2.3.1 Puget Sound Chinook Salmon Critical Habitat 51
2.3.2 Puget Sound Steelhead Critical Habitat 52
2.3.3 Southern Resident Killer Whale 52

3 ENVIRONMENTAL SETTING 54

3.1 Terrestrial Species and Habitats 54

3.2 Aquatic Species and Habitats 56
3.2.1 West Fork Hylebos Creek Tributary 0014C 56
3.2.2 East Fork Hylebos Creek Tributary 0016A 60
3.2.3 West Fork Hylebos Creek 61
3.2.4 East Fork Hylebos Creek 62
3.2.5 Hylebos Creek (Mainstem) 62
3.2.6 Hylebos Waterway 63
3.2.7 Wetlands 63

4 EFFECTS OF THE ACTION 65

4.1 Direct Effects 65

4.2 Indirect Effects 65
4.2.1 Stormwater 66
4.2.2 Changes in Land Use 70
4.2.3 Changes in Prey Species Abundance 70
4.2.4 Riparian and Wetland Habitat Impacts 71
4.2.5 Stream Habitat Enhancement 72

4.3 Effects on the Physical and Biological Features of Critical Habitat 73
4.3.1 PBFs for Puget Sound ESU Chinook Salmon and Puget Sound DPS Steelhead 73

4.4 Effects of Interrelated and Interdependent Actions 74

4.5 Cumulative Impacts 74

5 CONCLUSIONS AND EFFECT DETERMINATIONS 75

5.1 Bull Trout 75

5.2 Puget Sound Chinook Salmon 76

5.3 Puget Sound Chinook Salmon Critical Habitat 77

5.4 Puget Sound Steelhead 77

5.5 Puget Sound Steelhead Critical Habitat 78

5.6 Bocaccio 78

5.7 Yelloweye Rockfish 79

5.8 Southern Resident Killer Whale 80

5.9 Southern Resident Killer Whale Critical Habitat 80

6 REFERENCES 81

Figures

Figure 1-1 Project Vicinity Map 2
Figure 1-2 Example Light Rail Vehicle 4
Figure 1-3 OMF South Project Elements: Mainline 6
Figure 1-4 OMF South Project Elements: OMF Site 7
Figure 1-5 OMF South Site Layout 8
Figure 1-6 Example Vegetation Clearing Zone 9
Figure 1-7 Construction of an Elevated Guideway 10
Figure 1-8 Falsework Columns Under Construction 11
Figure 1-9 Fish Passage Barriers in the Hylebos Creek Watershed 15
Figure 1-10 Project TDAs - Mainline 21
Figure 1-11 Project TDAs – OMF South Site 22
Figure 1-12 Stormwater Facilities: Mainline 26
Figure 1-13 Stormwater Facilities: OMF Site 27
Figure 1-14 Action Area: Expanded View 34
Figure 1-15 Action Area: OMF Site 35
Figure 1-16 Action Area: Mainline 36
Figure 3-1 Land Use in the Project Area 55
Figure 3-2 Streams and Wetlands: Expanded View 57
Figure 3-3 Streams and Wetlands: OMF Site 58
Figure 3-4 Streams and Wetlands: Mainline 59

Tables

Table ES-1 ESA-Listed Species, Critical Habitats, and Recommended Determinations 3

Table ES-2 Effect Determinations for Essential Fish Habitat 4

Table 1-1 Light Rail Guideway Types and Length 9

Table 1-2 Culvert Removal/Replacement Summary 14

Table 1-3 Culvert Modification Summary 17

Table 1-4 Existing and Proposed Impervious Area (Acres) 20

Table 1-5 Existing and Proposed PGISs (Acres), Treatment, and Discharge 23

Table 2-1 ESA-Listed Species and Critical Habitats 41

Table 2-2 Distribution and Impediments to Chinook Salmon Presence in the Project Area 46

Table 2-3 Distribution and Impediments to Steelhead Presence in the Project Area 49

Table 3-1 Summary Characteristics of Wetlands in the Project Area by Drainage Basin 64

Table 4-1 Summary of Potential Stream and Stream Buffer Impacts 71

Table 4-2 Summary of Wetland and Wetland Buffer Impacts (Acres) 72

Table 5-1 Summary of Effect Determinations for the OMF South Project 75

Appendices

Appendix A Essential Fish Habitat Assessment

Appendix B Pre-BA Meeting Notes

Appendix C Typical Light Rail Guideway Profiles

Appendix D Preliminary Stream and Culvert Design Drawings

Appendix E USFWS Official Species List

Appendix F Project Area Photographs

Acronyms and Abbreviations

BA	biological assessment
BMP	best management practice
BPA	Bonneville Power Administration
Corps	U.S. Army Corps of Engineers
CSTW/DP	Combined stormwater treatment wetland/detention pond
dBA	Decibels (A-weighted scale)
DPS	distinct population segment
Ecology	Washington Department of Ecology
EFH	essential fish habitat
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FHWA	Federal Highway Administration
FR	Federal Register
FTA	Federal Transit Administration
FWLE	Federal Way Link Extension
HUC	hydrologic unit code
I-5	Interstate 5
Leq	equivalent continuous sound level
LRV	light rail vehicle
LSWS	Link system wide storage
MOW	maintenance of way
NCEI	National Centers for Environmental Information
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NPGIS	non-pollution generating impervious surface area
NWIFC	Northwest Indian Fisheries Commission
OHWL	ordinary high water line
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
PBF	physical and biological feature
PGIS	pollution-generating impervious surface
Project	proposed action

RC	retained cut
RF	retained fill
Sound Transit	Central Puget Sound Regional Transit Authority
SR	State Route
SRKW	Southern Resident Killer Whale
SWIFD	Statewide Washington Integrated Fish Distribution
SWM	stormwater management
SWPPP	stormwater pollution prevention plan
TDA	threshold discharge area
TDLE	Tacoma Dome Link Extension
TESC	temporary erosion and sediment control
TPSS	Traction Power Sub Station
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

1 INTRODUCTION AND PROJECT DESCRIPTION

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct a new regional operations and maintenance facility (OMF) to serve its planned systemwide light rail expansions, including those into South King County and Pierce County. The proposed action is known as the Operations and Maintenance Facility South (OMF South) project (Figure 1-1). The Federal Transit Administration (FTA) and Sound Transit are currently conducting environmental review for the OMF South project. FTA and Sound Transit are studying three alternatives. The Sound Transit Board identified the S 336th Street alternative as the Preferred Alternative in December 2021. For the purposes of this BA, the Preferred Alternative is the proposed action that is under consideration and is herein after referred to as the OMF South project. The OMF South project will require an expansion of the regional light rail system south from the terminus of the Federal Way Link Extension (FWLE) at the Federal Way Downtown Station to the OMF South facility site between S 336th Street and S 341st Place in the city of Federal Way, Washington. The project is also located immediately west of, and parallel with, the Interstate 5 (I-5) corridor. The proposed action (project) is part of the Sound Transit 3 Plan, which voters approved funding for in 2016.

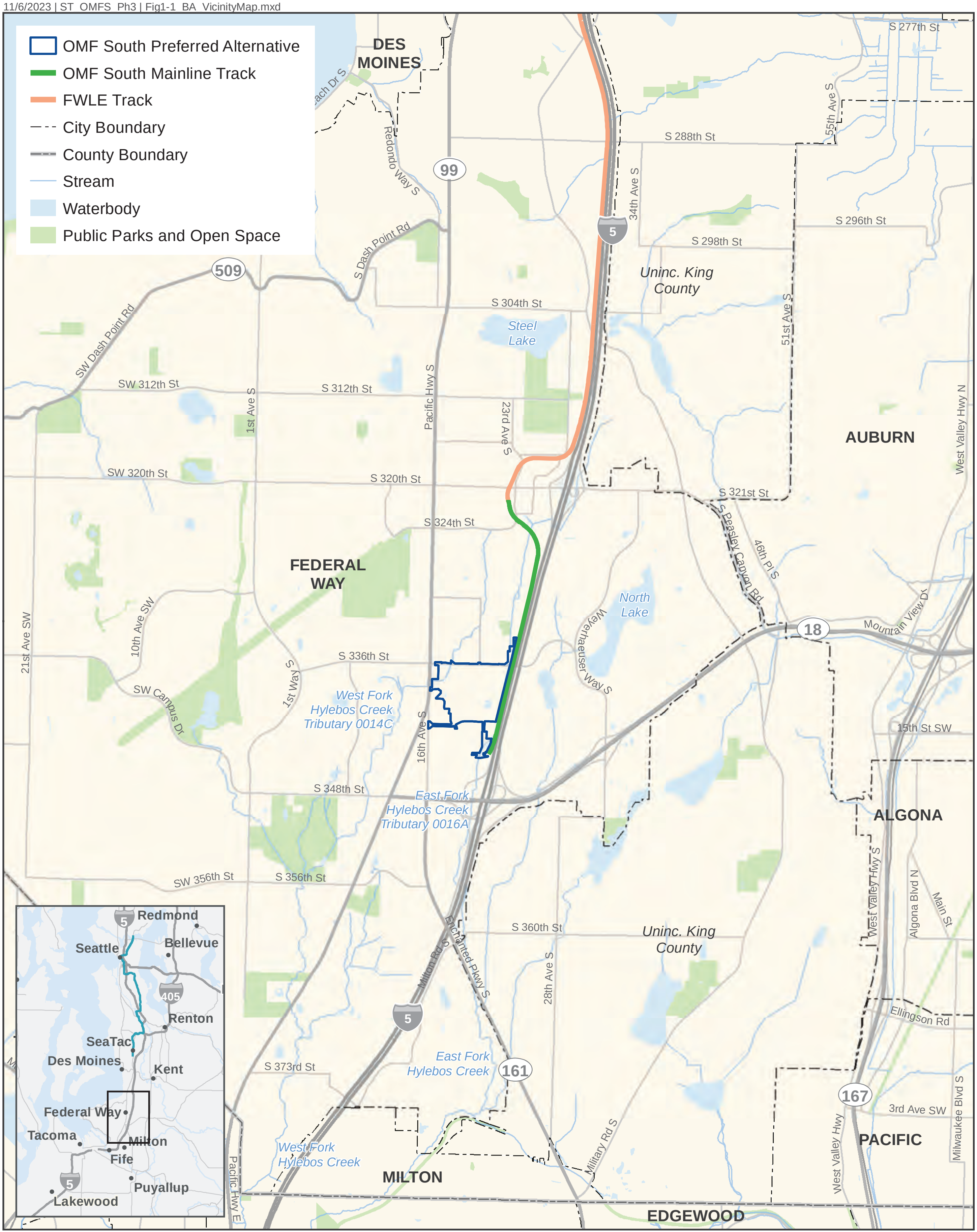
The OMF South project supports Sound Transit’s Link light rail system expansion and the related increase in its light rail vehicle fleet and daily operations. The project includes measures to preserve and promote a healthy and sustainable environment by minimizing adverse impacts to people and the natural and built environments. The purpose of the OMF South is as follows:

- Provide a facility with the capacity to receive, test, commission, store, maintain, and deploy vehicles to support the intended level of service for the system-wide Link light rail system expansion.
- Support efficient and reliable Link light rail service that minimizes system operating costs.
- Support and connect efficiently to the regional system and be technically and financially feasible to build, operate, and maintain, consistent with the Sound Transit 3 Plan and Sound Transit’s Regional Transit Long-Range Plan.

The project is needed for the following reasons:

- The current regional system lacks a facility with enough capacity and a suitable location to support the efficient and reliable long-term operations for system-wide light rail expansion, including the next phase of expansion in King and Pierce Counties.
- New light rail maintenance and storage capacity has to be available with enough time to accept delivery of and commission new vehicles to both meet fleet expansion needs and store existing vehicles while the new vehicles are tested and prepared.

The purpose of this biological assessment (BA) is to evaluate the potential effects of the proposed action on federally listed and proposed species and designated critical habitat in accord with the provisions of Section 7 of the Endangered Species Act (ESA) of 1973, as amended (ESA; 16 United States Code [USC] §§1531-1543). Section 7(a)(2) of the ESA specifies that each federal agency shall, in consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of critical habitat. This BA also analyzes effects on essential fish habitat (EFH) under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act (see Appendix A).



OMF South Preferred Alternative
OMF South Mainline Track
FWLE Track
City Boundary
County Boundary
Stream
Waterbody
Public Parks and Open Space
DES MOINES
FEDERAL WAY
AUBURN
ALGONA
PACIFIC
MILTON
EDGEWOOD
Uninc. King County
Uninc. King County
S 277th St
S 288th St
S 296th St
S 298th St
S 304th St
S 312th St
SW 312th St
SW 320th St
S 320th St
S 321st St
S 324th St
S 336th St
S 348th St
SW 356th St
S 356th St
S 360th St
S 373rd St
15th St SW
3rd Ave SW
Ellingson Rd
Mountain View Dr
55th Ave S
34th Ave S
51st Ave S
46th Pl S
S Peasley Canyon Rd
Weyerhaeuser Way S
23rd Ave S
Pacific Hwy S
1st Ave S
10th Ave SW
21st Ave SW
1st Way S
16th Ave S
SW Campus Dr
SW Dash Point Rd
S Dash Point Rd
Redondo Way S
Redondo Beach Dr S
West Valley Hwy N
West Valley Hwy S
West Valley Hwy
Algona Blvd N
Main St
Milwaukee Blvd S
Milton Rd S
Enchanted Pkwy S
28th Ave S
Military Rd S
Pacific Hwy E
Steel Lake
North Lake
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
East Fork Hylebos Creek
West Fork Hylebos Creek
5
5
99
509
18
161
167
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood
5
5
N
0
0.5
1 Miles

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023).
FWLE = Federal Way Link Extension (under construction)

FIGURE 1-1
Vicinity Map
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Sound Transit has prepared this BA to facilitate consultation between the FTA, NMFS, and USFWS under Section 7 of the ESA. The primary federal nexus for this project is federal aid funding provided by FTA. In addition, the proposed action will also require a permit from the U.S. Army Corps of Engineers (Corps) and approval from the Federal Highway Administration (FHWA) for use of the limited access right-of-way along I-5. In addition, the proposed action will result in the relocation of a Bonneville Power Administration (BPA) electric power transmission tower and transmission lines. BPA will consult on this action separately. This BA supports the ESA Section 7 compliance requirements for all federal agencies.

1.1 Background and Consultation History

A Pre-BA meeting was held on August 24, 2023, and included representatives from USFWS, NMFS, FTA, and Sound Transit. Notes from the pre-BA meetings are included in Appendix B. Topics covered during the meeting included stormwater management, injunction culverts, known fish use and existing barriers, and the effects of N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine-quinone (6PPD-quinone) on ESA-listed fish.

The meeting included a brief discussion of the OMF South purpose and need followed by a description of the project and schedule; action area; species addressed; existing habitat conditions; direct and indirect effects; and provisional effect determinations for listed species, critical habitat, and EFH. Overall, there was preliminary agreement on the effects determinations provided except for bocaccio and yelloweye rockfish. The provisional effect determination for both species was identified as "no effect." However, because of the potential presence of larval rockfish within the lower tidally influenced portion of Hylebos Creek and the potential for exposure to stormwater related contaminants, NMFS staff indicated that a "may affect, not likely to adversely affect" was warranted. The USFWS indicated that if project related mitigation were to include any in-water work, then the effect determination for bull trout, would likely need to be elevated. Currently the effect determination for bull trout is "may affect, not likely to adversely affect."

1.2 Project Location

The project is located entirely within the city of Federal Way, Washington (NW1/4 Section 21, Township 21N, Range 04 East: NW and SW ¼ Section 16, Township 21 North, Range 04 East). The project is contained within Water Resource Inventory Area (WRIA) 10, the Puyallup White Watershed (6th Field Hydrologic Unit Code (HUC) 17110019025 – Hylebos Creek -Frontal Commencement Bay).

The proposed OMF South project is located between S 336th Street and S 341st Place and between Interstate-5 (I-5) and State Route 99 (SR 99). The OMF South project includes connections to the terminus of the Federal Way Link Extension (FWLE) at the Federal Way Downtown Station by a guideway that will extend from the Federal Way Downtown Station to S 344th Street. Figure 1-1 shows the location of the OMF South facility and the associated mainline, lead, and test tracks.

1.3 Project Description

OMF sites are necessary throughout Sound Transit's light rail network to clean, store, maintain, and deploy light rail vehicles (LRVs) (Figure 1-2). The OMF South would also require construction of mainline track to connect with the terminus of FWLE at the Federal Way

Downtown Station (opening in 2026) to the north and the planned future Tacoma Dome Link Extension (TDLE) to the south.

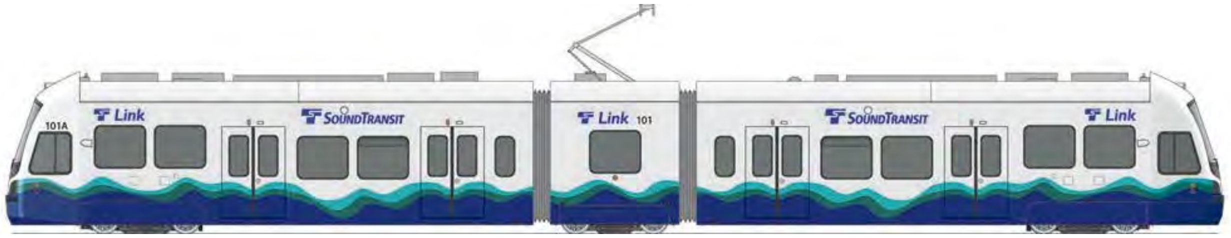


Figure 1-2 Example Light Rail Vehicle

Major project elements will include the following:

- Construction and operation of the OMF South facility, including the following:
  - Runaround tracks
  - Storage tracks sized for a minimum of 144 light rail vehicles (LRVs)
  - Maintenance building with service lanes for vehicle maintenance, repair, carwash, cleaning, painting, spare parts storage, operations, and administration
  - Yard area for outside storage
  - Maintenance of Way (MOW) building for indoor maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure
  - Training track that includes all the track installation configurations found in the Link system
  - Link System-Wide Storage (LSWS) building for receiving and indoor storing all parts of the Link light rail system, including LRV parts and components, MOW track and components, and Facilities Station parts and components
  - A traction power substation (TPSS) to boost the power to the overhead catenary system that powers the LRVs
  - Offices, locker rooms, lunchrooms, and other spaces for employees
  - Auto/truck access points
  - Employee, Sound Transit vehicle (nonrevenue vehicle), and visitor parking
  - Construction and operation of lead track connecting the OMF South facility with mainline and test tracks. The lead tracks will be on an elevated guideway. Elevated lead tracks would leave the northeast corner of the site and be approximately 600 feet long. Similarly, a pair of approximately 1,030-foot-long, elevated lead tracks would leave the southeast corner of the site to access the mainline tail tracks.
- Construction and operation of 1.4 miles of mainline track extending from the Federal Way Downtown Station to its end point at S 344th Street. In the future, this track would continue south as part of the planned Tacoma Dome Link Extension (TDLE project). The mainline track (guideway) will include at-grade, elevated, retained fill, and retained cut segments.
- Construction of 0.9 mile of test track running parallel and east of the mainline track (along I-5) from S 324th Street to just south of S 336th Street. The test track (guideway) will include at-grade, elevated, retained fill, and retained cut segments. Approximately 0.5 mile of access road will be constructed parallel with and on the west side of the test track.

- Construction of permanent treatment and flow control BMPs, as appropriate, for all new and replaced impervious surfaces
- Roadway improvements including replacing culverts with fish passable structures
- Stream relocation and daylighting activities
- Mitigation for wetland and stream impacts

Project elements are shown in Figure 1-3 and Figure 1-4 except for mitigation. Potential mitigation sites are still being selected but for the purpose of this document, all on-site and off-site mitigation opportunities will be located in the Hylebos Creek watershed. More detailed descriptions of major project elements are included in the following sections.

1.3.1 OMF South Site

The OMF South facility site is approximately 66 acres. It will include the maintenance building, the MOW building, the Link System-Wide Storage Building, storage tracks, parking, training tracks, lead tracks, and yard areas. There will be approximately 480 parking spaces, including spaces for employees, visitors, accessible parking, and nonrevenue Sound Transit vehicles. The yard area will be approximately 5.7 acres. Figure 1-5 provides more detail on location of specific OMF South facilities.

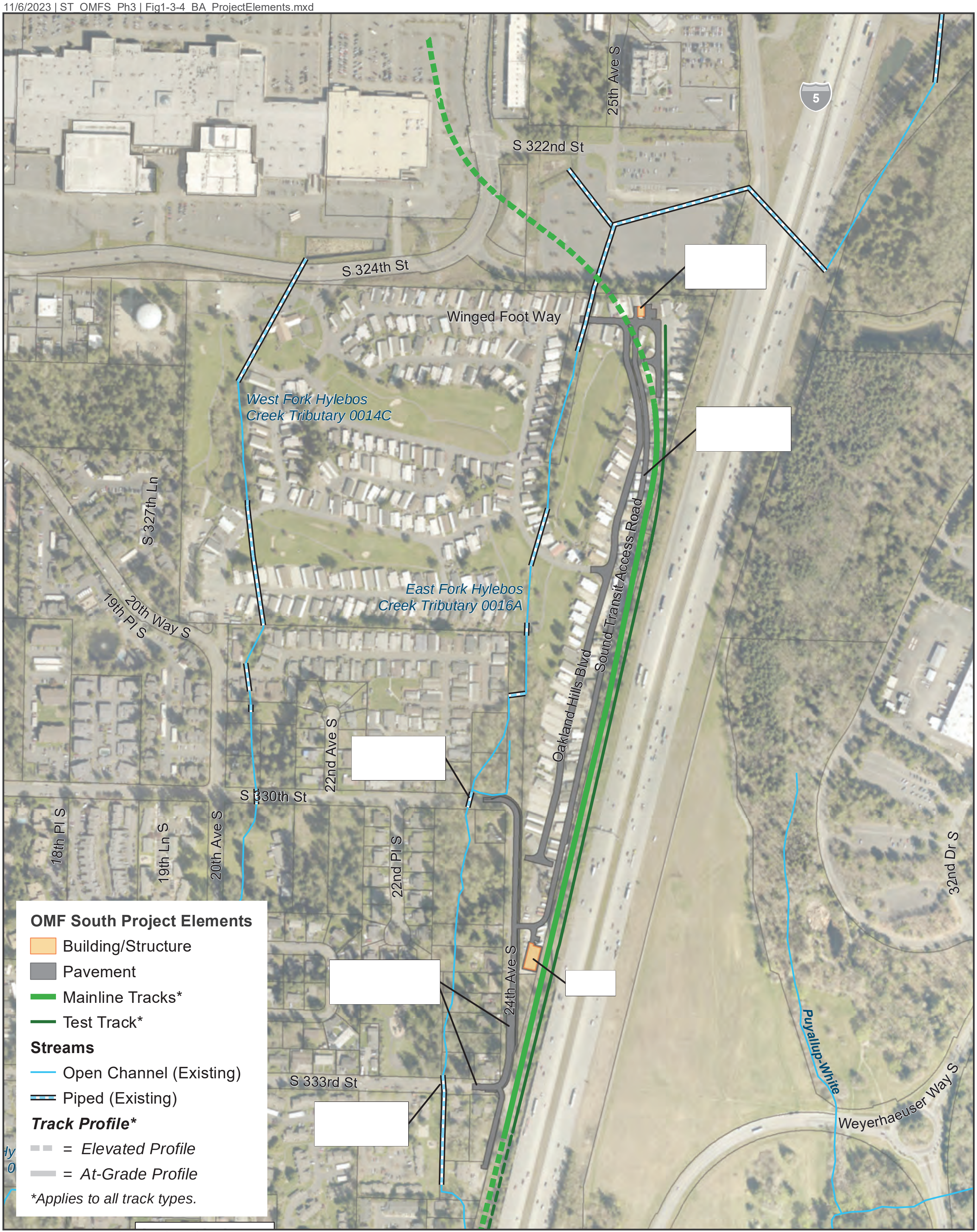
The project will also require lead tracks for LRVs to access the mainline tracks. Two elevated lead tracks will extend from the northeast corner of the site to the mainline tracks, and they will each be approximately 600 feet long. Similarly, two elevated tracks, each approximately 1,000 feet long, will extend from the southeast corner of the site connecting to the tail tracks.

Construction of the project will require modifications to local roadway systems, including replacing 20th Avenue S along the east side of the site with an extension of 18th Place S from 336th Street to 340th Street along the west side of the site. Additionally, 21st Avenue South will be extended southward to a new intersection with S 344th Street. Transportation related project elements are discussed further in Section 1.3.4.

1.3.2 Light Rail Guideway and Associated Tracks

The light rail guideway width will vary. In areas with two tracks, the width will be from 30 to 40 feet wide. In areas with three to four parallel tracks, the width will be from 50 to 60 feet wide. The transit right-of-way will include room for poles and the overhead catenary system needed to power the trains. Some sections of the right-of-way will be wider to accommodate TPSSs, signal bungalows, maintenance driveways, and emergency access points, with walls or barriers to restrict other access. The test track constructed along I-5 will require construction of a new limited access road. Elevated structures will require support columns or other bridging support structures. For at-grade guideway in areas with slopes, retaining walls might be needed where the alignment will cut into an adjacent hillside, or to support fill material below the guideway. In some places, sound walls will be added to the guideway or to retaining walls to reduce noise impacts. Table 1-1 identifies the approximate length for the different track profile types. The structure types are described below, and cross-sectional views of the guideway profiles can be found in Appendix C.

11/6/2023 | ST OMFS Ph3 | Fig1-3-4 BA ProjectElements.mxd



S 322nd St
25th Ave S
5
S 324th St
Winged Foot Way
West Fork Hylebos
Creek Tributary 0014C
S 327th Ln
East Fork Hylebos
Creek Tributary 0016A
20th Way S
19th Pl S
Sound Transit Access Road
Oakland Hills Blvd
22nd Ave S
S 330th St
18th Pl S
19th Ln S
20th Ave S
22nd Pl S
24th Ave S
32nd Dr S
Puyallup-White
Weyerhaeuser Way S
S 333rd St
OMF South Project Elements
🟧 Building/Structure
⬛ Pavement
Mainline Tracks*
Test Track*
Streams
Open Channel (Existing)
Piped (Existing)
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.

Data Sources: King County; City of Federal Way.
Notes: OMF = Operation and Maintenance Facility; MOW = Maintanence of Way;
LSWS = Link System-Wide Storage; TPSS = Traction Power Substation

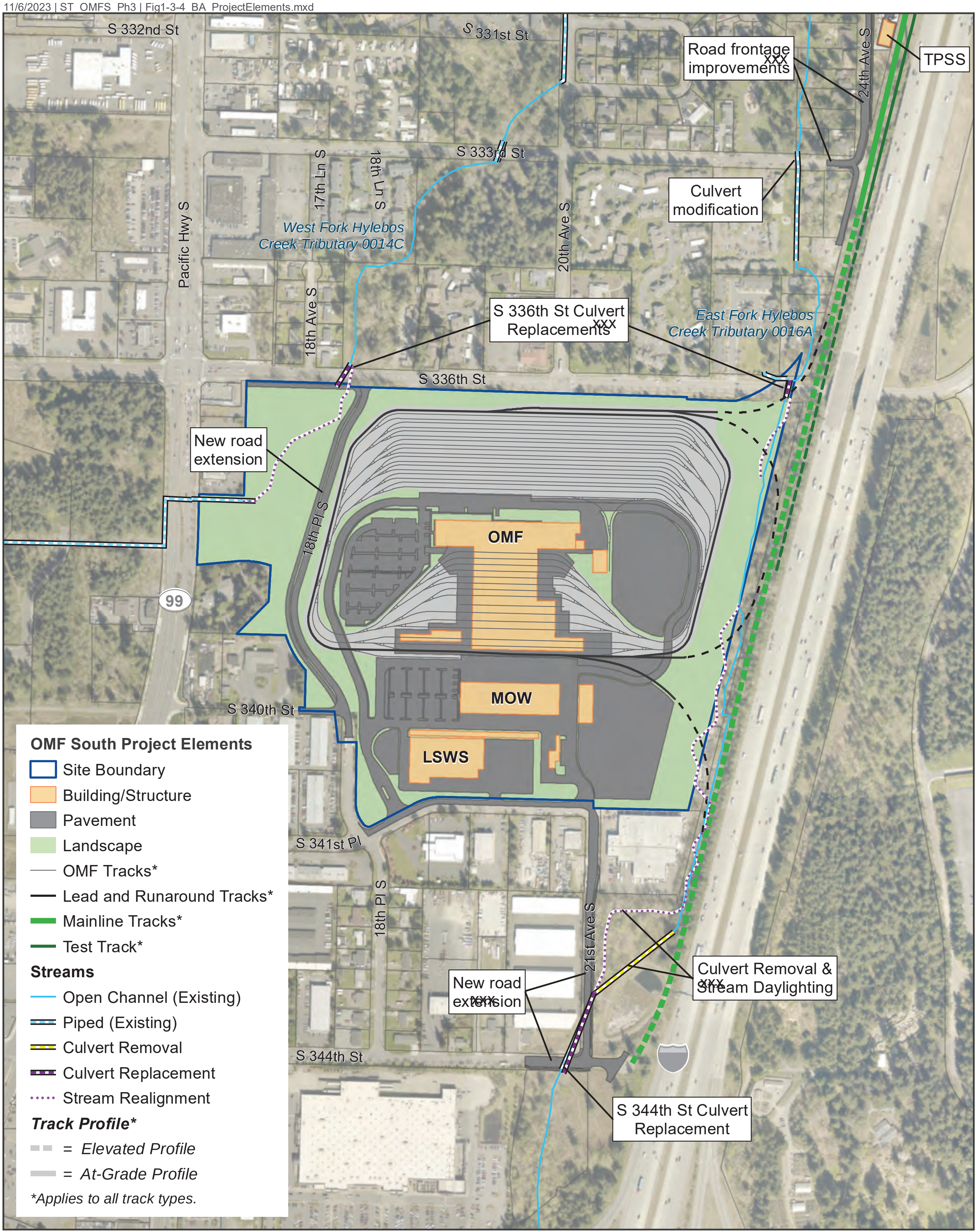
N

0 500 1,000 Feet

FIGURE 1-3
Project Elements: Mainline
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


S 332nd St
S 331st St
Road frontage improvements
TPSS
24th Ave S
S 333rd St
17th Ln S
18th Ln S
Culvert modification
Pacific Hwy S
West Fork Hylebos Creek Tributary 0014C
20th Ave S
S 336th St Culvert Replacements
East Fork Hylebos Creek Tributary 0016A
18th Ave S
S 336th St
New road extension
18th Pl S
OMF
99
MOW
S 340th St
LSWS
S 341st Pl
18th Pl S
21st Ave S
Culvert Removal & Stream Daylighting
New road extension
S 344th St
S 344th St Culvert Replacement
OMF South Project Elements
Site Boundary
Building/Structure
Pavement
Landscape
OMF Tracks*
Lead and Runaround Tracks*
Mainline Tracks*
Test Track*
Streams
Open Channel (Existing)
Piped (Existing)
Culvert Removal
Culvert Replacement
Stream Realignment
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.

Data Sources: King County; City of Federal Way.
Notes: OMF = Operation and Maintenance Facility; MOW = Maintanence of Way;
LSWS = Link System-Wide Storage; TPSS = Traction Power Substation

N

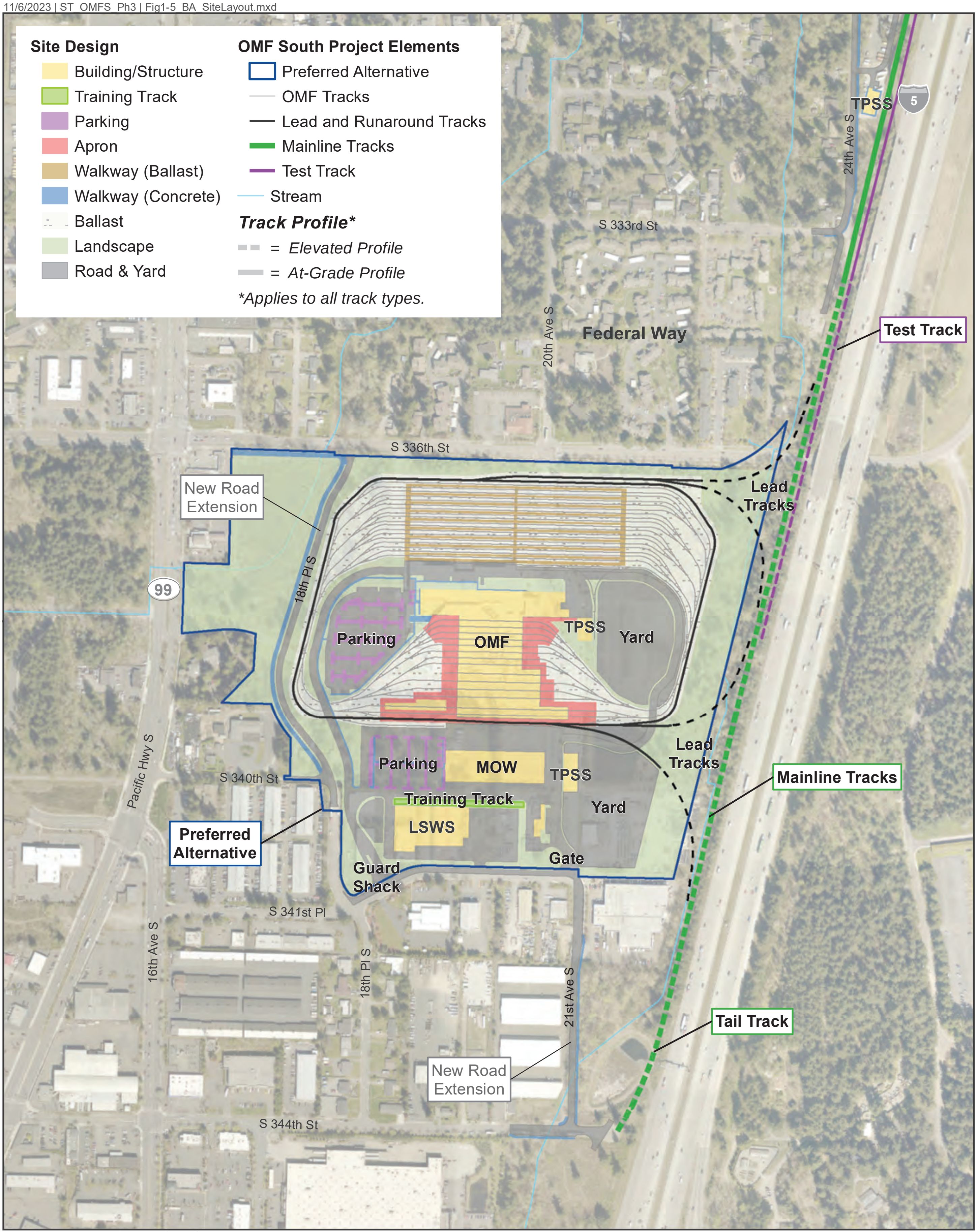
0 500 1,000 Feet

FIGURE 1-4
Project Elements: OMF Site
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

11/6/2023 | ST OMFS Ph3 | Fig1-5 BA SiteLayout.mxd


Site Design
🟨 Building/Structure
🟩 Training Track
🟪 Parking
🟥 Apron
🟫 Walkway (Ballast)
🟦 Walkway (Concrete)
Ballast
Landscape
⬜ Road & Yard
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Stream
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.
TPSS
5
24th Ave S
S 333rd St
20th Ave S
Federal Way
Test Track
S 336th St
New Road Extension
Lead Tracks
99
18th Pl S
Parking
OMF
TPSS
Yard
Pacific Hwy S
S 340th St
Parking
MOW
TPSS
Lead Tracks
Mainline Tracks
Training Track
Yard
LSWS
Preferred Alternative
Guard Shack
Gate
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Data Sources: King County; City of Federal Way.
Notes: OMF = Operation and Maintenance Facility; MOW = Maintanence of Way;
LSWS = Link System-Wide Storage; TPSS = Traction Power Substation

N

0 500 1,000 Feet

FIGURE 1-5
OMF South Conceptual Site Layout
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Table 1-1 Light Rail Guideway Types and Length

Light Rail Guideway Profile Type	Length (ft)
Elevated Guideway	
Elevated Mainline Guideway	3,500
Elevated Triple Track (Mainline and Test Track)	680
Elevated Four Track (Mainline, Test, and Lead Track)	840
At-Grade Guideway	
At-grade Triple Track	400
At Grade Independent Test Track	190
At-grade Mainline and Independent Test Track	1,060
Retained Cut/Retained Fill Guideway	
Triple Track Mainline – Mainline on retained fill (RF) and Test Track on Retained Cut (RC)	370
RF Triple Track	1,020
RF Independent Test Track	100

Safety considerations require that vegetation be cleared near all guideways, necessitating a tree-clear zone within 20 feet of the structure at the time of construction. After construction, low growing vegetation such as native shrubs can be planted within the permanent tree-clear zone in critical areas and stream buffers, which will typically extend approximately 15 feet on either side of the guideway tracks (Figure 1-6).

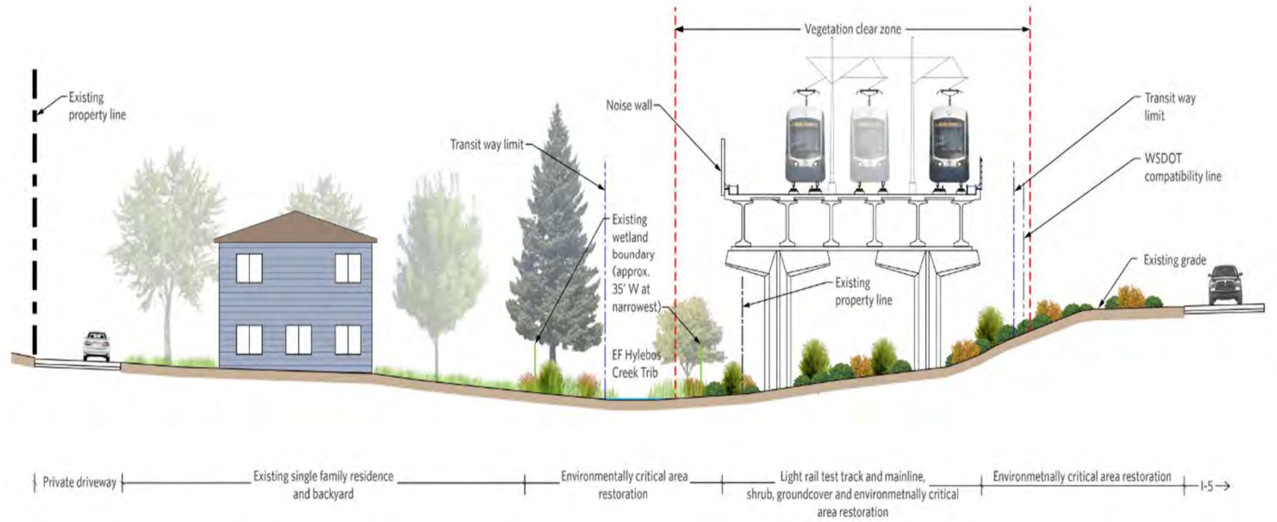

Vegetation clear zone
Existing property line
Noise wall
Transit way limit
Transit way limit
WSDOT compatibility line
Existing wetland boundary (approx. 35' W at narrowest)
Existing property line
Existing grade
EF Hylebos Creek Trib
Private driveway
Existing single family residence and backyard
Environmentally critical area restoration
Light rail test track and mainline, shrub, groundcover and environmetnally critical area restoration
Environmetnally critical area restoration
I-5

Figure 1-6 Example Vegetation Clearing Zone

The total width of the guideway (elevated or at grade) will vary between 30 and 60 feet wide; adding the clear zone to this width will result in an approximately 60- to 90-foot-wide area in which vegetation will be restricted to no vegetation or low-growing species. Vegetation within the footprint of at-grade guideway will be permanently removed. Regulations also require at least 5 feet of vertical clearance between the tops of mature plants and the bottom of any elevated structures. Vegetation outside the guideway will be pruned back to a clear zone between the edge of the guideway and the edge of the tree canopy. Where tree heights will reach above the height of the safety railing, a larger clear zone must be provided that will extend from the edge of the guideway to the edge of the tree canopy. In general, vegetation growth beneath elevated guideway, outside of sensitive or critical areas and associated buffers, is limited to allow for access and minimize long-term maintenance.

1.3.2.1 Elevated Guideway

An elevated guideway must have at least 16.5 feet of vertical clearance over roadways, but existing topography and other considerations can result in a profile as high as 50 feet or more. Pier supports holding up the guideway are typically about 10 feet in diameter at the ground; the underground support structure may consist of four 10-foot columns with a concrete foundation as large as 50 feet by 50 feet on top of the piles. An elevated guideway can travel, along the side of the roadway, or in off-street corridors. Approximately one-half of the guideway through the OMF South corridor is elevated. Figure 1-7 provides an example of an elevated profile under construction. Elevated guideway profiles along the alignment will include both double-, triple-, and four-track profiles with the double-track profile consisting of a mainline track in both the north and south directions. The triple-track profile will include the mainline tracks and test track, and the four-track profile will include the mainline tracks, test track and the lead track. Examples of elevated guideway profiles along the alignment can be found in Appendix C.

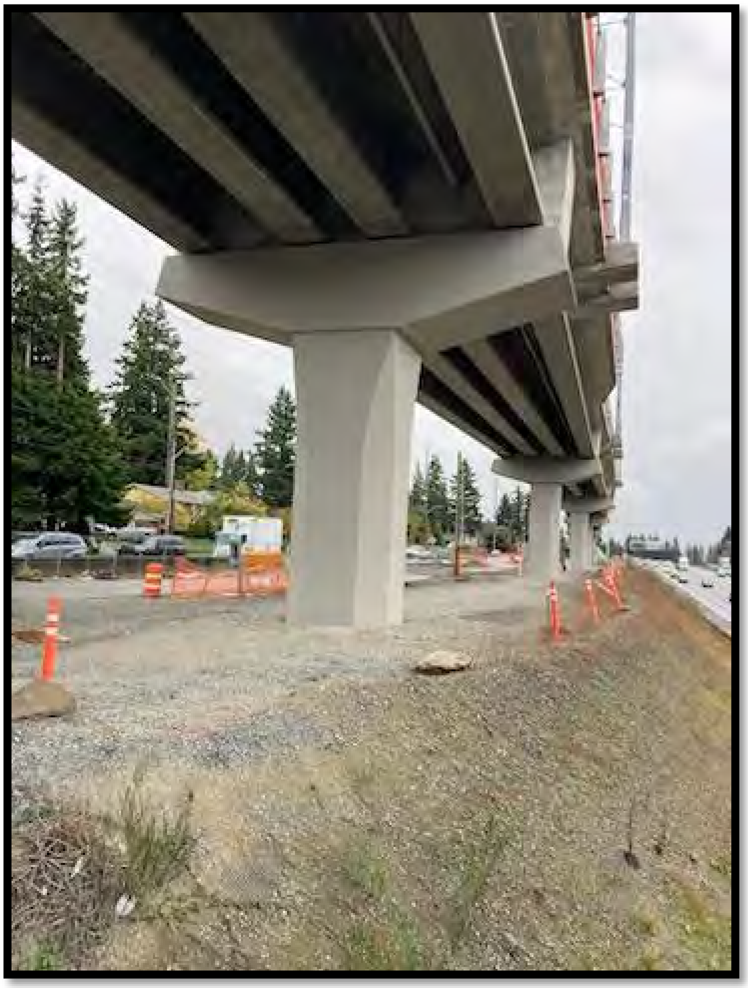


Figure 1-7 Construction of an Elevated Guideway

Construction of an elevated guideway will involve demolition of structures, clearing, grading, relocating utilities, preparing necessary construction access, and building the guideway structure. A temporary construction road will typically be built for constructing elevated guideways in undeveloped areas or where access is not available from existing roads. Constructing an elevated guideway within existing street rights of way may require temporary closure of some traffic lanes and detours.

Elevated guideways, similar to structures such as highway bridges, are generally reinforced concrete, steel, or combinations of both. Construction will begin with preparation work to build foundations, which may consist of shallow spread footings, deep-driven or augured piles, or drilled shafts. Once foundations are in place, concrete columns will be constructed. The elevated superstructure could be steel, cast-in-place concrete, precast concrete, or segmental concrete. If steel and cast-in-place concrete are used, temporary support structures referred to as false-work could be required to support the superstructure while the concrete is poured and while the cast concrete gains enough strength during curing to support itself, or while the steel beams are joined through welding or bolting (Figure 1-8).

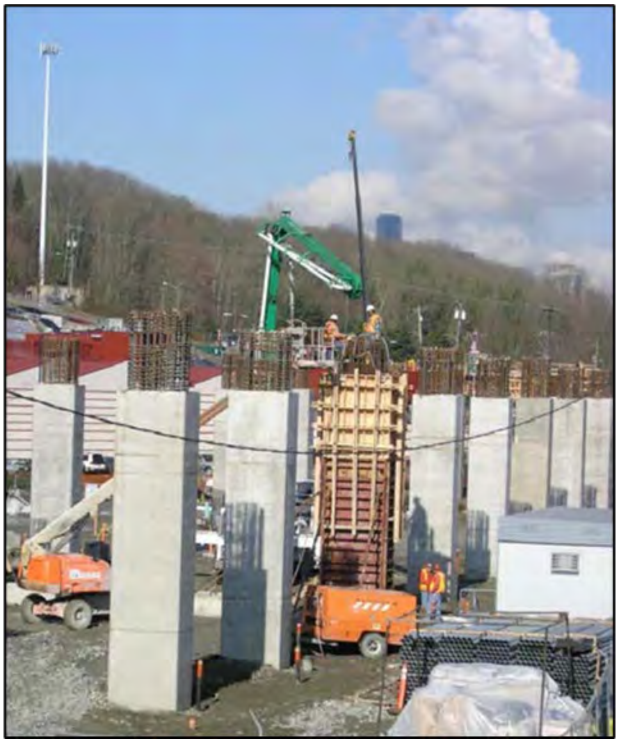


Figure 1-8 Falsework Columns Under Construction

If the elevated guideway is close to or within a roadway, the false work will require temporary lane closures and traffic detours until enough of the elevated structure is complete. Precast girder construction is expected to be the primary method of construction for the elevated guideway and can typically be built without false work between the columns. Some short-term partial or full street closures may be required to accommodate placing girders and other construction activities. The use of falsework will be most likely to occur at the S 336th Street crossing of the guideway for this project.

1.3.2.2 At-Grade Guideway

At-grade light rail is most appropriate for long, relatively flat sections where exclusive right-of-way is available. This project will have an at-grade profile for short sections in Belmor Mobile Home Park extending to just north of S 336th Street within the Washington State Department of Transportation (WSDOT) right-of-way. Typical at-grade profiles for this project include a triple track profile that includes mainline track in both the north and south direction with an adjacent test track, and a double track profile that includes mainline track in both the north and south directions with an adjacent independent at-grade test track that is separated from mainline track. Appendix C provides examples of cross sections of the at grade guideway.

Construction methods and impacts for at-grade guideways will be similar to typical road construction. Existing structures in the project footprint will be demolished, and conflicting utilities will be relocated before construction begins. Shallow, near-surface excavations will be required to construct the subgrade, track, and station platform slabs for at-grade segments. In areas where access is not available from existing roads, a temporary construction road will be built. During the grading phase, the contractors will install culverts or other permanent drainage structures and below-grade light rail infrastructure.

1.3.2.3 Retained Cut/Fill Guideway

With the retained-cut profile, the guideway will be cut into the ground with a retaining wall on one or both sides. Portions of the guideway and test track will include retained-cut profiles due to topography. Where the guideway and test track will transition between at-grade and elevated, or due to topography, there will often be retained fill sections. Retained fill sections will be slightly higher than ground level, and they will be supported by retaining walls (Appendix C).

Construction of retained-cut and retained fill guideway sections will be similar to construction of the at-grade guideway, but they may be more intensive and of longer duration due to the need to construct retaining walls. Retained-cut or retained fill sections will be needed in areas where creating a level surface for the track ballast will be necessary. Such sections could include retaining walls, where necessary. Construction of cuts and fills may include demolition of existing structures, clearing and grading, excavation, utility relocation, construction of temporary access roads between 15 and 30 feet wide, and temporary traffic detours and lane closures. Depending on the depth of the cut and groundwater conditions, dewatering may be necessary during construction.

Fill material for retained fill construction will be delivered to the site by truck. Retained fill structures may require ground improvement, depending on the ability of existing soils to support the increased loads. Reconstruction of streets, sidewalks, and other existing facilities may also be necessary, depending on the final alignment and profile of the retained fill.

1.3.3 Other Facilities and Structures

Equipment buildings used for operation of light rail will be required along the alignment. The buildings are generally beneath the guideway, but they can be separate from the facility. This includes buildings for TPSSs that boost power to the overhead catenary system and signal bungalows that house signal systems. In addition, a test track support building and associated employee parking will be constructed at the north terminus of the test track.

General maintenance roads will sometimes be needed to allow for maintenance of other elements of the project (such as elevated guideway and retaining walls). A small number of parking spaces could also be associated with signal bungalows for service vehicles.

1.3.4 Transportation Improvements/Modifications

The following sections describe transportation improvements necessary to accommodate the OMF South site and associated guideway. These improvements include roadway extensions, road frontage improvements, new guideway access roads, and culvert removal/replacement/modifications.

1.3.4.1 Light Rail and Test Track Access Roadways

Permanent roadway will be constructed to provide access to both the test track and the mainline guideway extending from Winged Foot Way at the north end of the project to its connection point with 24th Avenue S. The roadway is anticipated to be approximately 30 feet wide. Two short access roads will also be constructed off the access roadway just before the connection point with 24th Avenue S. These roadways will allow access to a proposed TPSS south of the access roadway and a stormwater facility north of the access roadway. These access roads will be approximately 16 feet wide. Intersection improvements will be necessary at the access roadways intersection with Winged Foot Way and 24th Avenue S.

1.3.4.2 18th Place S Extension

The proposed project will require the permanent closure of 20th Avenue S from S 336th Street to S 341st Place. A new north-south road connection is required by city code as part of the vacation of 20th Avenue S. The 18th Place S extension will provide an additional connection to S 341st Place on the west side of the proposed OMF South site, and it will also provide access to proposed entry points to the new facility from S 341st Street. The current northern terminus of 18th Place S is S 340th Street. The proposed 18th Place S extension will terminate at S 336th Street. Intersection improvements will be required at both S 336th Street and S 340th Street. The proposed extension will include two 12-foot-wide travel lanes, 3-foot-wide utility corridors on either side of the roadway, a 12-foot-wide multi-use trail, and planter strips on both sides of the roadway, varying from 4 to 6.5 feet wide. The overall roadway will be 52.5 feet wide.

1.3.4.3 21st Avenue S Extension

Because of other modifications to the existing street network as part of the proposed action, 21st Avenue S will also be extended south from S 341st Place to S 344th Street to satisfy city code requirements. The proposed roadway will include two 12-foot-wide travel lanes, a six-foot wide sidewalk, 4-foot-wide planter strips on either side of the roadway, and 3-foot-wide utility strips on either side of the roadway for an overall roadway width of 44 feet.

1.3.4.4 Roadway and Roadway Frontage Improvements

Because of modifications to the local roadway system, improvements will be made to several roadways, including full roadway improvements along 24th Avenue S between S 330th Street and S 333rd Street. This may include minor roadway widening, addition of planter strips, streetside parking, and sidewalks. Half-street improvements are proposed along Oakland Hills Boulevard, S 336th Street, S 341st Street, and S 344th Street.

1.3.5 Culvert Removal/Replacements

The OMF South project will require the removal and replacement of up to three culverts, as well as the complete removal and daylighting of one culvert. Table 1-2, below, summarizes work activities that involve culvert removals or replacements, and more detail on individual culvert replacement is provided in Sections 1.3.5.1 through 1.3.5.4). Figure 1-4 and Figure 1-5 identify where each culvert removal, replacement, or modification will occur.

One culvert identified in the table may be associated with a roadway (WDFW ID #: 935271), and conveys East Fork Hylebos Creek around an existing WSDOT stormwater facility located just north of S 344th Street. This culvert was initially planned to be removed as part of WSDOT's Triangle Project because it was on the list of culverts to be replaced under a 2013 federal court injunction requiring the removal of state-owned culverts in western Washington. However, because WSDOT's project will not be constructed until after the OMF South project has been initiated, this culvert removal is being included as part of the proposed Sound Transit project.

Table 1-2 Culvert Removal/Replacement Summary

Culvert Location	Stream Affected	WDFW ID#	Fish Passage Barrier Status	Action
S 336th Street	East Fork Hylebos Creek Tributary 0016A	935274	Partial Barrier	Remove/Replace – Potential Mitigation Action
S 336th Street	West Fork Hylebos Creek Tributary 0016A	933224	Partial Barrier	Remove/Replace
S 344th Street	East Fork Hylebos Creek Tributary 0016A	935060	Passable	Remove/Replace
Between S 336th and S 344th Streets	East Fork Hylebos Creek Tributary 0016A	935271	Partial Barrier	Remove/Daylight Channel

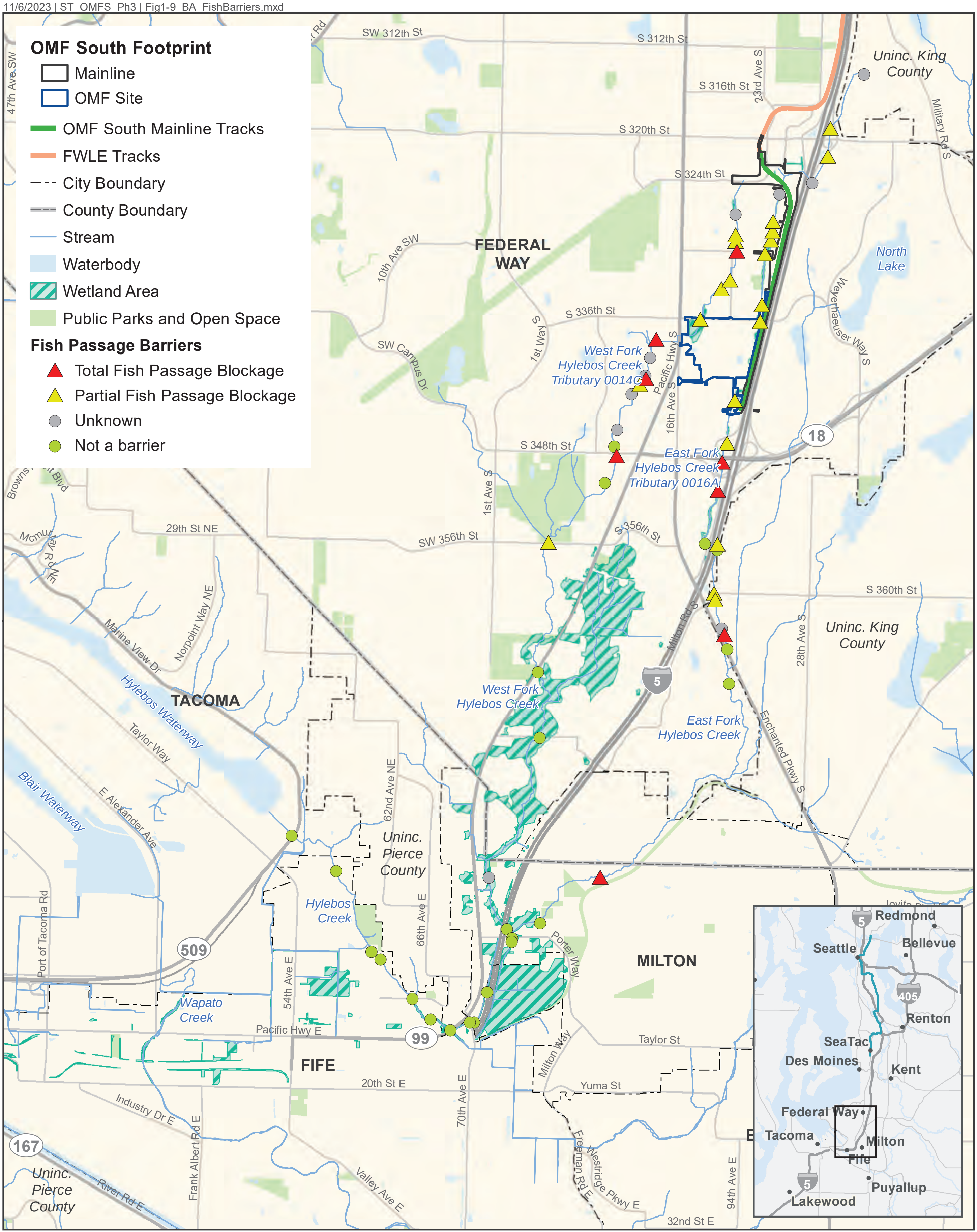
Source: WDFW 2023a, WDFW 2020a, WDFW 2015, WDFW 2020b, WDFW 2020c

The replacement crossing structures will be sized and configured to prevent them from becoming barriers in the future. The structures will be designed using the design criteria from the Washington Department of Fish and Wildlife's (WDFW's) 2013 Water Crossing Design Guidelines (Barnard et al. 2013). The design of the structures will be determined through hydraulic, geotechnical, and structural engineering evaluations. Appendix D contains preliminary design information for the proposed replacement culverts.

According to the WDFW Habitat Survey Summary Report for the lowermost fish passage barrier (WDFW ID: 935271), removal of all three barriers on the East Fork Hylebos Creek with fish passable structures may improve access to approximately 2.5 linear miles of stream habitat (WDFW 2020c). Barriers located both upstream and downstream currently obstruct fish from accessing the proposed habitat gains; however, WSDOT plans to correct many of these barriers along the I-5 corridor both upstream and downstream of the project footprint in the future. A summary of fish barriers downstream of the site is provided in Section 2 and Figure 1-9 illustrates the overall breadth of fish passage concerns in the Hylebos Creek drainage basin.

The WDFW Level A Culvert Assessment Report for WDFW Site ID 933224 (WDFW 2015) on West Fork Hylebos Creek Tributary 0014C does not document potential upstream habitat gain as WDFW has not surveyed this stream reach; however, removal of this barrier has the potential to facilitate access to approximately 3,800 linear feet of stream channel. Similar to the East Fork Hylebos Creek Tributary 0016A, access to this habitat will be possible only after multiple downstream and upstream barriers to fish passage are removed.

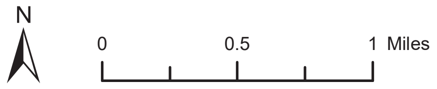
11/6/2023 | ST_OMFS_Ph3 | Fig1-9_BA_FishBarriers.mxd


OMF South Footprint
▭ Mainline
▭ OMF Site
OMF South Mainline Tracks
FWLE Tracks
City Boundary
County Boundary
Stream
Waterbody
▨ Wetland Area
Public Parks and Open Space
Fish Passage Barriers
▲ Total Fish Passage Blockage
▲ Partial Fish Passage Blockage
● Unknown
● Not a barrier
FEDERAL WAY
TACOMA
MILTON
FIFE
Uninc. King County
Uninc. King County
Uninc. Pierce County
Uninc. Pierce County
North Lake
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
West Fork Hylebos Creek
East Fork Hylebos Creek
Hylebos Creek
Hylebos Waterway
Blair Waterway
Wapato Creek
SW 312th St
S 312th St
S 316th St
23rd Ave S
S 320th St
S 324th St
10th Ave SW
SW Campus Dr
1st Way S
S 336th St
Pacific Hwy S
16th Ave S
S 348th St
1st Ave S
SW 356th St
S 356th St
S 360th St
28th Ave S
Milton Rd S
Enchanted Pkwy S
Weyerhaeuser Way S
Military Rd S
47th Ave SW
29th St NE
Norpoint Way NE
Marine View Dr
Taylor Way
E Alexander Ave
62nd Ave NE
66th Ave E
54th Ave E
Port of Tacoma Rd
Pacific Hwy E
20th St E
70th Ave E
Porter Way
Milton Way
Taylor St
Yuma St
Industry Dr E
Frank Albert Rd E
River Rd E
Valley Ave E
Freeman Rd E
Westridge Pkwy E
94th Ave E
32nd St E
5
18
99
509
167
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: King County; WDFW (2023).

FIGURE 1-9
Fish Passage Barriers
Biological Assessment

OMF South


N
0
0.5
1 Miles

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

1.3.5.1 South 336th Street Culvert Replacement - East Fork Hylebos Creek Tributary 0016A

The proposed action will include replacing the existing S 336th Street culvert crossing of East Fork Hylebos Creek Tributary 0016A. Although the current design does not affect this culvert, Sound Transit anticipates that the replacement of this culvert may be required as mitigation for the project. The existing crossing includes two culverts, a round, 27-inch-diameter, 65-foot-long precast concrete culvert, and a round, 18-inch-diameter, 65-foot-long precast concrete culvert. The existing crossing has been identified as a partial fish passage barrier due to inadequate depth through the culverts (WDFW 2023a). Sound Transit will replace the existing culverts with a 19-foot-wide, 53-foot-long structure that will meet current fish passage design standards. Limited in-stream grading will be required upstream and downstream of the crossing to tie into existing grades.

1.3.5.2 South 336th Street Culvert Replacement – West Fork Hylebos Creek Tributary 0014C

The proposed action will include replacing the existing S 336th Street crossing of West Fork Hylebos Creek Tributary 0014C. This culvert replacement is required due to the widening of South 336th Street and frontage improvements required by the city. The existing crossing includes two culverts, a round, 42-inch-diameter, 86-foot-long precast concrete culvert and a round, 42-inch-diameter, 92-foot-long precast concrete culvert. The existing crossing has been identified as partial fish passage barriers due to excessive slope through (WDFW 2023a). Sound Transit will replace the existing crossing with a 19-foot-wide, 89-foot-long structure that will meet current design standards for fish passage. Limited in-stream grading will be required upstream and downstream of the crossing to tie into existing grades.

1.3.5.3 South 344th Street Culvert Replacement - East Fork Hylebos Creek Tributary 0016A

The proposed action will include replacing the existing S 344th Street culvert crossing of East Fork Hylebos Creek Tributary 0016A. This culvert replacement is required due to culvert relocation as part of the extension of 21st Avenue S to South 344th Street. The existing crossing is a 4-foot-diameter, 315-foot-long corrugated steel culvert. The existing crossing is considered fish passable (WDFW 2023a). Sound Transit will replace the existing crossing with a 32-foot-wide, 382-foot-long structure that will meet current design standards for fish passage. Limited in-stream grading will be required upstream and downstream of the crossing to tie into existing grades.

1.3.5.4 East Fork Hylebos Creek Tributary 0016A Modifications and Daylighting

There are several locations where guideway supports for the mainline and lead tracks overlap with the existing channel location of East Fork Hylebos Creek Tributary 0016A. To avoid these areas of conflict, approximately 1,800 linear feet of channel will be relocated from just upstream of S 336th Street to the inlet for the existing culvert (WDFW Site ID 935271).

The proposed action will also include the removal of the existing culvert (WDFW Site ID 935721). Instead of replacing this culvert, the proposed action will include the creation of (daylighting of) approximately 600 linear feet of stream channel that will tie into the channel relocation discussed above and grading for the new culvert being proposed for the S 344th Street crossing.

Overall, there will be approximately 2,400 lineal feet of channel relocation and associated grading between S 336th Street and S 344th Street. Appendix D contains preliminary design drawings associated with channel relocation and stream daylighting.

1.3.6 Culvert Modifications

1.3.6.1 South 330th and South 333rd Street Culvert Modifications - East Fork Hylebos Creek Tributary 0016A

The proposed action will require the installation of a manhole within the existing roadway prism at both stream crossings identified. The project will require a stormwater connection to the existing culverts at these locations through the manhole, which will serve as both treated construction stormwater discharge points and permanent treated stormwater discharge points. Table 1-3,

Table 1-3 Culvert Modification Summary

Culvert Location	Stream Affected	WDFW ID#	Fish Passage Barrier Status	Action
S 330th Street	East Fork Hylebos Creek Tributary 0016A	935276	Partial Barrier	Install Manhole Cover and Stormwater Piping
S 333rd Street	East Fork Hylebos Creek Tributary 0016A	935275	Partial Barrier	Install Manhole Cover and Stormwater Piping

Source: WDFW 2023a, WDFW 2020d, WDFW 2020e

1.3.7 Mitigation

Although Sound Transit is working to avoid and minimize impacts during design, the construction and operation of the OMF South project will result in unavoidable impacts to wetlands, streams, and their buffers. Pursuant to federal, state, and local regulations, mitigation will be required to compensate for these impacts. At this time, selection of appropriate mitigation and potential mitigation sites is still under development but is likely to include a combination of on-site restoration/mitigation, off-site mitigation (but still within the Hylebos Creek watershed), and use of mitigation banks/in lieu fee programs to purchase credits. Off-site mitigation areas will be designed to compensate for permanent project impacts to wetlands and buffers and could include wetland creation, rehabilitation, and/or enhancement.

1.3.8 General Construction Activities and Equipment

The construction methods discussed above are based on the current preliminary level of engineering design. Specific construction methods will vary depending on site conditions and final design of the structures proposed. Typical construction activities will include the following:

- Demolition (buildings, pavement)
- Clearing and vegetation removal
- Temporary stream diversion (including temporary piping)
- Fill and excavation

- Installation of drainage systems, electrical systems, and communication systems
- Elevated structure construction
- At-grade track construction
- Retained cut construction
- Cut-and-cover trench construction
- Roadway construction and landscaping
- Utility relocation
- Retaining wall construction
- Pile-driving or augering piles
- Deep shaft drilling
- Truck hauling and delivery of materials and equipment
- Dewatering
- Culvert replacements to fish passable structures
- Use of concrete batch plant
- Remediating any unexpected hazardous material areas
- Planting and revegetation

Typical construction equipment used to complete the project includes:

- Trucks (e.g., haul, service, delivery, and tractor trailers)
- Cranes
- Backhoes, loaders, compactors, and excavators
- Grading and paving equipment
- Vibratory equipment
- Drilling rigs and pile-driving equipment
- Forklifts and manlifts
- Jackhammers
- Pumps (e.g., concrete, dewatering)
- Compressors, generators, and welding equipment
- Demolition equipment

1.3.9 Stormwater Management

The OMF South project will largely be a redevelopment of existing developed areas through conversion of areas currently occupied by residential and commercial development to the proposed use. In general, pollution generating impervious surfaces under existing and proposed conditions include local roadways, buildings, and parking areas. Because local roadways and parking lots are subject to substantially lower traffic volumes than any of the adjacent high-volume roadways (SR-99 and I-5), the contribution of contaminants from these surfaces is anticipated to be of less concern than those of highly traveled roadways.

Sound Transit applied the Western Washington Hydrology Model, Version 3.0, to analyze project hydrology and to determine sizing of the stormwater facilities. The conceptual design for stormwater facilities provides best management practices (BMPs) for all new post-project impervious surfaces. New impervious areas resulting from OMF South will include buildings, parking areas, roads, and sidewalks.

Currently, light rail guideways are considered to be non-pollution-generating impervious surfaces[1]. The preliminary design will include stormwater treatment facilities large enough to accommodate treatment for all post-project impervious surfaces. Proposed facilities will include detention ponds, detention vaults, and guideway dispersion. Water quality will be treated to enhanced treatment standards (intended to provide a higher rate of removal of dissolved metals than basic treatment).

Detention facilities have been designed to achieve post-project stormwater flows equivalent to forested conditions, as required by Ecology.

Most treated and retained stormwater is expected to be discharged to existing city drainage facilities that discharge to water bodies from existing municipal separate storm sewer discharge locations. New discharge locations will be added where existing connections do not exist. There will be new outfalls to the East Fork Hylebos Creek Tributary 0016A and the West Fork Hylebos Creek Tributary 0014C.

A project-specific Stormwater Pollution Prevention Plan (SWPPP) and a Temporary Erosion and Sediment Control (TESC) Plan will be prepared and implemented before beginning earthwork. The sediment and flow-control best management practices (BMPs) described in the TESC and SWPPP will minimize the potential for water quality impacts to wetland and stream resources in the project area.

1.3.9.1 Impervious Surfaces

Existing impervious area includes roadways, sidewalks, buildings, and parking lots. Currently, there are large surface parking areas (approximately 11 acres) surrounding the proposed OMF South facility site.

New impervious areas resulting from OMF South will include guideways, buildings, parking areas, roads, ballasted track areas, and sidewalks. To support the design of new or modified stormwater facilities, stormwater engineers delineated 24 threshold discharge areas (TDAs) in the action area, based on downstream flow paths. Table 1-4 summarizes the current and anticipated post-construction acreage of impervious areas' PGISs and areas of runoff to stormwater management facilities in each TDA. Figure 1-10 and Figure 1-11 identify where each TDA is relative to the mainline track and the OMF South Site.

---

[1] Sound Transit and the Washington State Department of Ecology (Ecology) entered into a Memorandum of Understanding dated December 9, 2019, in which Sound Transit agreed to conduct a study to characterize the quality of the stormwater discharged from light rail guideways. The data and analysis from the study will be used to inform the design of light rail projects that are scheduled in the Sound Transit 3 Plan to be completed between 2030 and 2041, and Sound Transit will identify all known, available, and reasonable methods of prevention, control, and treatment to define best management practices specific to light rail.

Table 1-4 Existing and Proposed Impervious Area (Acres)

TDA	Existing	Proposed	Change
East Fork Hylebos Creek Tributary 0016A Drainage Basin			
21st Avenue	0.12	0.49	+0.38
24th 2A	0.21	0.30	+0.08
24th 2B	0.21	0.56	+0.35
24th Access Road	0.04	0.15	+0.11
S 336th Street	0.30	0.30	0.00
S 341st East	0.48	0.39	-0.09
S 344th	0.21	0.22	0.00
TDA 1	0.18	0.23	+0.05
TDA 2A North	0.63	0.83	+0.19
TDA 2A South	0.89	2.80	+1.91
TDA 2B North	0.40	1.68	+1.28
TDA East	13.5	21.92	+8.41
Track TDA 3	0.08	2.65	+2.58
Track TDA 4	0.17	1.10	+0.93
Winged Foot North	0.23	0.35	+0.11
Winged Foot Oakland	0.05	0.07	+0.02
Total	**17.70**	**33.06**	**+16.36**
West Fork Hylebos Creek Tributary 0014C Drainage Basin			
18th Place A/B/C	0.19	0.81	+0.62
18th Place D	0.43	0.09	-0.33
S 336th West-East	0.39	0.39	0
S 336th West-West	0.27	0.27	0
S 341st West	0.23	0.12	-0.11
TDA 1A	0.44	0.56	+0.12
TDA West 1	8.06	10.19	+2.13
TDA West 2	7.00	11.55	+4.54
Total	**17.01**	**23.98**	**+6.97**
Grand Total	**34.71**	**57.04**	**+22.33**

11/6/2023 | ST_OMFS_Ph3 | Fig1-10-11_BA_TDAs.mxd

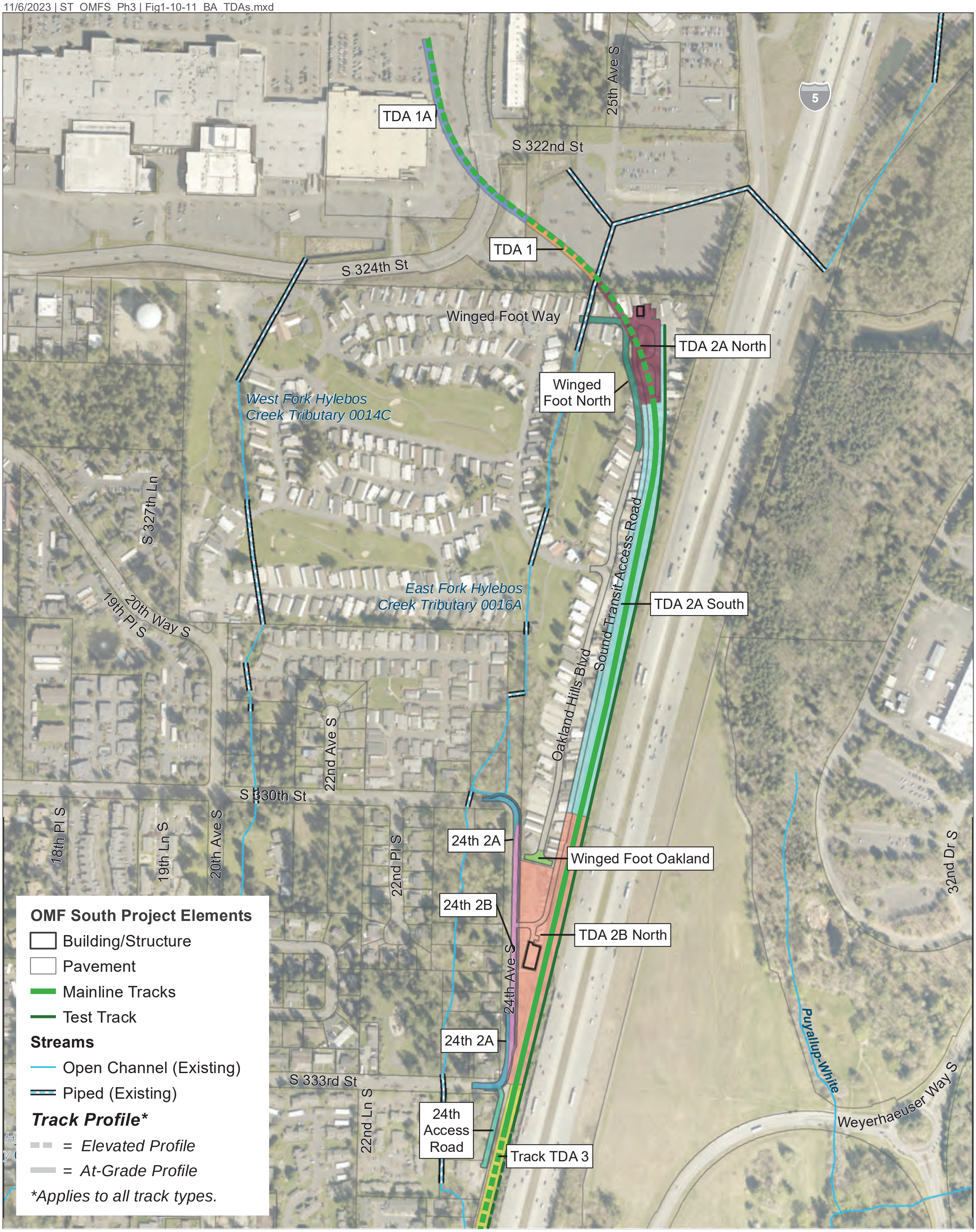

TDA 1A
S 322nd St
25th Ave S
5
TDA 1
S 324th St
Winged Foot Way
TDA 2A North
Winged Foot North
West Fork Hylebos Creek Tributary 0014C
S 327th Ln
East Fork Hylebos Creek Tributary 0016A
Sound Transit Access Road
TDA 2A South
20th Way S
19th Pl S
Oakland Hills Blvd
22nd Ave S
S 330th St
18th Pl S
19th Ln S
20th Ave S
22nd Pl S
24th 2A
Winged Foot Oakland
24th 2B
TDA 2B North
24th Ave S
24th 2A
S 333rd St
22nd Ln S
24th Access Road
Track TDA 3
Puyallup-White
Weyerhaeuser Way S
32nd Dr S
OMF South Project Elements
Building/Structure
Pavement
Mainline Tracks
Test Track
Streams
Open Channel (Existing)
Piped (Existing)
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.
N
0
500
1,000 Feet

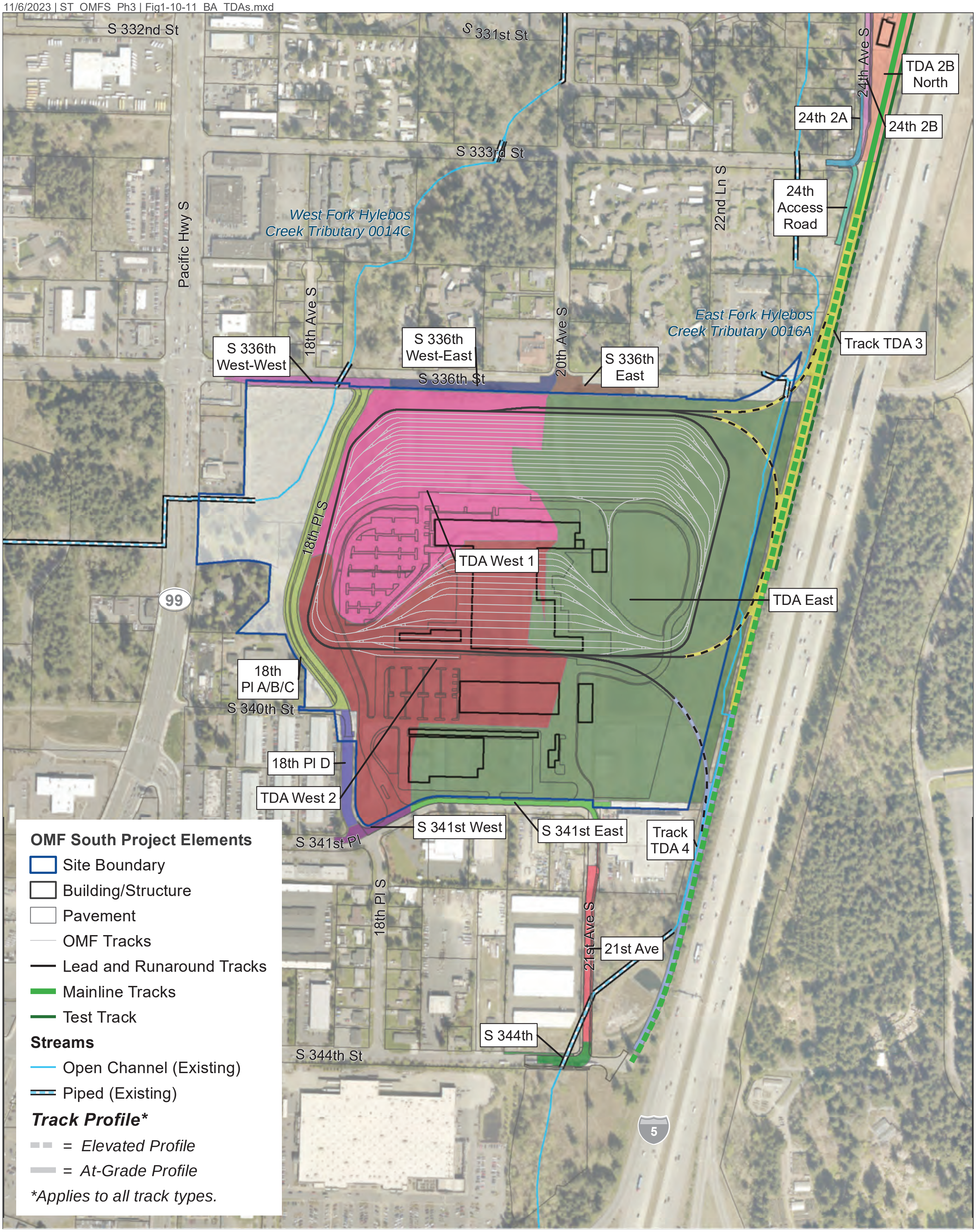
FIGURE 1-10

Project Elements and TDAs: Mainline
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

11/6/2023 | ST_OMFS_Ph3 | Fig1-10-11_BA_TDAs.mxd


S 332nd St
S 331st St
S 333rd St
24th Ave S
TDA 2B North
24th 2A
24th 2B
24th Access Road
22nd Ln S
Pacific Hwy S
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
18th Ave S
20th Ave S
S 336th West-West
S 336th West-East
S 336th St
S 336th East
Track TDA 3
18th Pl S
99
TDA West 1
TDA East
18th Pl A/B/C
S 340th St
18th Pl D
TDA West 2
S 341st Pl
S 341st West
S 341st East
Track TDA 4
18th Pl S
21st Ave S
21st Ave
S 344th
S 344th St
5
OMF South Project Elements
Site Boundary
Building/Structure
Pavement
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Streams
Open Channel (Existing)
Piped (Existing)
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.

N

0 500 1,000 Feet

FIGURE 1-11
Project Elements and TDAs: Mainline
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

New and relocated roads to accommodate OMF South were counted as project-associated impervious areas because the new and replaced pavement will require stormwater treatment and detention. In areas where elevated guideways will be built over roadways, the underlying impervious area of the road was not included in the impervious area numbers to avoid double-counting. For this analysis, ballasted track sections were counted as impervious areas, although they do not typically express direct stormwater runoff. The project will increase the amount of impervious surface in the action area by 22.3 acres (approximately 67 percent), mostly as a result of the new guideway covering existing forested and grassy right-of-way areas and conversion of grassy areas to impervious surface at the OMF South site. This will include a 16.36-acre increase in impervious surface area in the East Fork Hylebos Creek Tributary 0016A drainage basin and a 6.97-acre increase in impervious area in the West Fork Hylebos Creek Tributary 0014C drainage basin.

1.3.9.2 Pollution Generating Impervious Surface Area

Existing PGISs include roadways, buildings, and parking lots covering 24.20 acres. The proposed action will largely be redeveloping the area, and project-related PGISs will include 25.47 acres that will be redeveloped primarily for new roadway extensions, access roads, frontage road improvements, and surface parking areas. Overall, there will be a 1.27-acre increase in PGIS within the project action area. This will include a 1.53 acre increase in PGIS in the East Fork Hylebos Creek Tributary 0016A drainage basin and a 0.26-acre reduction in PGIS in the West Fork Hylebos Creek Tributary 0014C drainage basin. Table 1-5 identifies all existing and proposed PGIS, changes in impervious surface area, what types of treatment will be provided, and where in each drainage basin the stormwater will ultimately be discharged (Figure 1-12 and Figure 1-13).

Table 1-5 Existing and Proposed PGISs (Acres), Treatment, and Discharge

TDA	Existing	Proposed	Change	Proposed Treatment	Post Treatment Discharge
East Fork Hylebos Creek Tributary 0016A Drainage Basin					
21st Avenue	0.10	0.40	+0.30	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
24th 2A	0.21	0.25	+0.04	Vault with presettling plus sand filter	New conveyance system with ultimate connection to culvert
24th 2B	0.21	0.42	+0.21	Vault with presettling plus sand filter	Proposed system with ultimate connection to culvert
24th Access Road	0.04	0.15	+0.11	Vault with presettling plus sand filter	New conveyance system with ultimate connection to culvert
S 336th Street East	0.25	0.25	0.00	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream

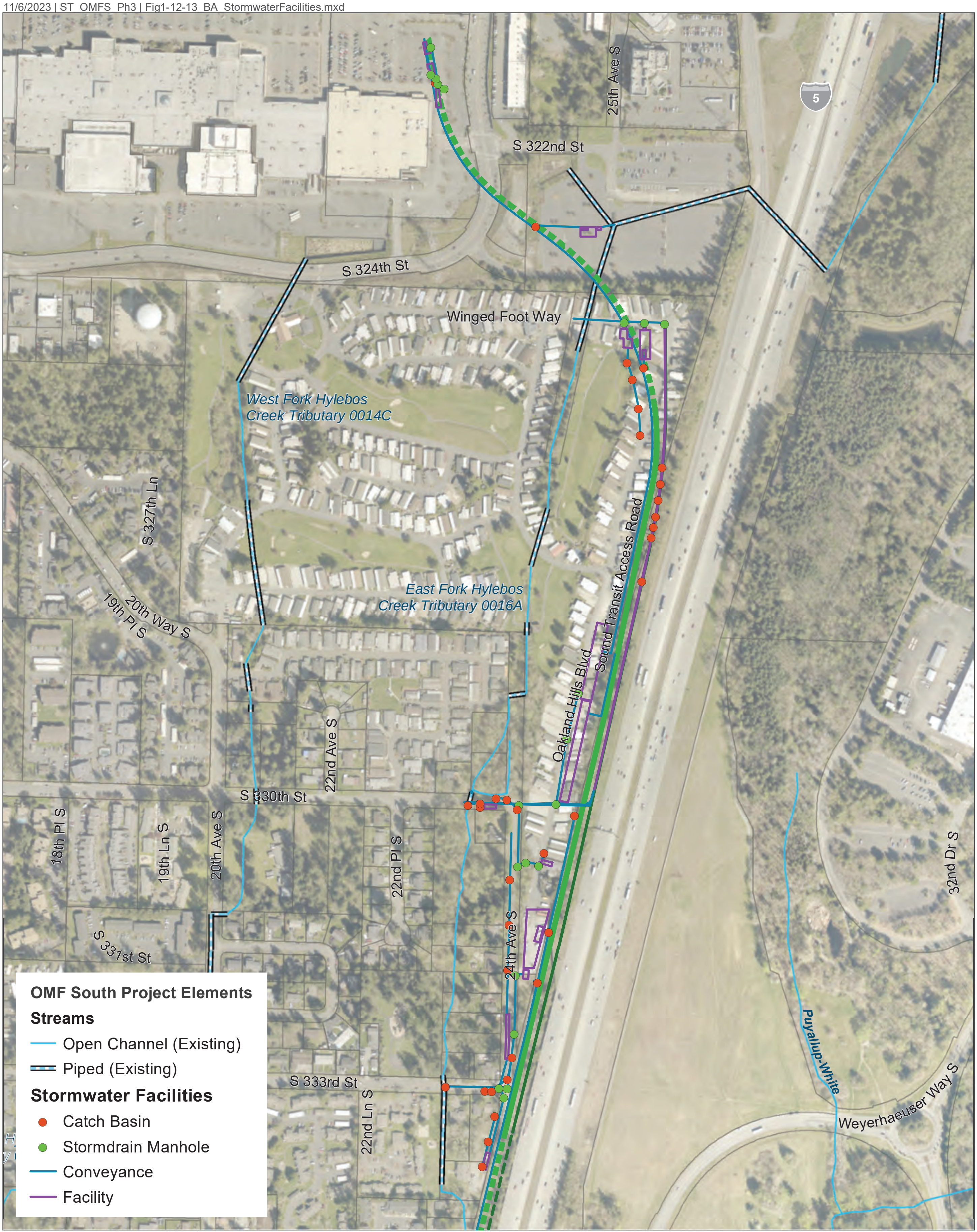
Table 1-5 Existing and Proposed PGISs (Acres), Treatment, and Discharge (continued)

TDA	Existing	Proposed	Change	Proposed Treatment	Post Treatment Discharge
S 341st East	0.38	0.38	0.00	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
S 344th	0.15	0.21	+0.06	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
TDA 1	0.18	0.18	0.00	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
TDA 2A North	0.28	0..48	+0.20	CSTW/DP[1]	Connect to existing conveyance system with ultimate discharge to stream
TDA 2A South	0.22	0.85	+0.63	CSTW/DP[1]	New conveyance system with ultimate connection to culvert
TDA 2B North	0.27	0.29	+0.02	Vault with presettling plus sand filter	New conveyance system with ultimate connection to culvert
TDA East	10.77	10.51	-0.26	CSTW/DP[1]	New conveyance system with ultimate connection to culvert
Track TDA 3	0.08	0.08	0.00	Vault with presettling plus sand filter	Surface discharge
Track TDA 4	0.07	0.07	0.00	Vault with presettling plus sand filter	Surface discharge with Site TDA East
Winged Foot North	0.16	0.34	+0.18	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
Winged Foot Oakland	0.03	0.07	+0.04	Vault with presettling plus sand filter	New conveyance system with ultimate connection to culvert
Total	**13.40**	**14.93**	**+1.53**		

Table 1-5 Existing and Proposed PGISs (Acres), Treatment, and Discharge (continued)

TDA	Existing	Proposed	Change	Proposed Treatment	Post Treatment Discharge
West Fork Hylebos Creek Tributary 0014C Drainage Basin					
18th Place A/B/C	0.12	0.81	+0.69	CSTW/DP	Connect to existing conveyance system with ultimate discharge to stream
18th Place D	0.37	0.09	-0.28	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
S 336th West-East	0.28	0.28	0.00	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to existing regional facility
S 336th West-West	0.15	0.15	0.00	Vault with presettling plus sand filter	Surface discharge into existing regional facility.
S 341st West	0.19	0.12	-0.07	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
TDA 1A	0.40	0.40	0.00	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
TDA West 1	5.35	3.17	-2.18	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
TDA West 2	3.94	5.52	+1.58	Vault with presettling plus sand filter	Connect to existing conveyance system with ultimate discharge to stream
Total	**10.80**	**10.54**	**-0.26**		
Grand Total	**24.20**	**25.47**	**+1.27**		

Notes:
(1) CSTW/DP = Combined Stormwater Wetland/Detention Pond


5
S 322nd St
25th Ave S
S 324th St
Winged Foot Way
West Fork Hylebos
Creek Tributary 0014C
S 327th Ln
East Fork Hylebos
Creek Tributary 0016A
20th Way S
19th Pl S
Sound Transit Access Road
Oakland Hills Blvd
S 330th St
22nd Ave S
18th Pl S
19th Ln S
20th Ave S
22nd Pl S
24th Ave S
S 331st St
S 333rd St
22nd Ln S
32nd Dr S
Puyallup-White
Weyerhaeuser Way S
OMF South Project Elements
Streams
Open Channel (Existing)
Piped (Existing)
Stormwater Facilities
Catch Basin
Stormdrain Manhole
Conveyance
Facility

Data Sources: King County; City of Federal Way.

FIGURE 1-12

Stormwater Facilities: OMF Site

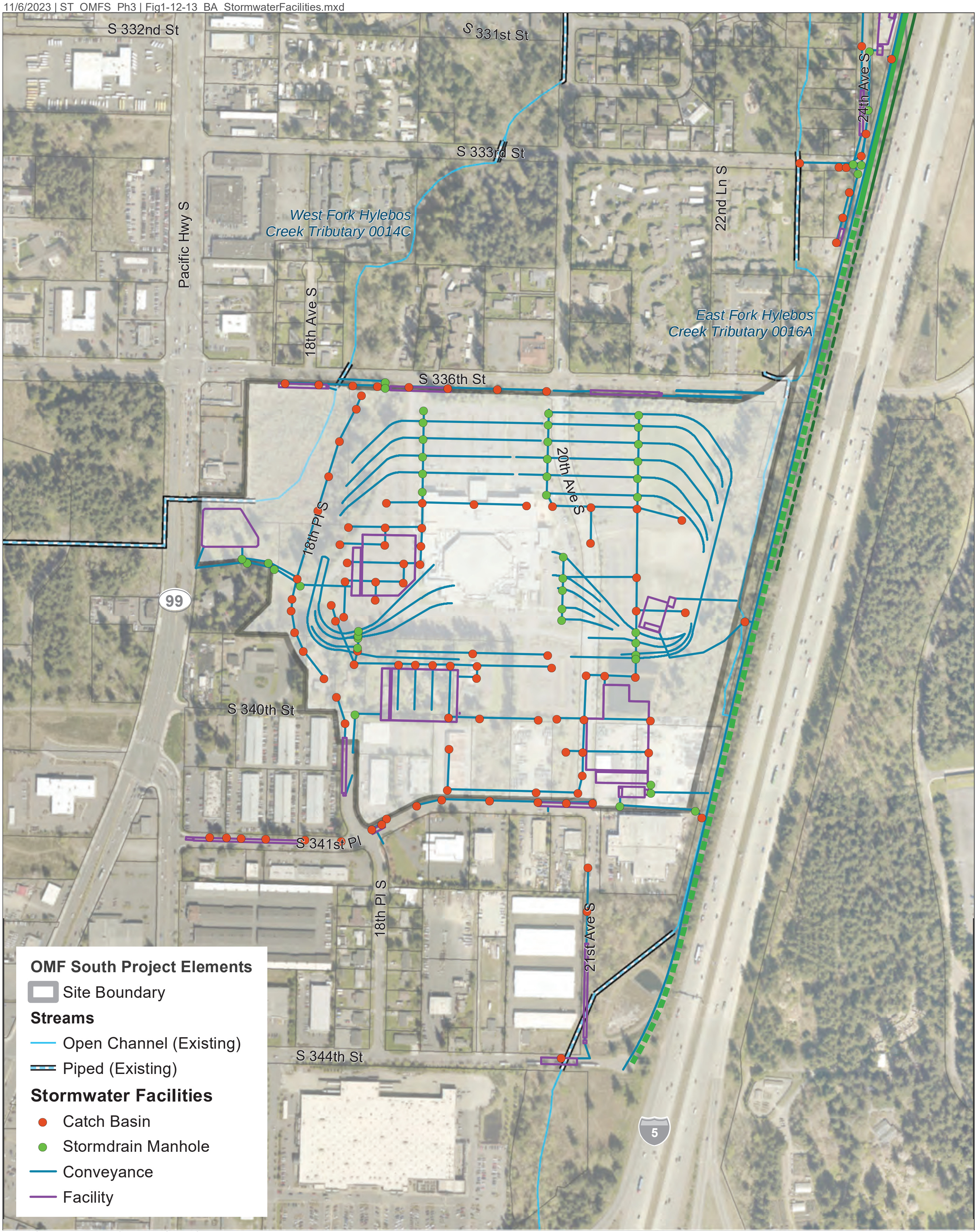
Biological Assessment

OMF South

N

0 500 1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


S 332nd St
S 331st St
S 333rd St
24th Ave S
22nd Ln S
Pacific Hwy S
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
18th Ave S
S 336th St
20th Ave S
18th Pl S
99
S 340th St
S 341st Pl
18th Pl S
21st Ave S
S 344th St
5
OMF South Project Elements
Site Boundary
Streams
Open Channel (Existing)
Piped (Existing)
Stormwater Facilities
Catch Basin
Stormdrain Manhole
Conveyance
Facility
N
0
500
1,000 Feet

Data Sources: King County; City of Federal Way.

FIGURE 1-13
Stormwater Facilities: OMF Site
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

1.3.9.3 Stormwater Flow Control and Treatment

The OMF South project will comply with the following local design manuals:

- City of Federal Way: King County Surface Water Design Manual (King County 2021) and the City of Federal Way Addendum to the King County Surface Water Design Manual (Federal Way 2017)

Stormwater management (SWM) facilities have been designed to provide enhanced treatment. Enhanced treatment facilities for the project will include CSTW/DPs and vaults with pre-settling basins and sand filters. The type of facility varies depending on location and ownership. CSTW/DP facilities are public-domain, non-proprietary SWM facilities. Vaults with pre-settling basins and sand filters are also public-domain, non-proprietary SWM facilities that meet the requirements of the King County Surface Water Design Manual (King County 2021). SWM facilities that discharge to East Fork Hylebos Creek Tributary 0016A, West Fork Hylebos Creek Tributary 0014C, and associated wetlands have been designed to provide enhanced treatment using a CSTW/DP, plus a large sand filter downslope or vaults with pre-settling basins and sand filters. This approach meets the requirements of the 2021 King County Surface Water Design Manual. These proposed types of best management plans (BMPs) have also been considered to have “medium” potential to reduce loading of 6PPD and 6PPD-quinone into surface water (Ecology 2022). As design proceeds, alternative treatment BMPs (public-domain or proprietary) may be implemented to reduce facility footprints and/or address maintenance concerns of the owning agencies. Stormwater BMPs will implement technologies that have been shown to achieve Ecology’s performance goals for enhanced treatment. All runoff is considered to be PGIS, except for runoff from light-rail-only impervious surface (such as at grade or elevated guideways), sidewalks, and roofs, which is consistent with the design manuals mentioned above. All PGIS will receive on-site water quality and flow control treatment before being discharged into separate municipal storm sewer systems.

Where practical, non-PGIS runoff will be conveyed separately from PGIS runoff because it will not require water quality treatment. Non-PGIS runoff from elevated guideways will be dispersed over established forested areas or installed permanent vegetation where infiltration could occur. In areas that require installation of permanent vegetation the underlying soils will meet the criteria of post-construction soil quality and depth and topped with jute matting. This will help to reduce the volume of runoff to be detained, thereby reducing the size of the detention facilities. Dispersion will be practical in areas where permeable surfaces exist below the guideway, and there will be little human activity (because water dripping from the guideway above will be bothersome to people below). Where non-PGIS and PGIS runoff will be conveyed jointly, the stormwater management facility will be designed to detain the joint flow and to provide required treatment for the PGIS flow in accord with Ecology standards.

The following provides a brief overview of the receiving waterbodies, contributing TDAs, and existing and proposed conveyance networks.

East Fork Hylebos Creek Tributary 0016A

Sixteen TDAs are in the East Fork Hylebos Creek Tributary 0016A watershed within the action area (Tables 1-3 and 1-4; Figures 1-10 and 1-11). Overall, there will be a 1.53 acre increase in PGIS within contributing area above baseline conditions. The proposed action will provide enhanced treatment for all new and existing PGIS (14.93 acres) within the contributing basin of East Fork Hylebos Creek Tributary 0016A. Most of the treatment BMPs consist of vaults with pre-settling basins and an additional sand filter. From treatment facilities, treated stormwater either enters existing stormwater conveyance facilities or new conveyance facilities that ultimately drain/discharge to East Fork Hylebos Creek Tributary 0016A at eight locations along the alignment (Figures 1-12 and 1-13). In general, the discharge locations will be made at existing culvert/road crossings via existing conveyance facilities, new culvert tie in locations (e.g., S 330th and South 333rd Street), or new outfalls with dispersion and overland flow to the stream. New outfalls will be stabilized to prevent scour/erosion at the outlet.

East Fork Hylebos Creek Tributary 0016A

Eight TDAs are in the West Fork Hylebos Creek Tributary 0014C watershed within the project action area (Tables 1-3 and 1-4; Figures 1-10 and 1-11). Overall, there will be a 0.26 acre decrease in PGIS within contributing area above baseline conditions. The proposed action will provide enhanced treatment for all new and existing PGIS (10.54 acres) within the contributing basin of West Fork Hylebos Creek Tributary 0014C. Stormwater treatment BMPs consist of vaults with pre-settling basins with an additional sand filter and a combined stormwater wetland detention facility. From the treatment facilities, stormwater is either conveyed via existing or new stormwater conveyance facilities to discharge in West Fork Hylebos Creek at 336th Street or will tie into the existing flow control structure at the outlet of the regional stormwater treatment/detention facility positioned between S 336th Street and SR-99. Note that those stormwater facilities that discharge at S 336th Street will receive additional water quality/quantity treatment (polishing) within the regional stormwater detention/treatment facility.

1.3.10 Construction Schedule

Mobilization is anticipated to begin in late April 2025 with construction not beginning until November 2025. Construction is anticipated to be completed by June 2032. ST is pursuing measures to advance the opening earlier (potentially 2030). Work may occur along any section of the alignment over the 43-month project duration. Typical construction will occur on a 5- to 6-day workweek schedule and will occur primarily between the hours of 7 a.m. and 10 p.m. In some locations (such as when street detours are involved and/or daytime construction periods have to be abbreviated to reduce impacts), additional shifts, all week, nighttime, or 24-hour construction activities could be necessary.

1.3.11 Interrelated and Interdependent Activities

An interrelated activity is part of the proposed action, and it depends on the proposed action for its justification (50 CFR 402.02). An interdependent activity has no independent utility apart from the action under consultation. The OMF South is a stand-alone project. It is justified by the separate components of the Sound Transit regional transit plan; however, these components are not contingent on the OMF South, and these individual components have been and/or would be subject to separate Section 7 consultation. Interrelated and interdependent activities associated with the OMF South project will include traffic detours and mitigation for impacts to sensitive areas.

When work occurs adjacent to or over a roadway, closure of lanes or the full roadway may be needed. Where construction will partially or fully close streets, through traffic will be detoured while maintaining access to existing businesses and residences. Road closures and detours will require approval by the local jurisdiction, as well as coordination with local residents and businesses. A maintenance of traffic plan will be prepared to address road closures, detours, access, and other traffic modifications needed for construction activities. Traffic modifications during construction will be unlikely to result in effects on listed species based on species' use of the action area and the general lack of suitable habitat (see Section 2).

Activities associated with compensatory mitigation for impacts to streams, wetlands, and wetland buffers can be considered interrelated and interdependent actions for this project. Mitigation for such impacts is still under development. Any potential impacts will be mitigated first by avoiding and minimizing impacts through design and by rectifying temporary impacts and, finally, by providing compensatory mitigation for unavoidable permanent impacts in compliance with applicable federal, state, and local requirements. Compensatory mitigation will be required and may include options such as on-site restoration, enhancement, use of mitigation banks or fee-in-lieu programs, and identification of a suitable site for in-kind mitigation nearby.

1.4 Performance Standards and Impact Avoidance, Minimization, and Mitigation Measures

To avoid and/or minimize potential impacts from construction and operation of the OMF South project, Sound Transit contracts will require implementing the conservation measures presented below.

1.4.1 Water Quality Protection During Construction

- The construction contractor will develop and implement a temporary erosion and sediment control (TESC) plan for all aspects of project construction requiring clearing, vegetation removal, grading, ditching, filling, embankment compaction, demolition, and/or excavation. BMPs defined in the plan will be used to control sediments from all vegetation removal or ground-disturbing activities.
- The construction contractor will develop a spill prevention control and countermeasures (SPCC) plan before beginning construction. The SPCC plan will identify the appropriate spill containment measures that will be used throughout project construction.
- The construction contractor will adhere to water quality standards as stated in the 401 Water Quality Certificate and National Pollution Discharge Elimination System (NPDES) permit issued for the project as applicable.
- BMPs included in the TESC and SPCC plans and NPDES permit conditions will include, but will not be limited to, the following:
  - Erosion control devices (e.g., silt fences) will be installed, as needed, to protect surface waters and other critical areas.
  - Erosion control blankets, or an equally effective BMP will be installed, as needed, on steep slopes that are susceptible to erosion and where ground-disturbing activities have occurred. This will prevent erosion and will assist with establishment of native vegetation.
  - Material that may be temporarily stored for use in project activities will be covered with plastic or other impervious material during rain events to prevent sediments from being washed from the storage area to surface waters.
  - All temporary and permanent erosion and sedimentation control measures will be inspected on a regular basis, maintained, and repaired to ensure continued performance of their intended function.
  - Silt fences will be inspected after each rainfall and at least daily during prolonged rainfall.

  - Turbid water will be prevented from discharging to streams and wetlands. Turbid wastewater may be routed to temporary or permanent detention facilities, or to upland areas that will provide adequate infiltration.
  - All equipment to be used for construction activities will be cleaned and inspected before arriving at the project site to ensure that no potentially hazardous materials are exposed, no leaks are present, and the equipment is functioning properly.
  - Construction equipment and vehicles will be maintained to prevent them from leaking fuel or lubricants.
  - Uncured concrete and/or concrete byproducts will be prevented from coming in contact with streams or water conveyed directly to streams during construction.
  - A concrete truck chute cleanout area or equally effective BMP will be established to properly contain wet concrete.

1.4.2 General Best Management Practices for Construction Near Sensitive Areas

- Sound Transit will ensure compliance with all local, state, and federal permits received for the project.
- The construction contractor will delineate the boundaries of ground disturbance to prevent unintended effects on riparian vegetation, wetlands, woodlands, and other sensitive sites, both inside and outside of the construction limits. The construction limits will be clearly marked with high-visibility construction fencing before any ground-disturbing or construction-related activities, and no work in sensitive areas will occur outside of the construction limits.
- The construction contractor will implement measures to prevent erosion from soil or rock stockpiles, excavated materials, and excess soil materials into sensitive habitats, including water channels, wetlands, and riparian areas outside of the construction limits as a result of stormwater runoff.

1.4.3 Mitigation for Impacts to Sensitive Areas

- Sound Transit is coordinating with resource agencies local jurisdictions and Tribes to identify compensatory mitigation sites for stream, wetland, and wetland/stream buffer impacts in association with the construction and operation of the OMF South. The mitigation will be approved by the appropriate permitting agencies and jurisdictions prior to construction. Wetlands and buffers that are temporarily disturbed during construction will be restored and replanted on site. The compensatory mitigation plan will include a combination of purchasing credits from the King County In-lieu Fee Program or approved mitigation bank, plus development of a mitigation area within the Hylebos Creek basin downstream of the project.

1.4.4 Design and Operational Best Management Practices

- The proposed action will include permanent stormwater runoff treatment and flow control facilities, meeting the requirements of the current King County Surface Water Design Manual (King County 2021).
- Sound Transit will incorporate stormwater conveyance and management facilities that promote infiltration in the facility design where practicable and permittable.

- Sound Transit will use runoff treatment BMPs that are best suited to the site conditions and best able to achieve the required levels of treatment. These may include natural or engineered dispersion BMPs; biofiltration BMPs such as vegetated filter strips, rain gardens, biofiltration swales, or media filters; wet-pool BMPs; and infiltration BMPs.
- Existing drainage configurations will not be rerouted to the extent that stormwater from one subbasin is conveyed and discharged to another.
- Sound Transit will use the following design and operational measures to prevent pollution resulting from mechanical lubricants used in the LRVs:
  - Sealed housing roller bearings for all axle bearings
  - Enclosed and sealed motor bearings
  - Enclosed truck bearings designed to exclude dirt
  - Sealed door mechanisms
  - Enclosed, sealed electrical conduits
  - On-board batteries contained within sealed enclosures
  - Air conditioners with refrigerant enclosed in sealed system and motors with sealed bearings

1.4.5 Regulatory Controls

- The project will be constructed in accord with regulatory permits, including the Hydraulic Project Approval issued by WDFW.
- In-water work will occur only during the authorized in-water work window, as determined by agencies with regulatory authority. The only streams in which in-water work will occur are the East Fork Hylebos Creek Tributary 0016A and the West Fork Hylebos Creek Tributary 0014C. Both tributaries flow intermittently, and they are typically dry during summer and early autumn (see Section 3.2.2). The tributaries flow to Hylebos Creek, which discharges to Commencement Bay. Neither WDFW nor the Corps specifies a standard window for work within tributaries to Commencement Bay. The in-water work window for the HPA WDFW issued for 2023 geotechnical borings on the preferred alternative was July 15 through September 30.
- Project construction will be performed in compliance with Washington State water quality rules (Washington Administrative Code [WAC] 173 201A 200), including requirements for work stoppage if turbidity levels or other relevant parameters exceed allowable levels outside the mixing zone.
- Before work below the ordinary high water line (OHWL) of any stream begins, the work site will be isolated from upstream and downstream waters to facilitate working in a dry channel and minimizing turbidity and erosion potential. If any fish are present within the work area, they will be relocated. While listed fish are not expected to be present within the project area, other resident species may be considered sensitive by the state or constitute the prey base for salmonids downstream.
- If water is present in stream channels where ground-disturbing work occurs, fish exclusion will follow the guidance outlined within the Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards document (USFWS 2012) and WSDOT’s Fish Exclusion Protocols and Standards document (WSDOT 2023a).

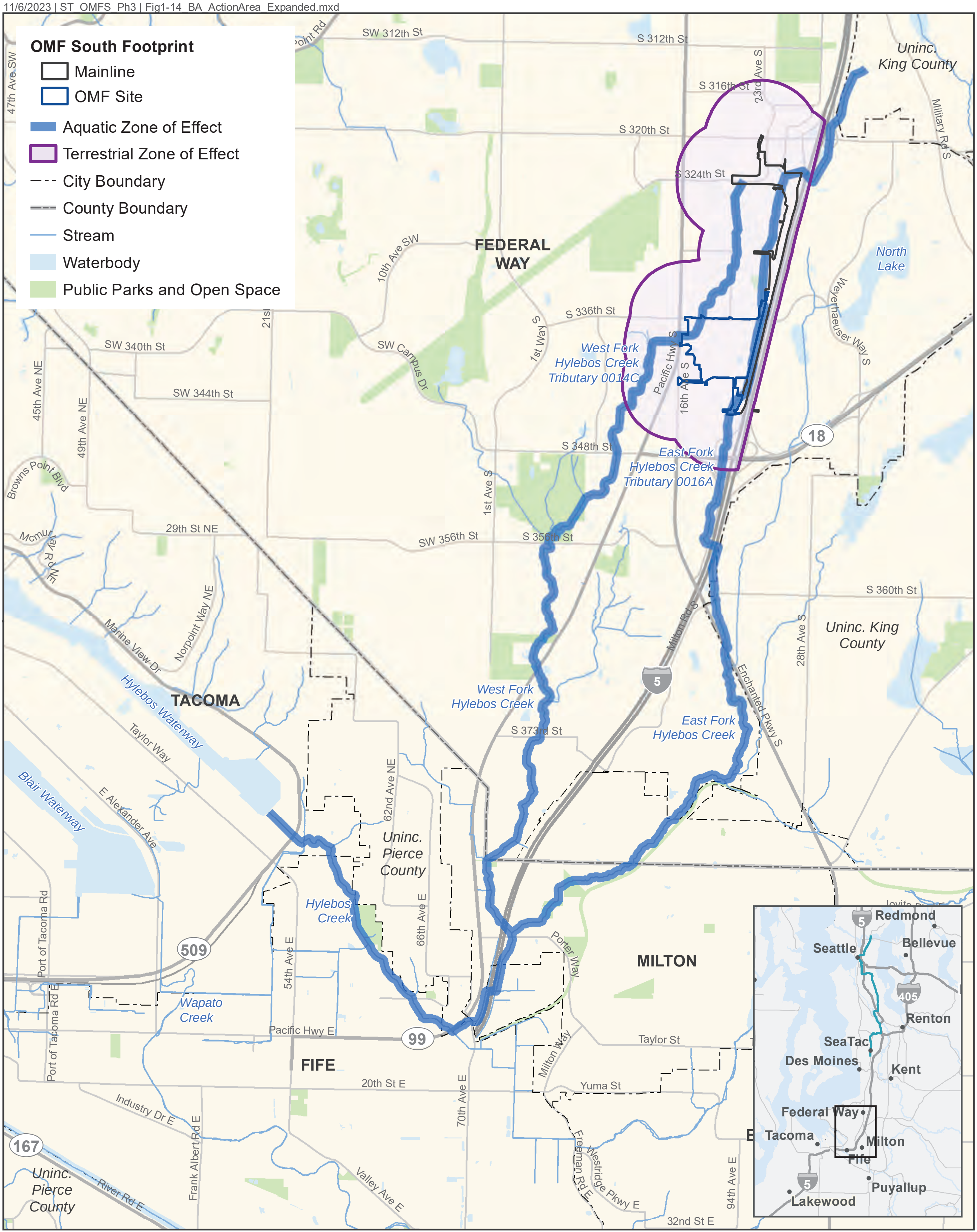
- Flow will be gradually introduced to the new channel to minimize sediment delivery in downstream reaches.
- Areas disturbed during construction will be restored with suitable vegetation, consistent with approved revegetation plans and critical area reports. Critical areas and riparian zones will be restored with native woody species adapted to those conditions.
- Unavoidable impacts on wetlands and streams and associated buffers will be mitigated by using guidance in Federal Way City Code (FWCC) 19.145.430. Ongoing restoration projects in the Hylebos watershed, the King County in-lieu fee program, and the development of a project-specific mitigation site are possible opportunities for mitigation that will comply with all federal, state, and local requirements.

1.5 Project Action Area

The project action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 Code of Federal Regulations [CFR] 402.02). The action area encompasses all areas where the project will have physical, biological, and chemical effects on the environment. This includes all areas within the project construction footprint, all areas influenced by the direct effects or delayed consequences of project construction and operation, and all areas affected by interrelated or interdependent actions.

The project action area consists of two components: terrestrial and aquatic. The extents of these two components of the action area are described in Sections 1.5.1 and 1.5.2, respectively, and they are illustrated in Figure 1-14**,** Figure 1-15, and Figure 1-16.

In this document, the term “project action area” (or “action area”) has a specific meaning, as defined above. The term “project site” encompasses the limits of construction, and it is also referred to as the project footprint. The project area is a more general term for the vicinity of the project site.


OMF South Footprint
Mainline
OMF Site
Aquatic Zone of Effect
Terrestrial Zone of Effect
City Boundary
County Boundary
Stream
Waterbody
Public Parks and Open Space
FEDERAL WAY
TACOMA
MILTON
FIFE
Uninc. King County
Uninc. King County
Uninc. Pierce County
Uninc. Pierce County
North Lake
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
West Fork Hylebos Creek
East Fork Hylebos Creek
Hylebos Creek
Wapato Creek
Hylebos Waterway
Blair Waterway
SW 312th St
S 312th St
S 316th St
23rd Ave S
S 320th St
S 324th St
Military Rd S
10th Ave SW
S 336th St
1st Way S
SW Campus Dr
Pacific Hwy S
16th Ave S
S 348th St
1st Ave S
SW 340th St
SW 344th St
45th Ave NE
49th Ave NE
47th Ave SW
21st
Browns Point Blvd
29th St NE
Mcmurray Rd NE
SW 356th St
S 356th St
S 360th St
Weyerhaeuser Way S
Marine View Dr
Norpoint Way NE
Milton Rd S
Enchanted Pkwy S
28th Ave S
Taylor Way
E Alexander Ave
S 373rd St
62nd Ave NE
66th Ave E
54th Ave E
Port of Tacoma Rd
Pacific Hwy E
Porter Way
Taylor St
Milton Way
Yuma St
20th St E
70th Ave E
Industry Dr E
Frank Albert Rd E
Valley Ave E
River Rd E
Freeman Rd E
Westridge Pkwy E
94th Ave E
32nd St E
Point Rd
18
5
509
99
167
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood
N
0
0.5
1 Miles

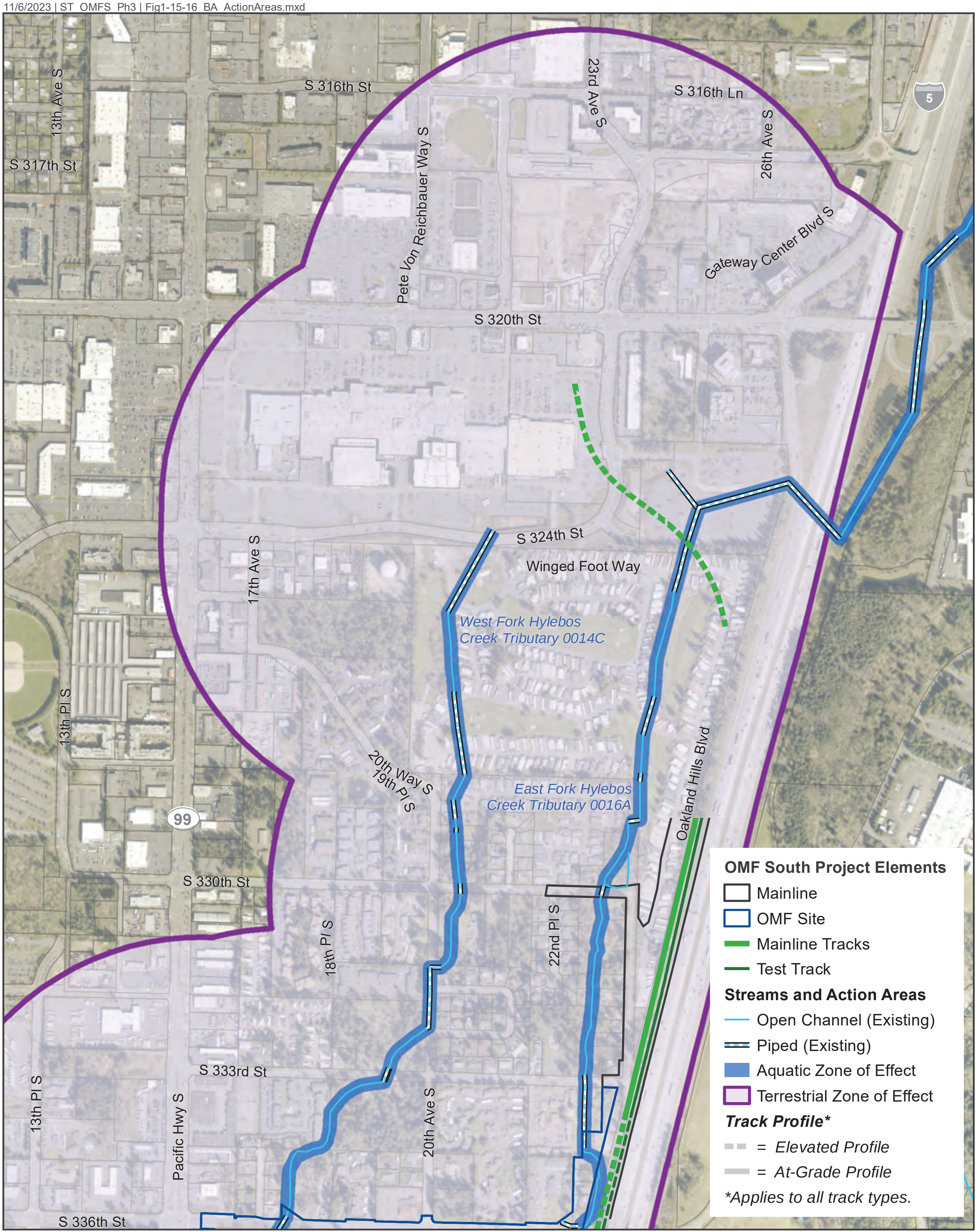
Data Sources: King County; City of Federal Way.

FIGURE 1-14
Action Area: Expanded View
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

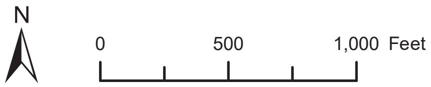
11/6/2023 | ST_OMFS_Ph3 | Fig1-15-16_BA_ActionAreas.mxd


S 316th St
S 316th Ln
13th Ave S
S 317th St
23rd Ave S
26th Ave S
5
Pete Von Reichbauer Way S
Gateway Center Blvd S
S 320th St
S 324th St
Winged Foot Way
17th Ave S
West Fork Hylebos
Creek Tributary 0014C
13th Pl S
20th Way S
19th Pl S
East Fork Hylebos
Creek Tributary 0016A
Oakland Hills Blvd
99
S 330th St
18th Pl S
22nd Pl S
S 333rd St
13th Pl S
Pacific Hwy S
20th Ave S
S 336th St
OMF South Project Elements
Mainline
OMF Site
Mainline Tracks
Test Track
Streams and Action Areas
Open Channel (Existing)
Piped (Existing)
Aquatic Zone of Effect
Terrestrial Zone of Effect
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.

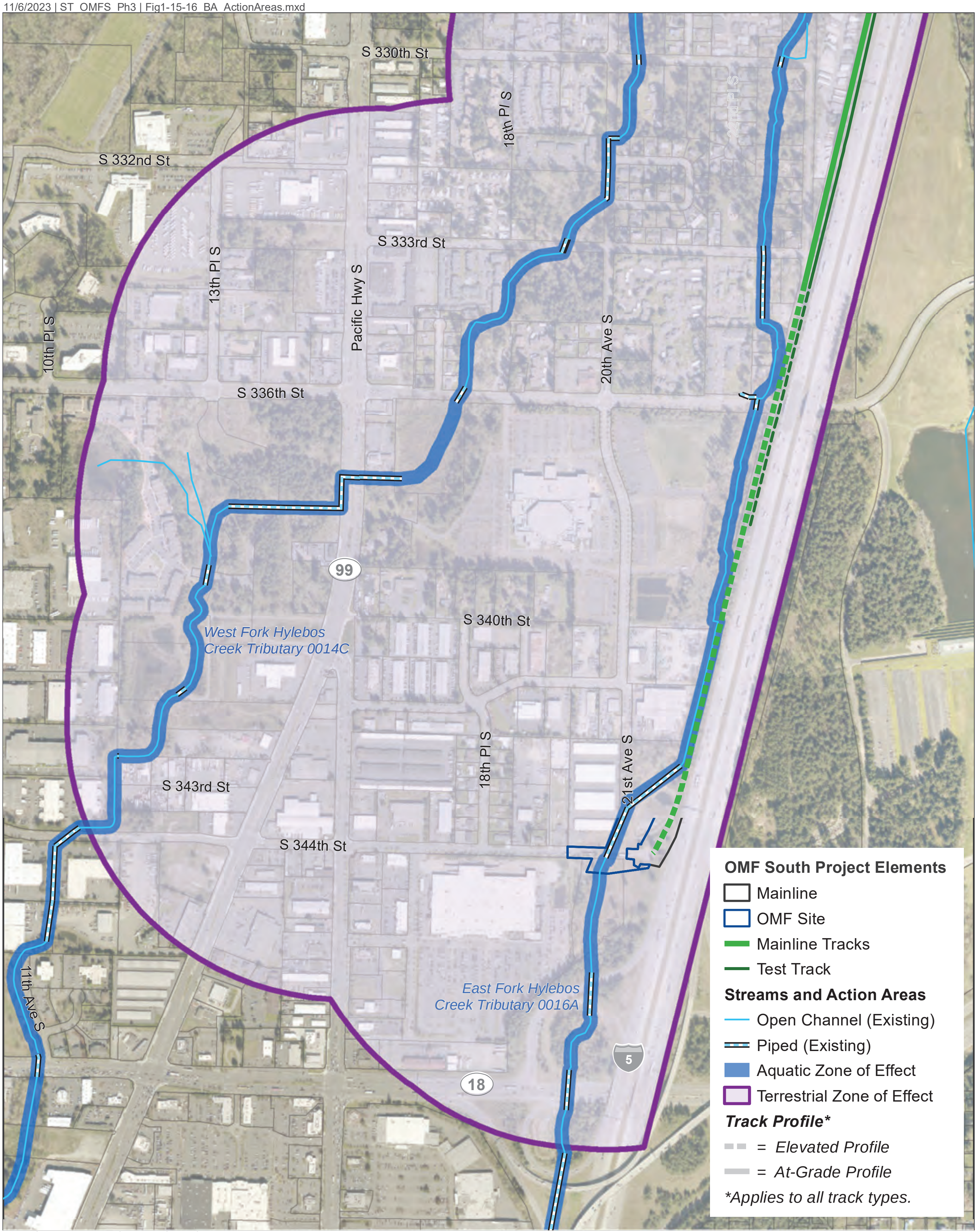
Data Sources: King County; City of Federal Way.

FIGURE 1-15
Action Area: Mainline
Biological Assessment

OMF South


N
0
500
1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


S 330th St
18th Pl S
24th Pl S
S 332nd St
S 333rd St
13th Pl S
Pacific Hwy S
10th Pl S
20th Ave S
S 336th St
99
S 340th St
West Fork Hylebos Creek Tributary 0014C
18th Pl S
21st Ave S
S 343rd St
S 344th St
11th Ave S
East Fork Hylebos Creek Tributary 0016A
5
18
OMF South Project Elements
Mainline
OMF Site
Mainline Tracks
Test Track
Streams and Action Areas
Open Channel (Existing)
Piped (Existing)
Aquatic Zone of Effect
Terrestrial Zone of Effect
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.
N
0
500
1,000 Feet

Data Sources: King County; City of Federal Way.

FIGURE 1-16
Action Area: OMF Site
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

1.5.1 Terrestrial Component of the Action Area

The terrestrial component of the action area includes the project footprint and terrestrial areas where construction noise will be audible. These areas are described below.

Project footprint: The approximate construction footprint includes areas for road improvement, new roadways and guideways, intersections, culvert replacements for fish passage barrier removal, and stormwater facilities. These activities are primarily bounded by I-5 to the east, SR-99 to the west, S 320th Street to the north, and S 344th Street to the west. Additional wetland off-site mitigation may be required for the project, but the mitigation strategy has not yet been identified. If mitigation for project-related impacts may result in impacts on ESA-listed species and habitats not considered in this analysis, those impacts will be addressed through future consultation.

Noise: The distance at which airborne construction noise will be audible is based on the distance at which construction noise will attenuate to background levels. For this project, there are two different background noise levels. Noise levels in the project area and west of I-5 were measured over a 24-hour period at two locations, one adjacent to the proposed guideway at the north end of the project and another close to the location for the proposed OMF South Site. Both sites resulted in an average background noise level of 70 dBA (a-weighted decibels). Noise levels to the east of the project area are better characterized by the traffic noise associated with I-5. I-5 in the project area has a posted speed limit of 60 miles per hour (mph) with an average annual daily traffic (AADT) volume of 174,000 vehicles (WSDOT 2023b). To convert AADT to an hourly traffic volume, WSDOT recommends taking 10 percent of the AADT, which in this case is roughly equivalent to 17,400 vehicles per hour (v/h) (WSDOT 2023c). A roadway with an hourly traffic volume of 6,000 vehicles per hour and a posted speed limit of 60 mph has an associated noise level of 79.8 dBA. For traffic volumes exceeding 6,000 per hour, add 1 dB for every 1,000 v/h increase at a particular speed. Applying this to our traffic volume of 17,400 vehicles per hour, we would add 11.4 dBA to the 79.8 dBA for a noise level of approximately 91 dBA (WSDOT 2023b).

WSDOT's terrestrial noise calculator was used to determine the extent of construction related noise. Data input included the background noise levels identified above and the three loudest pieces of equipment anticipated to be used during construction, including a jackhammer (95 dBA), an impact hammer (105 dBA), and a vibratory hammer (105 dBA).

Based on this information, the terrestrial zone of effect related to noise is anticipated to extend 1,600 feet from the project footprint on the west side of I-5 in all directions except to the east. Because the noisy I-5 corridor is immediately east of the project footprint, construction-related noise is expected to attenuate to background within 241 feet from the east edge of the project footprint Figure 1-14.

1.5.2 Aquatic Component of the Action Area

The aquatic portion of the action area includes watercourses that will be affected by the following:

- Construction-related impacts during culvert removal and replacement, stream daylighting, and channel realignment activities
- Changes in the amount of PGIS
- Future expansion of fish-accessible habitat by removal of fish passage barriers

Construction-related impacts: Fish passage culvert replacements and planned stream realignments may result in temporarily elevated turbidity in the East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek due to disturbance of the stream bed and bank. Portions of these streams may be temporarily piped to protect water quality during construction. Work near and within both streams will be performed during the period when stream flows are lowest and when anticipated stream flow is less than 10 cubic feet per second. Stream flow is intermittent in the project area, and the channel is typically dry during summer and early autumn (i.e., during the anticipated in-water work window). Project construction will be performed in compliance with Washington State water quality rules (WAC 173-201A-200). If water is present in the stream at the time of construction, any potential exceedance of the turbidity criteria established in WAC 173 201A 200 will not be expected to extend more than 100 feet downstream and 50 feet upstream of the project footprint. This distance represents the maximum extent of the aquatic portion of the action area as defined by the effects associated with construction-related turbidity.

PGIS-related impacts: New or reconfigured SWM facilities will discharge to the two tributaries: West Fork Hylebos Creek Tributary 0014C and East Fork Hylebos Creek Tributary 0016A. These streams ultimately drain to the mainstem Hylebos Creek, which discharges to the Hylebos Waterway. The Hylebos Waterway is a dredged channel maintained by the Port of Tacoma that connects to Commencement Bay.

Based on habitat conditions, intermittent flows, and the presence of total barriers to fish passage, ESA-listed fish are not expected to be present in any stream reaches within 1.5 miles of the project footprint, including the discharge points of proposed stormwater facilities.

However, emerging research related to urban runoff mortality syndrome indicates that adult and juvenile coho salmon (*Oncorhynchus kisutch*) are particularly vulnerable to lethal and sublethal effects of exposure to 6PPD-quinone, a ubiquitous chemical in tires that is introduced into streams via road runoff (Tian et al. 2021). Additional research has shown that both juvenile steelhead (*Oncorhynchus mykiss*) and juvenile Chinook salmon (*Oncorhynchus tshawytscha*) are also vulnerable to untreated stormwater containing 6PPD-quinone; however, the effects are not as immediate and instead of mortality occurring within a few hours of exposure (up to 4 hours for coho salmon), it can take one or two days for steelhead and Chinook salmon to display mortality (Fresh et al., 2022). A recent study looked at the sensitivity of early life stage (~ three weeks post swim-up [newly feeding] coho salmon and Chinook salmon) and found that juvenile coho salmon are three orders of magnitude more sensitive to 6PPD-quinone than Chinook salmon (Lo et al., 2023). This study found only 7.1% survival for coho salmon exposed to the lowest concentration treatment group, while Chinook salmon showed 61.4% survival in the highest concentration treatment group (Lo et al. 2023). While not showing the degree of sensitivity to stormwater runoff containing 6PPD-quinone as coho salmon, juvenile steelhead and Chinook do appear to exhibit direct mortality, although at higher concentrations and longer response times (Tien et al. 2021, Fresh et al. 2022, Lo et al. 2023, and Brinkman et al 2022). Other contaminants, such as metals and polycyclic aromatic hydrocarbons, are also associated with adverse effects on ESA listed salmonids and their prey. FHWA and WSDOT are closely tracking efforts to gather critical additional information on this topic, such as the fate and transport of 6PPD quinone and other contaminants in the environment, concentration thresholds for acute and sublethal toxicity, potential effects on species other than coho salmon, and the effectiveness of stormwater treatment facilities in reducing the concentration of contaminants in stormwater runoff.

For this analysis, it is assumed that (1) 6PPD quinone and other contaminants in stormwater are toxic to ESA-listed salmonids and potentially toxic to other listed species including bocaccio and yelloweye rockfish, (2) contaminants may be present in toxic concentrations in streams that receive discharges from SWM facilities, and (3) such concentrations may persist as far downstream as the streams’ discharge points to marine waters. As such, the aquatic component of the action area extends downstream to the mouth of Hylebos Creek, where it drains into the Hylebos Waterway in Commencement Bay (Figure 1-14).

Habitat expansion: The action area in East Fork Hylebos Creek Tributary 0016A will extend approximately 2.5 miles upstream and east of I-5 due to the removal of a current partial fish passage barrier (Site ID 935271), located immediately upstream of S 344th Street. The existing 417-foot culvert will be removed, and the stream will be daylighted in this general location. Accessibility to the aquatic habitats will depend on removal of several barriers upstream and downstream of the project area. WSDOT is developing plans for the removal of several barriers to fish passage (two total barriers and four partial barriers) on East Fork Hylebos Creek Tributary 0016A downstream of the project area. It is assumed for this analysis that those barriers will not have been removed before construction begins. Even if those barriers are removed before starting construction, several barriers (including one total barrier) will impede access to the habitat rendered accessible by this project. The total barrier (WDFW Site ID 932945) is on a crossing of S 363rd Place approximately 1.3 miles downstream of S 344th Street.

Similarly, the action area in the West Fork Hylebos Creek Tributary 0014C will extend approximately 0.8 mile upstream of S 336th Street to the stream’s end point in Belmor Park Golf and Country Club due to the removal of the current fish passage barrier beneath S 336th Street (Site ID 933224) and replacement with a fish passable culvert. Accessibility to the aquatic habitats will depend on removal of several barriers upstream and downstream of the project area. Currently there are three complete barriers downstream, one complete barrier upstream, and numerous partial fish passage barriers upstream and downstream of the S. 336th Street crossing (Figure 1-14).

2 STATUS AND PRESENCE OF LISTED SPECIES AND DESIGNATED CRITICAL HABITAT IN THE PROJECT ACTION AREA

The following resources were consulted to develop and refine the list of species that might be affected by construction and operation of the OMF South project:

- The USFWS Information for Planning and Consultation Program (see Appendix E)
- WDFW Priority Habitats and Species data (WDFW 2023b)
- Maps depicting the freshwater range of ESA-listed Pacific salmon and steelhead under the jurisdiction of NMFS (NMFS 2023)
- Statewide Integrated Fish Distribution (SWIFD) Web Map from the Northwest Indian Fisheries Commission (NWIFC 2023)
- USFWS critical habitat online mapper (USFWS 2023)
- Bird species maps and sighting data (eBird 2023)
- Washington Department of Natural Resources (WDNR) Washington Natural Heritage Program data (WDNR 2023a and 2023b)
- City of Federal Way critical areas maps (City of Federal Way 2016)
- Communications with Puyallup Tribe of Indians Fisheries (Ladley, personal Communications 2021a and 2021b)
- Annual salmon, steelhead, and bull trout report: Puyallup/White River Watershed – Water Resource Inventory Area 10 (Marks et. al 2018 and 2021)

2.1 Species and Critical Habitat Lists and Listing Status

The USFWS and NMFS lists of ESA-listed species and critical habitats were accessed on their websites on September 8, 2023 (Appendix E). Based on information provided at those websites and tribal coordination on salmon presence, ESA-listed species that could occur within the action area are identified in Table 2-1. No species proposed for listing are known or expected to currently use habitats in the action area, and no areas proposed for designation as critical habitat are present.

The list provided by USFWS does not identify the gray wolf as an ESA-listed species potentially present in the action area. This may be a product of the rule issued by USFWS on November 3, 2020 (85 Federal Register [FR] 69778), removing gray wolves from the list of species protected under ESA. However, on February 10, 2022, the U.S. District Court for the Northern District of California vacated and remanded USFWS' delisting rule. The court's decision effectively reinstated the listing status the species had before USFWS issued the delisting rule. As a result, gray wolves in western Washington have a listing status of endangered. Gray wolf critical habitat is not present in the action area.

Table 2-1 ESA-Listed Species and Critical Habitats

Species or Critical Habitat[(1)]	Listing Status	Federal Jurisdiction	Critical Habitat in Action Area
Streaked horned lark (*Eremophila alpestris strigata*)	Threatened	USFWS	No
Yellow-billed cuckoo, Western U.S. distinct population segment (DPS) (*Coccyzus americanus*)	Threatened	USFWS	No
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	USFWS	No
Taylor's checkerspot (*Euphydryas editha taylori*)	Endangered	USFWS	No
Gray wolf (*Canis lupus*)	Endangered	USFWS	No
North American wolverine (*Gulo gulo luscus*)	Threatened	USFWS	No
Bull trout (*Salvelinus confluentus*)	Threatened	USFWS	No*
Chinook salmon, Puget Sound ESU (*Oncorhynchus tshawytscha*)	Threatened	NMFS	Yes
Steelhead, Puget Sound DPS (*Oncorhynchus mykiss*)	Threatened	NMFS	Yes
Bocaccio, Puget Sound/Georgia Basin DPS (*Sebastes paucispinis*)	Endangered	NMFS	No
Yelloweye rockfish Puget Sound/Georgia Basin DPS (*Sebastes ruberrimus*)	Threatened	NMFS	No
Killer whale, Southern Resident DPS (*Orcinus orca*)	Endangered	NMFS	No

Sources: * 75 FR 63898;

Notes:
(1) ESU = evolutionarily significant unit; DPS = distinct population segment

Six of the species identified in Table 2-1 are not expected to occur in the action area for the reasons detailed in the sections below. An additional species, the northwestern pond turtle (*Actinemys marmorata*), was recently proposed for listing as a threatened species; however, due to its restricted distribution, it is not anticipated to occur within the action area. A brief description of the northwestern pond turtle and current distribution is provided below.

Streaked Horned Lark

Streaked horned larks are not expected to use habitats in the action area. This species requires large areas of open grassland habitat with clear sightlines, and it is known to occur in portions of southern Puget Sound, along the Washington Coast, and at lower Columbia River islands (78 FR 61451, October 3, 2013). Breeding habitat for streaked horned larks in Washington consists of grasslands and sparsely vegetated areas at airports, sandy islands, and coastal spits. No such habitat is present in the action area. Grassland habitat is present on the Weyerhaeuser property located immediately east of the proposed action and on the east side of I-5. This grassland habitat is visible in Figure 1-15 and Figure 1-16. The total size of the habitat patch is less than 60 acres; the smallest site with evidence of streaked horned lark use in the Puget Trough region is 90 acres (Anderson and Pearson 2015). In addition, the fields on the Weyerhaeuser property are dominated by densely growing, sod-forming grasses. Streaked horned larks typically select habitat patches with low, sparse vegetation and a relatively high percent cover of bare ground, avoiding areas dominated by shrubs or sod-forming grasses

(Anderson and Pearson 2015). The closest known breeding area is at Tacoma Narrows Airport, more than 10 miles from the action area. The closest location where critical habitat has been designated for the streaked horned lark is more than 80 miles from the action area. For these reasons, the project will have **no effect** on streaked horned larks.

Yellow-billed Cuckoo

Yellow-billed cuckoo nest almost exclusively in low- to mid-elevation riparian woodlands that cover 50 acres or more within arid to semiarid landscapes (Hughes 1999). Most breeding sites have been found in patches larger than 200 acres. Historical records indicate that breeding habitat for yellow-billed cuckoos in Washington consisted primarily of cottonwood and willow bottoms along the lower Columbia River and in the Puget Sound lowlands. The last confirmed breeding records of yellow-billed cuckoos in Washington are from the 1930s. Currently, the species no longer breeds in western Canada and the northwestern continental United States (Washington, Oregon, and Montana) (79 FR 59991, October 3, 2014). No observations of this species have been documented within 10 miles of the action area (WDFW 2023b; eBird 2023). No blocks of suitable forested riparian habitat larger than 5 acres are present in the action area. For these reasons, the project will have **no effect** on yellow-billed cuckoos.

Marbled Murrelet

Marbled murrelets require old-growth forest for nesting and marine habitats for foraging. No suitable nesting or foraging habitat is present within 2 miles of the terrestrial portion of the action area, and there have been no documented observations of nesting marbled murrelets within 10 miles. Occasional observations of marbled murrelets have been documented in Commencement Bay outside of the industrial waterways (eBird 2023); however, given the noise and industrialized nature of these marine foraging areas, marbled murrelet use of these areas is anticipated to be extremely low. No designated critical habitat for marbled murrelets is present within 10 miles of the action area. The potential for marbled murrelet nesting in the action area is minimized by the following:

- All forested areas in the action area have been logged multiple times in the past century and a half; young forests and small patches of conifers lack the complexity preferred by murrelets. Murrelets typically nest in large coniferous trees in areas containing characteristics of older forests (McShane et al. 2004).
- The project site is immediately adjacent to I-5 and the urban landscape of Federal Way, where high levels of noise and activity likely discourage use by nesting marbled murrelets. Raphael et al. (2016) found that nesting habitat correlated strongly with areas of low human disturbance.
- Construction related noise is not anticipated to affect marbled murrelets flying between foraging habitat in Puget Sound and inland nesting sites due to the existing high levels of noise along the I-5 corridor and adjacent urban development.
- The closest sites where potential nesting behavior has been observed are more than 30 miles away.
- Marbled murrelets have been found to demonstrate a fairly high degree of fidelity to forest stands used for nesting (Plissner et al. 2015). If murrelets historically nested near the project site, any nest trees were removed when the area was cleared at the time of initial settlement by Euro-Americans and on multiple occasions thereafter. Descendants of any murrelets that nested near the project site had to find suitable breeding habitat farther inland, on the western slopes of the Cascades. Birds in those lineages are likely to return to the stands that have been used more recently for nesting. Flying through forested areas near the

project site in search of trees with suitable nest platforms would require an excessive expenditure of energy and exposure to predation risk. As such, the probability of any murrelets finding platforms in the project area and selecting them as nest sites is negligible.

For the reasons specified above, the project will have **no effect** on marbled murrelets.

Taylor's Checkerspot

Taylor's checkerspot butterflies require grassland dominated by fescue or other short-stature grass species, with a diversity of larval host plants and spring nectar sources (Stinson 2005). The closest known population is more than 15 miles from the project area. Populations in the Puget Sound region are primarily associated with shallow soil balds and grasses within a forested landscape. In Washington and Oregon, Taylor's checkerspot butterfly larvae feed primarily on native paintbrush and closely related species (e.g., *Castilleja hispida, C. levisecta, Triphysaria spp.*), and on plantain species such as non-native *Plantago lanceolata* and native *Plantago maritima* (61938 FR 77, October 11, 2012). Other annuals documented as larval host foods include several species of speedwell (*Veronica spp.*), blue-eyed Mary (*Collinsia grandiflora* and *C. parviflora*), and sea blush (*Plectritus congesta*). *Plantago lanceolata* and *Plantago maritima* could be present in grassy habitat throughout the project corridor. Other larval host species have not been observed, and they are unlikely to be present. Grosboll (Grosboll 2011) found that, within areas of broadly suitable grassland vegetation structure, Taylor's checkerspot butterfly adults lay their eggs in areas with very high densities of host plants. Of 31 oviposition locations studied, the volume of host plants in all but one exceeded 10,000 cubic centimeters per square meter. No areas with such high densities of paintbrush or plantain species have been observed in the project action area. For the reasons specified above, the project will have **no effect** on Taylor's checkerspot.

Gray Wolf

Gray wolves require areas with abundant prey and low levels of human disturbance. The current range of gray wolves is not known to extend into the Puget lowlands, and there have been no documented den or rendezvous sites within the action area. The closest pack is the Napeequa Pack (nonbreeding pack) over 70 miles away from the action area, followed by the Shady Pass pack (breeding pack) approximately 90 miles away from the action area, and the Teanaway single wolf territory over 60 miles away from the action area (WDFW 2023c). All packs and territories are located on the other side of the Cascade crest. Based on the location of the project area in a lowland urban setting with high levels of human activity and no nearby roadless areas, no suitable habitat for this species is present in the action area. Critical habitat for gray wolves in Washington has not been designated. For the reasons specified above, the project will have **no effect** on the gray wolf.

North American Wolverine

North American wolverines strongly prefer cold areas with a deep snowpack that persists through the spring. Because of this preference, wolverines are typically found at high elevations at the latitude of the project site. Suitable habitat and sufficient prey resources for wolverines do not exist within the action area. For the reasons specified above, the project will have **no effect** on North American wolverine.

Northwestern Pond Turtle

The northwestern pond turtle was proposed for listing as a threatened species in October 2023 (88 FR 68370). No critical habitat has been proposed or designated for the species at this time.

Historical records suggest a limited distribution of northwestern pond turtle in Washington, being restricted to central and southern Puget Sound from Snohomish County to Thurston County, and Skamania and Klickitat counties in the Columbia Gorge (Hays et al. 1999). Currently, the species occurs at six locations in the state, including three sites in Skamania County, and one each in Klickitat, Mason and Pierce counties (Hallock et al. 2017). In Washington, they are found associated with ponds, small lakes and wetlands at elevations below 300 m (985 ft.) (Hays et al. 1999). They also require the availability of adjoining open upland habitats. In Washington, northwestern pond turtles are considered conservation reliant because of the small number of occupied sites, low abundance, non-native predation, and reliance on headstarting to maintain populations (88 FR 68370-68399). Headstarting is the process of removing eggs from the wild and raising through the most vulnerable life stages and then releasing back to the wild.

Currently, the closest population is located approximately 10 miles southwest of the proposed action. Given the distance from the existing population in Pierce County and the project area, the dense road network system between the existing population and the project area, and the developed nature of the project area, the potential for the species to occupy habitats in the project action area is extremely unlikely without human intervention.

2.2 Presence of Federally Listed and Proposed Species in the Project Action Area

Parametrix biologists conducted field investigations in the action area on several occasions between 2019 and 2022. The results of the investigations are summarized below. Before conducting fieldwork, the biologists reviewed maps and materials on the soils, hydrology, topography, land use, floodplains, wetlands, streams, and wildlife habitat in the action area. In addition, information from the WDNR Natural Heritage database indicates that no threatened or endangered plants are known to occur within 5 miles of the project site (WDNR 2023a and 2023b).

Discussions in this subsection describe the known and expected use of habitats in the action area by the species identified in Table 2-1. Based on the presence of downstream barriers to fish passage, combined with intermittent flows and a lack of potentially suitable habitat, ESA-listed fish are not expected to be present in any streams within 1 mile of the project site. The following discussions are intended primarily to support evaluations of the potential for exposure of fish in downstream waters. These species might be exposed to contaminants in stormwater runoff from impervious surfaces created or replaced by project construction. Discussions of species presence and habitat use include those with the potential to occur in the Hylebos Creek watershed (HUC 17110019).

2.2.1 Bull Trout

USFWS listed bull trout as threatened under ESA on November 1, 1999 (64 FR 58910). The Statewide Integrated Fish Distribution (SWIFD) database does not indicate the presence/distribution of bull trout in any streams within the Hylebos Creek drainage basin (NWIFC 2023). According to the SWIFD database, the closest documented presence of bull trout is in the Puyallup River (NWIFC 2023).

Despite the general absence of bull trout-preferred habitat conditions (as described below) within the Hylebos Creek basin (see below), there was one report of a single sub-adult bull trout or Dolly Varden captured near the S 373rd Street crossing of West Fork Hylebos Creek in August 2018, approximately 3.9 miles downstream of the project footprint (Heltzel 2018 pers. comm.). Genetic analysis was not performed to verify whether the fish was a bull trout or a Dolly

Varden. This single observation should be considered in the context of decades of fish monitoring studies in the Hylebos Creek watershed conducted by Puyallup Tribal Fisheries. These studies have not encountered bull trout in the watershed (Marks et al. 2021). This individual bull trout or Dolly Varden likely strayed. For the purposes of this analysis, we are assuming that there is an extremely low probability for bull trout to be present within the Hylebos Creek drainage basin at any time of year and that if they were to occur, their distribution in the system would be transitory and in extremely low numbers.

Bull trout are strongly associated with snowmelt-dominated streams that maintain cold water temperatures in headwater tributaries year-round. Streams supporting bull trout have clean gravel substrates and cold water temperatures (less than 9ºC/48ºF) (63 FR 31693, June 10, 1998). Hylebos Creek is a rainfall-dominated stream that does not provide this type of habitat, and stream temperatures are regularly higher than the temperatures this species requires. Stream substrates in the Hylebos Creek watershed are dominated by fines, particularly near the project footprint. Water temperatures often exceed those preferred by bull trout. A 2001 water quality study of East Fork Hylebos Creek (east of I-5) indicated that temperatures frequently exceeded 14ºC in summer months at one of the stations (King County 2002). Such temperatures are likely to limit the presence of bull trout. West Fork Hylebos Creek and portions of its tributaries are included on the 303(d) list of impaired waters, based on temperatures exceeding 17ºC (Ecology 2023). Other 303(d) water quality impairments identified in the watershed include dissolved oxygen, heavy metals, copper, and bacteria, which may also limit the potential presence of bull trout (Ecology 2023). The Hylebos Waterway has 303(d) listings for chlorinated pesticides, DDT and metabolites, high molecular weight polycyclic aromatic hydrocarbons, and polychlorinated biphenyls, all of which detrimentally affect various life history stages of fish.

2.2.2 Puget Sound Chinook Salmon

Chinook salmon in the Puget Sound ESU are listed as threatened under ESA (64 FR 14308, March 24, 1999). The ESU includes naturally spawned Chinook salmon originating from rivers flowing into Puget Sound, along with Chinook salmon from 26 artificial propagation programs. Primary factors contributing to declines in Chinook salmon in the Puget Sound ESU include habitat blockages, genetic modification of wild fish through interbreeding with hatchery fish, urbanization, logging, hydropower development, harvests, and flood control and flood effects (NMFS 1998).

Chinook salmon have been documented in the Hylebos Creek watershed. Chinook salmon typically spawn in the mainstem channels of rivers and large tributaries, in riffles, and in pool tail outs where clean, gravel-dominated substrates are available. Compared to other Pacific salmon, spawning Chinook salmon require larger and deeper streams and pools (at least 3 feet deep), as well as larger gravel (up to 5.5 inches diameter). Such habitats are not available in the low-energy, intermittently flowing headwater tributaries present in the project area.

Chinook salmon are neither known nor expected to be present in the headwater tributaries to which treated stormwater from the project will be discharged. According to the SWIFD database, the closest watercourses where Chinook salmon have been documented, are presumed present, or could potentially be present are at least 1.5 miles downstream from any discharge points of stormwater facilities that will be built or reconfigured for this project (NWIFC 2023). Numerous human-made fish passage barriers, combined with small stream sizes and intermittent flow regimes, likely limits the movement of Chinook salmon into stream reaches in the project area (Ladley 2021a, pers. comm.).

Chinook salmon have been documented in Hylebos Creek and the lower reaches of West Fork Hylebos Creek (downstream of barriers), and they are presumed to be present in the lower 700 feet of East Fork Hylebos Creek (NWIFC 2023). Fisheries biologists from the Puyallup Tribe of Indians have documented Chinook salmon in West Fork Hylebos Creek as far upstream as S 356th Street, approximately 1.4 miles upstream of the upstream extent of the documented distribution of Chinook salmon in that stream, as mapped by NWIFC (NWIFC 2023).

Downstream human-made barriers to fish migration currently obstruct Chinook salmon from entering stream reaches in the project area. Table 2-2 provides an overview of the downstream distances to reaches where Chinook salmon have been documented or where their presence is not precluded by stream channel gradients (<= 16% stream gradient). The latter would become more accessible to Chinook salmon in the future, if all human-made downstream impediments to fish passage are removed. The table also identifies the number of human-made fish passage barriers between the project area and reaches where Chinook salmon have been documented. For each stream, the downstream distance is measured as the distance between the farthest downstream discharge point of a stormwater facility and the upstream extent of documented, presumed, or potential presence. The downstream distance to the documented presence of Chinook salmon in the West Fork Hylebos Creek subbasin is based on information provided by the Puyallup Tribe of Indians. The downstream distance to the documented presence of Chinook salmon in the East Fork Hylebos Creek subbasin is based on information from NWIFC (NWIFC 2023).

Table 2-2 Distribution and Impediments to Chinook Salmon Presence in the Project Area

Chinook Distribution and Human Made Barriers	West Fork Hylebos Creek Tributary 0014C	East Fork Hylebos Creek Tributary 0016A
Distance to the closest gradient-accessible reach$^{(1)}$	1.3 miles	1.1 miles
Distance to the closest reach with presumed presence	1.5 miles	3.7 miles
Distance to the closest reach with documented presence	1.5 miles	3.9 miles
Number of total barriers	4	4$^{(2)}$
Number of partial barriers	7	11$^{(2)}$
Number of human-made features unassessed for fish passage	4	2

Sources: NWIFC 2023; WDFW 2019, WDFW 2023b

Notes:

(1) Gradient-accessible reaches are those to which access is not precluded by stream channel gradients that pose a barrier to upstream migration (<= 16% stream gradient for Chinook). Please note that this is modeled data and is not meant to be a definitive statement about the distribution of a species or imply there are natural barriers due to stream gradient.

(2) Values in this table are based on barrier inventory data as of May 2023. WSDOT is developing plans for the correction of two total barriers and four partial barriers to fish passage on East Fork Hylebos Creek Tributary 0016A downstream of the project area. Installation of new, fish-passable structures at these sites will reduce barriers, but this will not provide access to stream reaches in the project footprint.

Based on the presence of human-made downstream barriers to fish passage, combined with intermittent flows and a lack of potentially suitable habitat, Chinook salmon are assumed to be absent from the Hylebos Creek tributaries near the project area. The remainder of this discussion describes Chinook salmon use of Hylebos Creek, West Fork Hylebos Creek, and the Hylebos Waterway.

Chinook salmon in the Hylebos Creek watershed are classified as fall-run. According to HDR Engineering, Inc. (HDR 2014), adults typically return to freshwater habitats in the Hylebos Creek watershed in August and September, with spawning occurring from mid-September through October. EarthCorps (2016) reported that Chinook salmon typically enter and spawn in Hylebos Creek and accessible tributaries between October and December of each year. Based on these characterizations, it is assumed for this analysis that adult Chinook salmon may be present in accessible streams in the Hylebos Creek watershed from August through December.

Fry emerge from spawning gravels in March and April, and they rear in the system between 2 to 12 months before migrating to Puget Sound (HDR 2014). Some juveniles migrate to salt water as subyearlings (i.e., a few weeks or months after hatching), while others rear in fresh water for a full year (Wydoski and Whitney 2003). Because juveniles may spend as much as a year in freshwater habitats in the Hylebos Creek watershed, it is assumed that they may be present in accessible streams in the action area at any time of year for this analysis.

The Puyallup Tribal Fisheries Department has documented Chinook salmon spawning in West Fork Hylebos Creek, primarily in the reach extending approximately 0.5 mile upstream from the confluence of West Fork Hylebos Creek and East Fork Hylebos Creek (Marks et al. 2021). Sediments in this reach of West Fork Hylebos Creek are dominated by sand and silt, but some small and isolated patches of suitable spawning habitat are available. Reaches of Hylebos Creek and West Fork Hylebos Creek in the action area also provide rearing habitat for juveniles, as well as serving as a migration corridor for Chinook salmon that may spawn in upstream reaches. Chinook salmon have been documented in West Fork Hylebos Creek as far upstream as S 356th Street (Ladley 2021b pers. comm.).

NMFS and USFWS (2009) determined that juvenile Chinook salmon typically are present in the estuarine waters of the Hylebos Waterway from March and early July, with peak numbers in late May or early June. Subyearling juvenile Chinook salmon have also been captured in Commencement Bay as early as January, during beach seining surveys (Ladley pers. comm., as cited in NMFS and USFWS 2009). Juveniles are generally observed more frequently near the mouths of the waterways than near the heads (Kerwin 1999), and observations are most frequent in the waterways closest to the Puyallup River (NMFS 2001).

As part of ongoing fish and habitat restoration efforts, the Puyallup Tribe has released approximately 10,000 to 20,000 juvenile fall-run Chinook salmon into West Fork Hylebos Creek annually, during the spring (Marks et al. 2021). These fish are produced by the Clarks Creek Hatchery Program, and they are included in the Puget Sound ESU (79 FR 20802, April 14, 2014). Hatchery fish have been identified on spawning grounds in West Fork Hylebos Creek (Marks et al. 2021).

2.2.3 Puget Sound Steelhead

The Puget Sound steelhead DPS is listed as a threatened species under the ESA (72 FR 26722, May 11, 2007). The DPS includes all naturally spawned anadromous winter-run and summer-run steelhead populations, in streams within the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington. The DPS also includes steelhead from artificial propagation programs in the Green River.

Steelhead have been documented in the Hylebos Creek watershed, and they may be present in some tributaries to Hylebos Creek in the action area. Detailed information about habitat use and the timing of steelhead presence is available for the Puyallup River, but not for streams in the Hylebos Creek watershed. Except where stated otherwise, descriptions of patterns of steelhead presence in the Hylebos Creek watershed are based on information from the Puyallup River watershed.

Steelhead have been documented in Hylebos Creek and the lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek (NWIFC 2023). The nearest watercourses where steelhead have been documented are at least 1.9 miles downstream from any discharge points of stormwater facilities that will be built or reconfigured for this project. Of the two headwater tributaries to which treated stormwater from the project will be discharged, steelhead have been documented only in the lowest reaches of East Fork Hylebos Creek Tributary 0016A, approximately 1.9 miles downstream from the project area. Approximately 1.3 miles of East Fork Hylebos Creek Tributary 0016A flows through or immediately adjacent to the project footprint and all but the upper 0.2 miles (800 feet) of that distance are considered gradient accessible to steelhead (<= 20% stream grade). The discharge point of TDA 13A (the furthest downstream discharge point from a project-related SWM to this stream) is in a reach characterized as gradient-accessible for steelhead—that is, access is not precluded by stream channel gradients that pose a barrier to upstream migration (access is, however, currently limited by the presence of anthropogenic barriers).

Numerous fish passage barriers, combined with small stream sizes and intermittent flow regimes, limits the movement of steelhead into stream reaches in the project area (Ladley 2021a, pers. comm.).

Table 2-3 provides an overview of the downstream distances to reaches where steelhead have been documented or where their presence is not precluded by stream channel gradients. The latter could become accessible to steelhead in the future if all downstream impediments to fish passage were removed. The table also identifies the number of fish passage barriers between the project area and reaches where steelhead have been documented. For each stream, the downstream distance is measured as the distance between the farthest downstream discharge point of a stormwater facility and the upstream extent of documented, presumed, or potential presence, based on information from NWIFC (2023).

Based on the presence of human-made downstream barriers to fish passage, combined with intermittent flows and a lack of potentially suitable habitat, steelhead are assumed to be currently absent from the Hylebos Creek tributaries near the project area. The remainder of this discussion describes steelhead use of Hylebos Creek, its major tributaries, and the Hylebos Waterway.

Table 2-3 Distribution and Impediments to Steelhead Presence in the Project Area

Steelhead Distribution and Human Made Barriers	West Fork Hylebos Creek Tributary 0014C	East Fork Hylebos Creek Tributary 0016A
Distance to nearest gradient-accessible reach(1)	1.3 miles	Gradient Accessible
Distance to nearest reach with presumed presence	N/A	N/A
Distance to nearest reach with documented presence	2.7 miles	1.9 miles
Number of total barriers	4	4(2)
Number of partial barriers	7	13(2)
Number of human-made features unassessed for fish passage	4	2

Sources: NWIFC 2023; WDFW 2019; WDFW 2023a

Notes:

(1) Gradient-accessible reaches are those to which access is not precluded by stream channel gradients that pose a barrier to upstream migration (<=20 stream gradient for steelhead). Please note that this is modeled data and is not meant to be a definitive statement about the distribution of a species or imply there are natural barriers due to stream gradient.

(2) Values in this table are based on barrier inventory data as of May 2023. WSDOT is developing plans for the correction of 2 total barriers and 4 partial barriers to fish passage on East Fork Hylebos Creek Tributary 0016A downstream of the project area. Installation of new, fish-passable structures at these sites will reduce barriers but will not provide access to stream reaches in the project footprint.

Steelhead in the Hylebos Creek watershed are predominantly a winter-run population. The principal spawning stock of steelhead in the Puyallup River system generally enters the river system from January through June, with peak migration occurring in mid- to late April and early May (Marks et al. 2021). In addition, a few individuals, likely strays from summer-run populations in the Green or Skykomish Rivers, are caught in the lower Puyallup River each year during August and September (Marks et al. 2021). WDFW does not recognize a summer run population of steelhead in the Puyallup River system, and only the winter run populations are included in the ESA-listed Puget Sound DPS (NMFS and USFWS 2009).

Juvenile steelhead typically rear in freshwater habitats for 2 years (range: 1 to 4) before migrating to marine waters (Marks et al. 2021). Juvenile out-migration takes place primarily in April and May, although a few individuals have been observed out-migrating as late as late-July (NMFS and USFWS 2009).

Information on recent observations of steelhead in the Hylebos Creek watershed is limited. No juvenile or adult steelhead were observed during habitat surveys and electrofishing surveys in several reaches of East Fork Hylebos Creek and West Fork Hylebos Creek in 2014 (HDR 2014). NWIFC (2023) does not classify any stream reaches in the Hylebos Creek watershed as documented spawning habitat. Marks et al. (2021) characterized the spawning frequency for this species in Hylebos Creek as low and inconsistent. NMFS and USFWS (2009) reported that steelhead spawn in the Hylebos Creek watershed occasionally, primarily in West Fork Hylebos Creek between S 373rd Street and SR 99, approximately 2.5 miles downstream from the project area.

Based on these observations, it is assumed for this analysis that steelhead may spawn in the Hylebos Creek watershed, albeit in low numbers and probably not every year. The nearest spawning areas are approximately 2.5 miles downstream from the downstream-most discharge point from a stormwater treatment facility in West Fork Hylebos Creek Tributary 0014C. Adults may be present in accessible streams from January through June, with the highest probability of presence occurring during the peak migration period (April and May).

Juveniles could be present at any time of year, albeit in low numbers and with low probability. The quality of rearing habitat in the action area is limited by the lack of suitable substrates and by elevated water temperatures during summer. Juvenile steelhead in the Hylebos Creek watershed are most likely to rear in lower reaches.

2.2.4 Puget Sound/Georgia Basin Bocaccio

The Puget Sound/Georgia Basin DPS of bocaccio was listed as “endangered” under the ESA on April 28, 2010 (75 CFR 22276). The DPS includes all bocaccio found in the waters of Puget Sound, the Strait of Georgia, and the Strait of Juan de Fuca east of Victoria Sill. Population declines for bocaccio, like all rockfish species in Puget Sound, were historically attributed to overfishing (Palsson et al. 2009; Drake et al. 2010; Williams et al. 2010); however, today there is some uncertainty about the relative impact of some fisheries and of other additional threats, including degraded water quality and habitat, contaminants, and derelict fishing gear, among others on population declines (Palsson et al. 2009, WDFW 2013).

Subadults and adult bocaccio typically occupy waters deeper than 120 feet (Love et al. 2002) and are therefore not expected to be present in the lower tidally influenced portions of Hylebos Creek. If any bocaccio were to enter the action area, they would likely do so as larvae; rockfish at that life stage are pelagic drifters, carried by the currents. Juveniles settle onto rocky or cobble substrates in shallow nearshore water at 3 to 6 months of age, moving to progressively deeper waters as they grow (Love et al. 2002). Juvenile bocaccio may also recruit to sandy zones with eelgrass or drift algae (Love et al. 2002). This habitat is not available within lower Hylebos Creek. Overall, the potential for use of the action area by bocaccio is by the larval life history form and likely only on incoming tidal conditions.

2.2.5 Puget Sound/Georgia Basin Yelloweye Rockfish

The Puget Sound/Georgia Basin DPS of yelloweye rockfish was listed as “threatened” under the ESA on April 28, 2010 (75 CFR 22276). This DPS includes all yelloweye rockfish found in the waters of Puget Sound, the Strait of Georgia, and the Strait of Juan de Fuca east of Victoria Sill. are not expected to occupy nearshore waters at any life stage and are therefore very unlikely to be in the action area when project activities are underway. Recent research has found evidence for two populations of yelloweye rockfish within the DPS—one in Hood Canal and one within the rest of the Puget Sound/Georgia Basin (NMFS 2017). Threats to yelloweye rockfish are similar to that identified above for bocaccio.

Similar to bocaccio, adult yelloweye rockfish are found in deep water habitats ranging from 90 to 1,394 feet (30-425 m) in depth (Orr et al. 2000; Love et al. 2002) and have a strong affinity to substrate. Juvenile yelloweye rockfish are not typically found in intertidal waters (Love et al. 1991; Studebaker et al. 2009). In British Columbia, juvenile yelloweye rockfish have been observed at a mean depth of 239 feet (73 m), with a minimum depth of 98 feet (30 m) (Yamanaka et al. 2006). Neither of these habitats are present within the project action area. Larval yelloweye rockfish are often associated with free-floating algae, seagrass, and detached kelp (Love et al. 2002; Shaffer et al. 1995) and can be found anywhere in the water column (Weis 2004). As larval yelloweye rockfish are subject to currents and tidal action, it is possible for larval rockfish to be present, albeit in low numbers, within the lower tidally influenced portion of Hylebos Creek during incoming tides. Larval fish would likely be flushed out of lower Hylebos Creek on an outgoing tide.

2.2.6 Southern Resident Killer Whale

The southern resident DPS of killer whales was listed as endangered on February 16, 2006 (70 FR 69903), and a recovery plan was completed in 2008. In 2021, NMFS completed a 5-year review and concluded that southern resident killer whales (SRKWs) should remain listed as endangered (NMFS 2021). The recovery plan identified several factors that may be limiting SRKW recovery, including quantity and quality of prey, toxic chemicals that accumulate in top predators, and disturbance from sound and vessels (NMFS 2008). Oil spills are also a risk factor. It is likely that multiple threats are acting together to impact the whales. Although it is not clear which threat or threats are having the largest impact on the survival and recovery of SRKWs, all the threats identified are potential limiting factors in the population dynamics of the DPS (NMFS 2008).

The action area does not include any areas of marine habitat where SRKWs are likely to be present. The aquatic component of the action area extends to the points at which Hylebos Creek enters the Hylebos Waterway. SRKWs are unlikely to enter in the shallow waters of Commencement Bay, and they are even less likely to enter the narrow confines of the Hylebos Waterway. Based on the above, the project has no potential to directly affect SRKWs or their habitat. However, based on the potential for adverse impacts on Chinook salmon, analyses in this BA consider potential indirect impacts on this species. Chinook salmon make up a large proportion of SRKW diets: it is estimated that Chinook salmon are approximately 70 percent of SRKW diet during winter and spring and more than 90 percent during summer and fall (NMFS 2021).

2.3 Presence of Federally designated or Proposed Critical Habitat in the Project Action Area

Designated or proposed critical habitat for bull trout, streaked horned lark, yellow-billed cuckoo, marbled murrelet, bocaccio, or yelloweye rockfish is not present in or near the Action Area.

- The nearest designated critical habitat for streaked horned larks is more than 80 miles from the project area.
- No critical habitat for the yellow-billed cuckoo has been designated in Washington.
- The nearest designated critical habitat for marbled murrelet is more than 30 miles from the project area.
- Designated critical habitat for bocaccio and yelloweye rockfish does not include Hylebos Creek or any of its tributaries.
- Designated critical habitat for bull trout does not include Hylebos Creek or any of its tributaries.

Based on the above, the project will have **no effect** on critical habitat for these species.

2.3.1 Puget Sound Chinook Salmon Critical Habitat

The final rule designating critical habitat for Puget Sound Chinook salmon included the main stem of Hylebos Creek and the West Fork Hylebos Creek downstream of S 373rd Street (west of I-5), (70 FR 52630, September 2, 2005). No Critical habitat for Chinook has been designated in the East Fork Hylebos Creek or any of its tributaries.

Specific Physical and Biologic Features (PBFs) for Chinook salmon in freshwater and nearshore marine/estuarine areas, as defined by NMFS, include the following:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival
4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between freshwater and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation
5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes supporting growth and maturation, and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels

Freshwater habitats in Hylebos Creek and West Fork Hylebos Creek in the action area likely support PBFs 2 and 3. Estuarine areas in the lower reaches of Hylebos Creek likely support PBF 4. PBF 1 is present only in the reaches of West Fork Hylebos Creek where Chinook salmon spawn. The action area does not include nearshore marine habitats; therefore, PBF 5 is not pertinent to this analysis.

2.3.2 Puget Sound Steelhead Critical Habitat

The lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek, approximately 1.3 to 1.9 miles downstream from the project footprint, respectively, are included in the designated critical habitat for Puget Sound steelhead under 81 FR 9251 (February 24, 2016). Critical habitat for Puget Sound steelhead is defined by the same PBFs as those identified above for Chinook salmon. Freshwater habitats in East Fork Hylebos Creek, West Fork Hylebos Creek, in the action area likely support PBFs 2 and 3. Estuarine areas in the lower reaches of Hylebos Creek likely support PBF 4. PBF 1 is present only in the reaches of West Fork Hylebos Creek where steelhead are known or expected to spawn occasionally and infrequently. The action area does not include nearshore marine habitats; therefore, PBF 5 is not pertinent to this analysis.

2.3.3 Southern Resident Killer Whale

The critical habitat of SRKW has been designated to include all marine waters of Puget Sound where depths are greater than 20 feet (86 FR 41668). Three habitat features essential to the conservation of the DPS include: 1) water quality to support growth and development; 2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; and 3) passage conditions to allow for migration, resting, and foraging. While the geographic definition of SRKW critical habitat does not overlap with the project action area, the second PBF, prey species, may be affected via trophic web interactions.

The potential for the project to have adverse impacts on Chinook salmon leads to the possibility of indirect effects to the quantity, quality, and availability of prey for killer whales.

3 ENVIRONMENTAL SETTING

Before describing the potential effects of the project action, it is important to define the environmental baseline.

“The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.” (50 CFR 402.02)

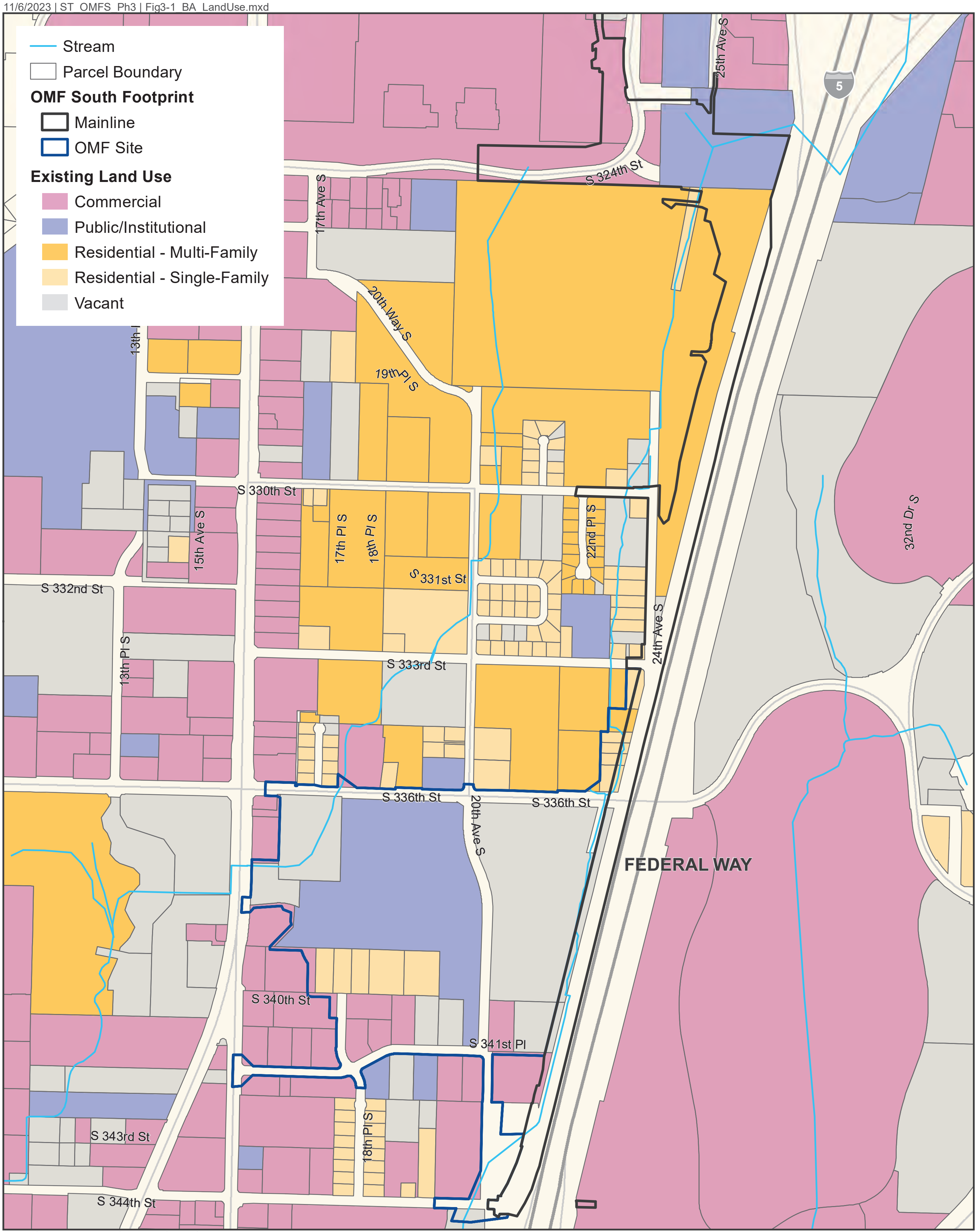
The OMF South mainline guideway will begin at the southern terminus of the FWLE in the Commons at Federal Way mall development area located between S 320th Street and South 324th Street and then turn southeast to travel down WSDOT’s southbound I-5 right-of-way to the guideway’s southern terminus at S 344th Street. The I-5 corridor is located immediately to the east of the guideway and land use to the west is a mixture of multi-and single-family residential, commercial, and institutional (Christian Faith Center) land uses with some vacant land. Land that is currently vacant is typically encumbered by sensitive habitats including wetlands, streams, forested buffers, and regional stormwater detention facilities. The OMF South site is largely occupied by institutional and commercial land uses with vacant land positioned between the OMF facility and guideway to the east. Overall, the project area is located within a highly developed urban/ suburban environment Figure 3-1.

Eighteen wetlands and two streams were identified in the immediate project area (Parametrix 2023). Wetland and streams affected by the proposed action are discussed in more detail in Section 3.2 below.

Project biologists Steve Krueger, Anna Hoenig, Mike Hall, and Josh Wozniak characterized riparian, wetland, and upland habitat in the Action Area during several site visits ranging from Fall 2019 to Spring 2023. Project area photographs are presented in Appendix F.

3.1 Terrestrial Species and Habitats

Mature forested habitat in the action area is largely restricted to riparian buffer habitats in undeveloped parcels. Mature forested buffers are dominated by Douglas-fir, western red cedar, black cottonwood, and red alder. Forested wetlands areas in the study area are dominated by Pacific willow, red alder, Oregon ash, and black cottonwood, with an understory of Douglas’ spiraea, salmonberry, Himalayan blackberry, slough sedge, and reed canarygrass. Scrub-shrub wetland areas in the study area are dominated by Scouler’s willow, Pacific willow, salmonberry, Himalayan blackberry, red-twig dogwood, and Douglas’ spiraea. Because there are no listed terrestrial species within the project Action Area, the focus of this assessment will be on species associated with aquatic habitats.


Stream
Parcel Boundary
OMF South Footprint
Mainline
OMF Site
Existing Land Use
Commercial
Public/Institutional
Residential - Multi-Family
Residential - Single-Family
Vacant
5
25th Ave S
S 324th St
17th Ave S
20th Way S
19th Pl S
13th
S 330th St
15th Ave S
17th Pl S
18th Pl S
22nd Pl S
32nd Dr S
S 331st St
S 332nd St
13th Pl S
24th Ave S
S 333rd St
S 336th St
20th Ave S
S 336th St
FEDERAL WAY
S 340th St
S 341st Pl
S 343rd St
18th Pl S
S 344th St

Data Sources: King County; City of Federal Way.

N

0 500 1,000 Feet

FIGURE 3-1
Land Use in the Vicinity of OMF South
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

3.2 Aquatic Species and Habitats

The project area contains two streams that will be affected by project construction or that include discharge points from project SWM facilities. Both streams are headwater tributaries in the Hylebos Creek watershed (West Fork Hylebos Creek Tributary 0014C and East Fork Hylebos Creek Tributary 0016A).

West Fork Hylebos Creek Tributary 0014C and East Fork Hylebos Creek Tributary 0016A are both west of I-5 in the project area and have been heavily modified to accommodate urban development. Downstream of the project limits, the streams pass through many culverts, most of which are complete or partial barriers to fish passage (WDFW 2023a). Impediments to fish passage include water velocity, surface water drops, and steep slopes. Furthermore, several of the pipes are long and have bends. While long and irregularly shaped culverts are not defined as barriers, such structures are known to inhibit the progress of fish upstream. Within the project area, both streams are intermittent, and flow is often tied to precipitation and seasonally high groundwater. Streambeds in the project vicinity are typically dry during summer and early fall. These tributaries flow into East Fork Hylebos Creek and West Fork Hylebos Creek, which converge to form Hylebos Creek south of the project area near Fife. Hylebos Creek then flows west and north, emptying to marine waters in Commencement Bay at the Hylebos Waterway.

These waterbodies are described in the sections below and shown in Figure 3-2, Figure 3-3, and Figure 3-4. Discussions of the use of these waterbodies by ESA-listed fish are included in Section 2.2.

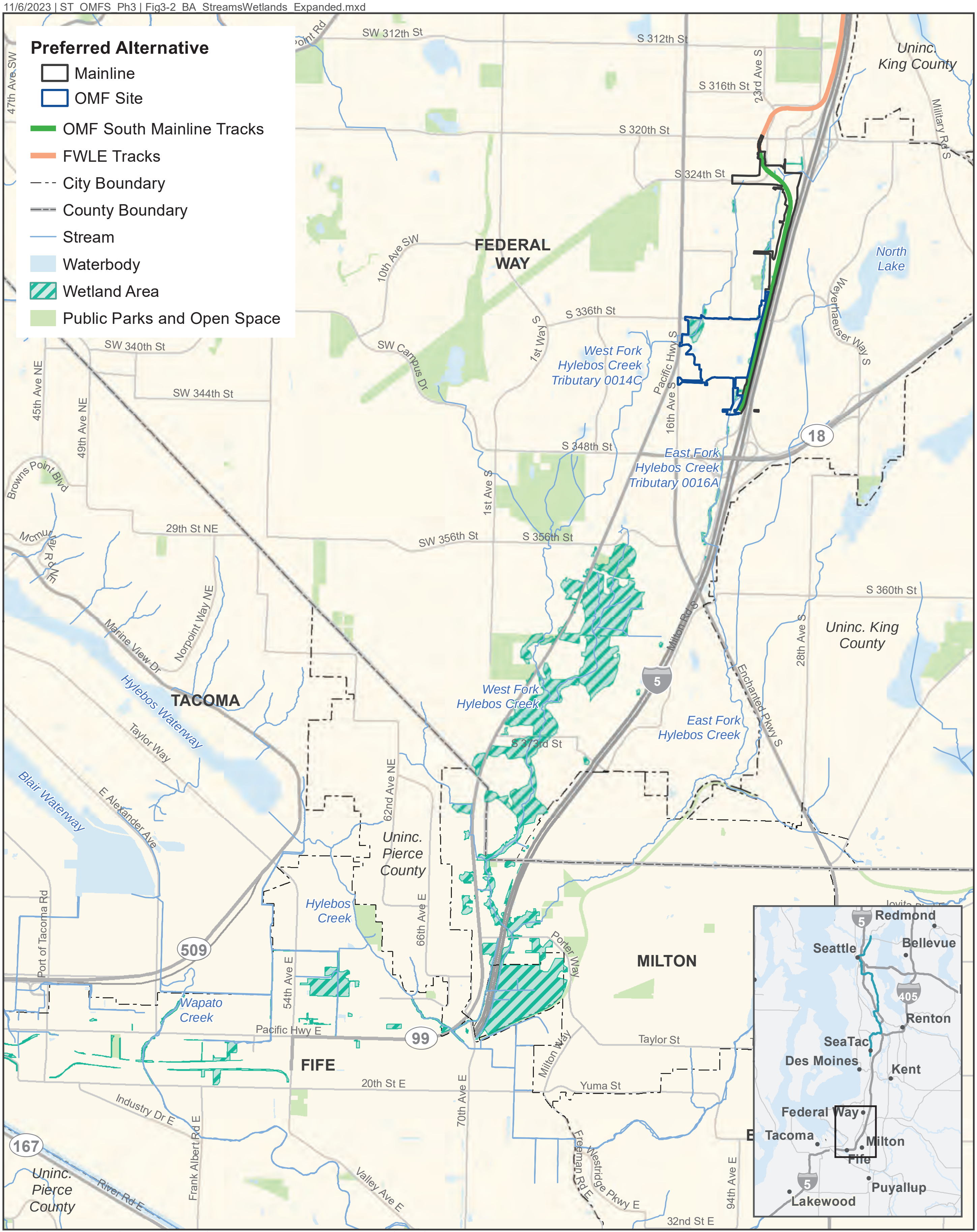
3.2.1 West Fork Hylebos Creek Tributary 0014C

The entirety of West Fork Hylebos Creek Tributary 0014C is within the aquatic component of the action area because SWM facilities built or modified for the project will discharge to the stream and the proposed action will also replace one culvert on this stream.

West Fork Hylebos Creek Tributary 0014C first daylights west of I-5 within the Belmor Park manufactured home community and country club. The stream flows south through residential developments before entering a series of stormwater detention ponds near S 336th Street (Appendix F; Photos 1-3). The stream then crosses SR 99 through a long, jointed pipe. Approximately 1.5 miles downstream from the project limits, in Hylebos Creek Wetlands Park, West Fork Hylebos Creek Tributary 0014C joins other tributaries to form West Fork Hylebos Creek. The upstream reaches of West Fork Hylebos Creek Tributary 0014C, including the immediate project area, flow only intermittently. Numerous barriers to fish passage exist downstream of the project limits (see Table 2-2 and Table 2-3 and Figure 1-8).

Urbanization in the stream basin has contributed to altered peak and base flows in West Fork Hylebos Creek Tributary 0014C (King County 1990). As a result, the City of Federal Way has initiated and completed numerous flood control projects, including large SWM facilities, throughout the basin. The portion of West Fork Hylebos Creek Tributary 0014C within the project footprint is contained wholly within two consecutive combined wetland and in-line regional stormwater detention facilities with the first located immediately north of S 336th Street and the other situated between South 336th Street to the north and State Route (SR) 99 to the southwest (Appendix F: Photos 1-3). These in-line detention facilities are also considered wetlands and were delineated as such as part of the proposed action. More detail on these

11/6/2023 | ST_OMFS_Ph3 | Fig3-2_BA_StreamsWetlands_Expanded.mxd


Preferred Alternative
Mainline
OMF Site
OMF South Mainline Tracks
FWLE Tracks
City Boundary
County Boundary
Stream
Waterbody
Wetland Area
Public Parks and Open Space
FEDERAL WAY
TACOMA
MILTON
FIFE
Uninc. King County
Uninc. King County
Uninc. Pierce County
Uninc. Pierce County
North Lake
West Fork Hylebos Creek Tributary 0014C
East Fork Hylebos Creek Tributary 0016A
West Fork Hylebos Creek
East Fork Hylebos Creek
Hylebos Creek
Wapato Creek
Hylebos Waterway
Blair Waterway
SW 312th St
S 312th St
S 316th St
S 320th St
S 324th St
23rd Ave S
Military Rd S
47th Ave SW
Point Rd
10th Ave SW
S 336th St
1st Way S
SW Campus Dr
Pacific Hwy S
16th Ave S
Weyerhaeuser Way S
SW 340th St
SW 344th St
45th Ave NE
49th Ave NE
S 348th St
18
Browns Point Blvd
1st Ave S
29th St NE
Mcmurray Rd NE
SW 356th St
S 356th St
S 360th St
28th Ave S
Norpoint Way NE
Marine View Dr
Milton Rd S
5
Enchanted Pkwy S
Taylor Way
S 373rd St
E Alexander Ave
62nd Ave NE
66th Ave E
54th Ave E
Port of Tacoma Rd
509
Porter Way
Pacific Hwy E
99
Milton Way
Taylor St
20th St E
Yuma St
70th Ave E
Industry Dr E
167
Frank Albert Rd E
Valley Ave E
River Rd E
Freeman Rd E
Westridge Pkwy E
94th Ave E
32nd St E
Jovita
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

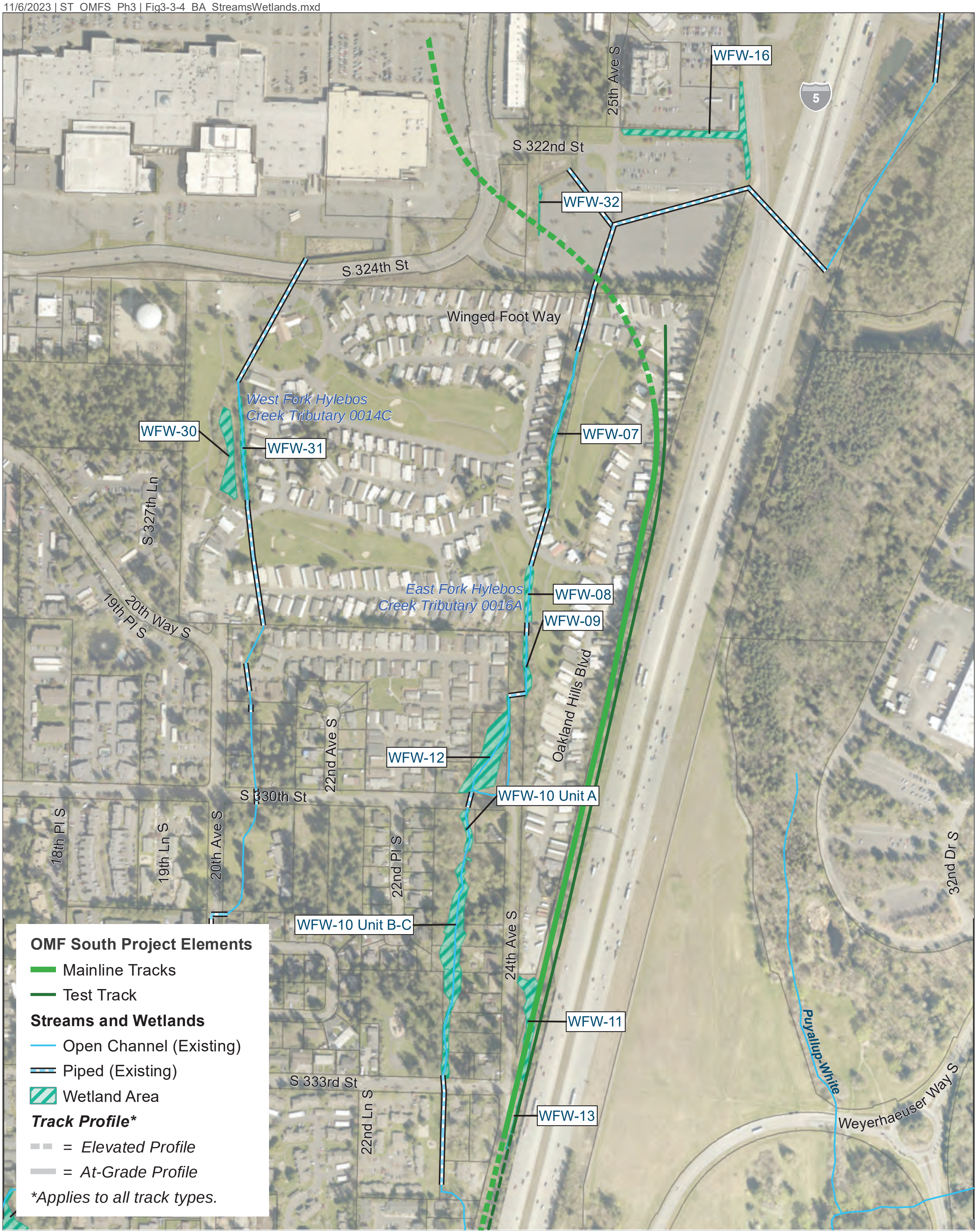
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023).

N
0
0.5
1 Miles

FIGURE 3-2
Streams and Wetlands: Expanded View
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


WFW-16
5
25th Ave S
S 322nd St
WFW-32
S 324th St
Winged Foot Way
West Fork Hylebos
Creek Tributary 0014C
WFW-30
WFW-31
WFW-07
S 327th Ln
East Fork Hylebos
Creek Tributary 0016A
WFW-08
WFW-09
20th Way S
19th Pl S
Oakland Hills Blvd
22nd Ave S
WFW-12
S 330th St
WFW-10 Unit A
18th Pl S
19th Ln S
20th Ave S
22nd Pl S
32nd Dr S
WFW-10 Unit B-C
24th Ave S
WFW-11
Puyallup-White
S 333rd St
22nd Ln S
WFW-13
Weyerhaeuser Way S
OMF South Project Elements
Mainline Tracks
Test Track
Streams and Wetlands
Open Channel (Existing)
Piped (Existing)
Wetland Area
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.
N
0
500
1,000 Feet

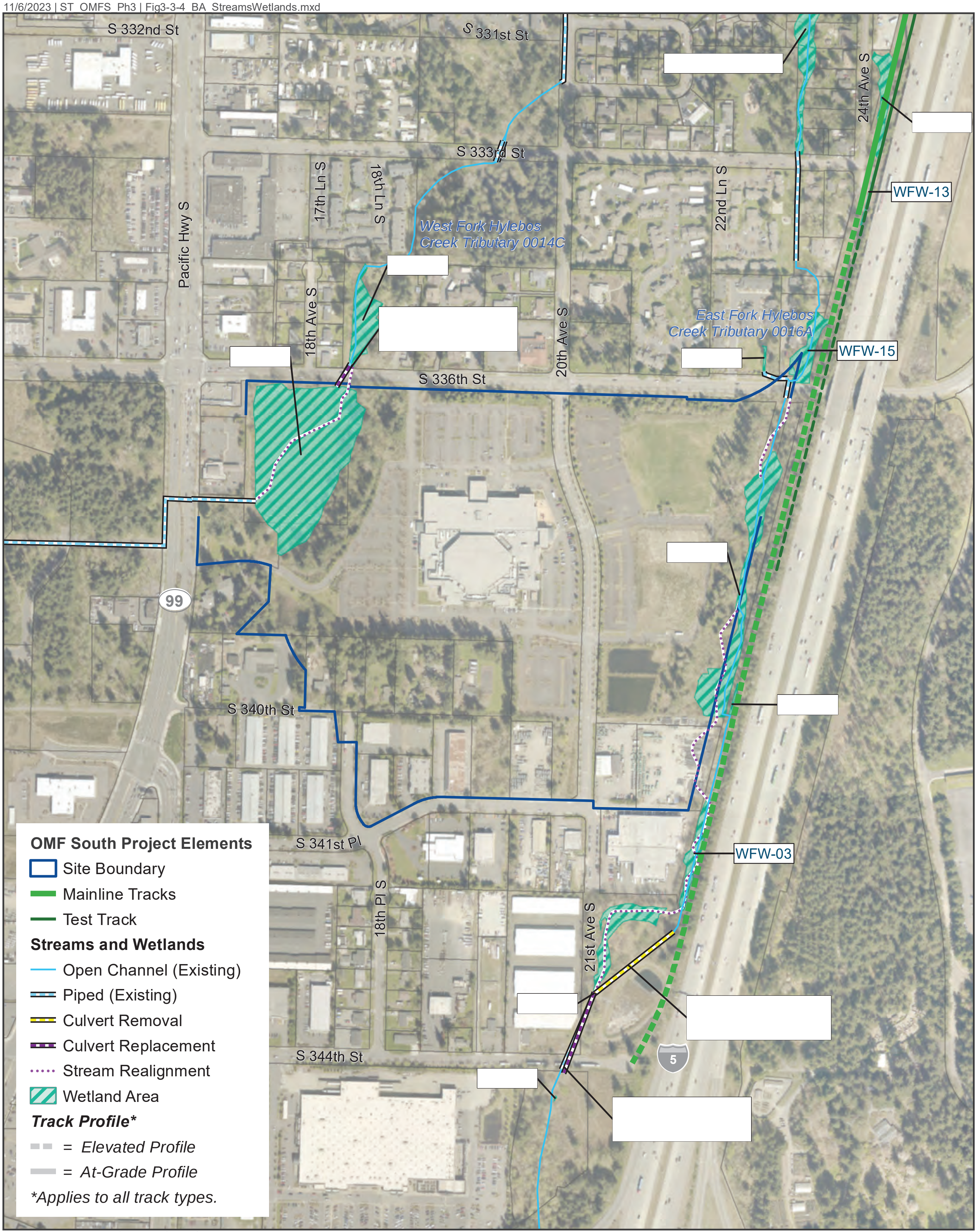
Data Sources: King County; City of Federal Way.

FIGURE 3-3
Streams and Wetlands in Project Area: Mainline
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

11/6/2023 | ST_OMFS_Ph3 | Fig3-3-4_BA_StreamsWetlands.mxd


S 332nd St
S 331st St
S 333rd St
24th Ave S
WFW-13
17th Ln S
18th Ln S
22nd Ln S
Pacific Hwy S
West Fork Hylebos Creek Tributary 0014C
18th Ave S
20th Ave S
East Fork Hylebos Creek Tributary 0016A
WFW-15
S 336th St
99
S 340th St
S 341st Pl
WFW-03
18th Pl S
21st Ave S
5
S 344th St
OMF South Project Elements
Site Boundary
Mainline Tracks
Test Track
Streams and Wetlands
Open Channel (Existing)
Piped (Existing)
Culvert Removal
Culvert Replacement
Stream Realignment
Wetland Area
Track Profile*
= Elevated Profile
= At-Grade Profile
*Applies to all track types.

Data Sources: King County; City of Federal Way.

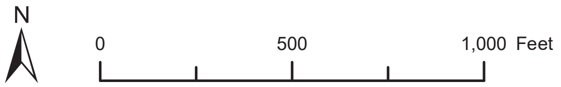

N
0
500
1,000 Feet

FIGURE 3-4

Streams and Wetlands in Project Area: OMF Site
Biological Assessment

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

wetlands (WFW-02 and WFW-33) can be found in Section 3.2.7 below. The stream enters the wetland/detention facility from the north at South 336th Street. Sediment accumulation within the detention facility has filled any prior defined channel that may have existed prior to creation of the detention facility. West Fork Hylebos Creek Tributary 0014C exits the detention facility via a water control structure, where it is piped west across SR 99. The stormwater detention facility was historically a wetland that was modified by the City of Federal Way as part of a flood mitigation program, which resulted in construction of 4- to 6-foot-high earthen berms along the western and southern boundaries to allow the wetland to provide for greater stormwater storage. Although modified, the area remains a Category II palustrine forested (PFO) wetland. Dominant vegetation in the wetland consists primarily of Pacific willow (*Salix lucida*) and black cottonwood (*Populus trichocarpa*). Understory species include red-twig dogwood (*Cornus alba*), salmonberry (*Rubus spectabilis*), and hardhack (*Spiraea douglasii*).

The segment of West Fork Hylebos Creek within the action area is on the 303(d) list of impaired waters, based on violations of state standards for copper, lead, zinc, dibenzo(a,h)anthracene, and benzo(a)pyrene (Ecology 2023). Other 303(d)-listed reaches have been identified downstream in the West Fork Hylebos Creek for temperature, dissolved oxygen, fecal coliform bacteria, and benthic macroinvertebrate bioassessment and in the mainstem Hylebos Creek for bacteria. Large amounts of impervious surface area in the upper watershed have likely contributed to elevated levels of pollutants associated with vehicle use, including metals such as copper, lead, and zinc. No fish use has been documented within this reach of West Fork Hylebos Creek (NWIFC 2023; WDFW 2023b).

3.2.2 East Fork Hylebos Creek Tributary 0016A

The entirety of East Fork Hylebos Creek Tributary 0016A is within the aquatic component of the action area because the stream will receive effluent from SWM facilities and because the project will replace two culverts and remove one culvert in its entirety (see Section 1.3.2).

The headwaters of East Fork Hylebos Creek Tributary 0016A are in a wetland complex northeast of I-5 and S 320th Street. After passing under I-5, the S 320th Street Park & Ride, and Winged Foot Way, the stream daylights within the golf course of the Belmor Park manufactured home community where the northern extent of this project is located. The stream then flows southward through a series of piped and open-channel segments for approximately 2.1 miles, confined by I-5 to the east and light industrial, commercial, and residential development to the west. Near S 356th Street, the stream turns east, crosses under I-5, and joins East Fork Hylebos Creek after converging with other tributaries.

West (downstream) of I-5, habitat conditions in East Fork Hylebos Creek Tributary 0016A are similar to those in West Fork Hylebos Creek Tributary 0014C. Much of the stream in this area is confined within a straight, ditch-like channel profile, and fish habitat is poor (Appendix F: Photos 4-6). The stream gradient is low, and accumulations of fine sediments have resulted in the shallowing and widening of the streambed. Supported by intermittent flow, dense patches of reed canarygrass grow in low-energy areas, exacerbating deposition of fine sediments. While the overall habitat quality is poor, the streams does flow through areas dominated by riparian wetlands and native forest. Forested riparian areas are dominated by red alder (*Alnus rubra*), black cottonwood, and Oregon ash (*Fraxinus latifolia*), with an understory consisting of salmonberry and vine maple (*Acer circinatum*). Farther downstream, well outside the project limits, the stream passes through areas dominated by wetlands and native forest and provides moderate-quality habitat.

East Fork Hylebos Creek Tributary 0016A flows intermittently in and near the project limits. The streambed in this area is typically dry during summer and early fall. The stream channel was completely dry during a reconnaissance survey in a reach immediately east of the proposed maintenance on October 9, 2019, and a soil pit excavated to a depth of 20 inches below the ground surface elevation in the stream failed to reach the groundwater table (Appendix F: Photo 4). Rainfall had been above normal during the preceding month (3.32 inches, compared to a normal of 1.61 inches) as well as the preceding 3 months (5.67 inches, compared to normal of 3.18 inches). Two weeks later (October 22, 2019), after several days of consistent rainfall, flows were re-established in the stream channel. East Fork Hylebos Creek Tributary 0016A is not on the 303(d) list of impaired waters (Ecology 2023).

There is no documented or presumed fish use in the upper reaches of East Fork Hylebos Creek Tributary 0016A (i.e., in areas where project construction will entail ground-disturbing work in or near the stream channel). Under current conditions, human-created barriers to fish passage obstruct anadromous salmonids from entering stream reaches in the project area (NWIFC 2023; see Tables 2-2 and 2-3 and Figure 1-8). The presence of resident fish is unlikely, given the intermittent flow of the stream and the presence of barriers between the study area and potential population sources downstream. However, the basin size, channel width, and gradient of the stream indicate the potential to support fish in the future. Furthermore, other projects are currently planned to remove several of the downstream barriers (for example, the I-5/SR 161/SR 18 Triangle Interchange project). If access is restored, the upper reaches of East Fork Hylebos Creek Tributary 0016A in and near the project limits have the potential to provide rearing habitat for juvenile salmonids.

3.2.3 West Fork Hylebos Creek

Reaches of West Fork Hylebos Creek, downstream of the West Fork Hylebos Creek Tributary 0014C confluence, are within the aquatic component of the action area. The only potential project-related impacts on this stream are associated with water quality; treated stormwater from SWM facilities that discharge to West Fork Hylebos Creek Tributary 0014C have the potential to affect water quality in West Fork Hylebos Creek. Therefore, this discussion focuses on water quality and use of this stream by fish.

West Fork Hylebos Creek is a perennial stream. A segment of the stream near S 373rd Street is included on the 303(d) list of impaired waters, based on elevated temperatures, low levels of dissolved oxygen, and elevated levels of fecal coliform bacteria (Ecology 2023).

Like the tributary streams described above, the West Fork Hylebos Creek basin has been affected by extensive urban development. In contrast to the smaller tributaries, large riparian wetland complexes in the West Fork Hylebos Creek basin help maintain base flow conditions and attenuate peak flows. Hydrologic conditions are still not optimal, however, and flood storage is still an issue.

Chinook salmon, coho salmon, steelhead, chum salmon (*Oncorhynchus keta*), and cutthroat trout (*O. clarkii clarkii*) have been documented in West Fork Hylebos Creek (NWIFC 2023; WDFW 2023b). The Puyallup Tribal Fisheries Department has documented Chinook salmon, chum salmon, coho salmon, pink salmon, and steelhead spawning in West Fork Hylebos Creek between SR-99 and the confluence with the East Fork Hylebos Creek (Marks et al. 2018). West Fork Hylebos Creek is a migratory corridor for all these species and provides rearing habitat for juvenile cutthroat trout, coho salmon, Chinook salmon, and steelhead. Salmonid distribution within West Fork Hylebos Creek is not anticipated to extend into West Fork Hylebos Creek Tributary 0014C within the project area.

3.2.4 East Fork Hylebos Creek

Reaches of East Fork Hylebos Creek, downstream of the East Fork Hylebos Creek Tributary 0016A confluence, are within the aquatic component of the action area. The only potential project-related impacts on this stream are associated with water quality; treated stormwater from SWM facilities that discharge to East Fork Hylebos Creek Tributaries 0016A and 0016B has the potential to affect water quality in East Fork Hylebos Creek. Therefore, this discussion focuses on water quality and use of this stream by fish.

East Fork Hylebos Creek is a perennial stream. The stream segment in the action area is included on the 303(d) list of impaired waters, based on elevated levels of fecal coliform bacteria (Ecology 2023b).

Chum salmon, coho salmon, and steelhead have been documented in East Fork Hylebos Creek, and reaches of the stream in the action area provide spawning habitat for coho salmon (NWIFC 2023; WDFW 2023b). Neither Chinook salmon nor pink salmon have been documented, but the stream is classified as gradient-accessible for both species (NWIFC 2023). Salmonid distribution within East Fork Hylebos Creek is not anticipated to extend into East Fork Hylebos Creek Tributary 0016A within the project area.

3.2.5 Hylebos Creek (Mainstem)

The entirety of mainstem Hylebos Creek is within the aquatic component of the action area. The only potential project-related impacts on this stream are associated with water quality; treated stormwater from SWM facilities that discharge to headwater tributaries has the potential to affect downstream water quality in Hylebos Creek. Therefore, this discussion focuses on water quality and use of this stream by fish.

Hylebos Creek originates at the confluence of West Fork Hylebos Creek and East Fork Hylebos Creek, east of I-5. The stream flows south before crossing under the freeway, then veers northwest to the Hylebos Waterway. Hylebos Creek is tidally influenced to approximately 0.5 mile upstream from the Hylebos Waterway.

Hylebos Creek is currently identified on 303(d) list of impaired waters for exceeding water quality standards for bacteria (Ecology 2023). Additional water quality impairments have been identified in several upstream tributaries, including East Fork Hylebos Creek, West Fork Hylebos Creek, and the Hylebos Waterway.

Currently, there are no barriers to fish passage downstream on the mainstem Hylebos Creek (WDFW 2023a). Steelhead and Chinook salmon presence has been documented within Hylebos Creek mainstem (NWIFC 2023).

Hylebos Creek in the action area flows through low-gradient floodplain habitat with some slight sinuosity. Habitats are dominated by deep mid-channel and lateral scour pool habitats. Large woody material is present in small quantities within the reach. The potential for future recruitment is limited by the lack of large, mature stands of trees in this reach, combined with the limited ability of upstream areas to transport large woody material to the area. The lack of in-stream and canopy cover reduces the quality of pool habitats. Sediments are dominated by fine materials, including sand and silt. While there is an overall lack of in-stream cover, pool depth is likely sufficient to provide important rearing habitat for juvenile salmonids. While there is some access to floodplain habitats from the main stem, there is a lack of off-channel and side channel habitats that could provide additional rearing habitat for juvenile salmonids.

3.2.6 Hylebos Waterway

The aquatic component of the action area ends where Hylebos Creek enters the Hylebos Waterway, which is a narrow, excavated extension of Commencement Bay. Modification of the historical estuary created a highly developed, industrial upland area surrounding the waterway. Due to pollution from industrial activities, the waterway was declared part of the Commencement Bay/Near Shore/Tideflats Superfund Site in 1983. The Hylebos Waterway has 303(d) listings for chlorinated pesticides, DDT and metabolites, high molecular weight polycyclic aromatic hydrocarbons, and polychlorinated biphenyls (Ecology 2023). Cleanup in the Hylebos Waterway involved sediment removal in the head (from 2004 to 2006) and mouth (from 2004 to 2006) of the Hylebos Waterway, and cleanup is ongoing for some sections of the waterway (EPA 2022; Port of Tacoma 2022). Source control efforts include monitoring groundwater for contaminants (EPA 2022). Water temperatures in the adjacent Sitcum Waterway are likely similar to the Hylebos Waterway and range from 47° F/8° C to 58° F/14° C (as recorded in 2021) (National Centers for Environmental Information [NCEI] 2022).

Based on poor water quality, the lack of complex habitat features, and high levels of boat traffic and other sources of disturbance, anadromous salmonids (including ESA-listed species) that pass through the Hylebos Waterway on their way to habitats in the Hylebos Creek system are unlikely to remain in the waterway for extended periods.

3.2.7 Wetlands

Freshwater forested/shrub and riverine wetlands are mapped within the study area (USFWS 2023, WDFW 2023b, WDNR 2023b, City of Federal Way 2023). These wetlands are typically riverine and associated with the two identified streams. Resident fish use is unlikely due to intermittent flows and multiple migration barriers (Parametrix 2021), but the wetlands could provide limited habitat functions if barriers were removed. Generally, wetland and buffer habitats lack connectivity to larger corridors, as the surrounding areas are limited by development and roads. However, wetland and buffers are forested and do provide water quality, screening, and shade functions. In addition to previously mapped wetlands, Parametrix and HDR delineated 18 wetlands in the portion of the study area where property access was granted. These wetlands include those wetlands previously identified by other sources; however, many unidentified wetlands were also added. Table 3-1 below includes a summary of wetlands delineated in the project study area. Figure 3-3 and Figure 3-4 show the location of wetlands in relation to the project footprint.

Table 3-1 Summary Characteristics of Wetlands in the Project Area by Drainage Basin

Wetland Name	HGM Classification[1]	USFWS Classification[2]	Approximate Wetland Acreage in Study Area (Acres)	Wetland Rating (Ecology)[3]
West Fork Hylebos Creek Tributary 0014C Drainage Basin				
WFW-02	Depressional, Riverine	PFO	4.15	II
WFW-33	Depressional, Riverine	PFO	2.23	II
East Fork Hylebos Creek Tributary 0016A Drainage Basin				
WFW-01	Depressional, Riverine	PFO	1.48	II
WFW-03	Riverine	PFO	0.32	II
WFW-04	Depressional	PFO	0.52	III
WFW-06	Slope	PSS	0.02	III
WFW-07	Riverine	PEM, PSS	0.26	III
WFW-08	Riverine	PEM, PSS	0.12	IV
WFW-09	Riverine	PSS	0.10	III
WFW-10	Riverine	PFO	1.04	III
WFW-11	Depressional	PEM, PFO	0.49	III
WFW-12	Riverine	PEM, PSS, PFO	0.66	III
WFW-13	Slope	PSS	0.04	IV
WFW-14	Depressional	PEM	0.02	IV
WFW-15	Riverine	PSS, PFO	0.27	III
WFW-16	Depressional	PEM, PSS	0.40	III
WFW-18	Riverine	PSS	<0.01	III
WFW-32	Depressional, Riverine	PEM, PSS	0.03	IV

4 EFFECTS OF THE ACTION

The following subsections describe potential effects on ESA-listed species and critical habitat. Direct effects include all immediate impacts from project-related actions, such as habitat loss, disturbance due to construction noise and activity, and work in or near waters where ESA-listed fish may be present. Indirect effects, also known as delayed consequences, include effects that are reasonably certain to occur as a result of the proposed action, but later in time (generally after construction is complete). The term “insignificant” indicates that the impact of an action never reaches the level where take occurs or where adverse modification of critical habitat occurs. The term “discountable” indicates that it is extremely unlikely that impacts will occur.

Because there are no listed terrestrial species or their critical habitat within the project Action Area, the focus of this assessment is on the effects of the action on listed aquatic species.

4.1 Direct Effects

Ground-disturbing work in and near East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C’s channels will have the potential to introduce sediment and contaminants into the water. If water is present in the stream channel where ground-disturbing work occurs, elevated turbidity could extend up to 100 feet downstream from the project footprint. As discussed in Section 2.2, numerous downstream barriers to human-made fish passage limit access by ESA-listed fish to both streams within 1 mile of the project footprint. As such, construction-related turbidity has no potential to affect ESA-listed fish. In addition, the potential for construction-related impacts on water quality will be avoided through implementation of conservation measures and BMPs specified in the SWPPP and TESC plan that will be prepared and implemented before project construction begins. Moreover, the measures specified in Section 1.4 will be implemented, and they will reduce or eliminate the potential for water quality impacts during construction.

Based on the above, construction activities in and near streams (including fish exclusion) have no potential to affect ESA-listed fish. Finally, no critical habitat for any ESA-listed species is present in or near the project footprint. For these reasons, the project will have no direct effects on ESA-listed species or critical habitat. The remainder of this section analyzes potential indirect effects, effects of interrelated and interdependent activities, and cumulative impacts.

4.2 Indirect Effects

Indirect effects may result from the operation of the project (e.g., long-term impacts on water quality) or from future activities related to the project (e.g., induced land use change or growth). Indirect effects can also include beneficial effects resulting from habitat enhancement. Analyses in this section address effects resulting from changes in the amount of impervious surface in the action area, potential changes in land use, potential changes in prey abundance, impacts to riparian habitat along stream reaches that may eventually become accessible to fish, and stream habitat enhancement (i.e., daylighting, fish passage barrier removal).

Although ESA-listed fish currently do not have access to stream reaches near any of the riverine wetlands in the project area (see Table 3-1 for a list of riverine wetlands in the project Action Area), the riverine wetlands provide some level of ecological functions for downstream watersheds. Impacts to these forested wetlands could contribute to degradation of habitat quality in waters currently accessible to ESA-listed fish—or to waters that are rendered accessible by future barrier correction projects.

4.2.1 Stormwater

The proposed action will result in a net increase in PGIS within the action area. Runoff from new and replaced PGIS and non-pollution generating impervious surfaces will be directed to CSTW/DP facilities (some with sand filters) or to vaults with pre-settling basins and sand filters to provide enhanced treatment and flow control.

As discussed below, contaminant levels in treated stormwater runoff entering those streams will be further reduced through infiltration and adsorption to organic material in stream channels, ditches, incidental infiltration and adsorption to organic material as water flows overland, and regional SWM facilities before entering stream reaches where ESA-listed fish may be present. For the foreseeable future, the potential for ESA-listed fish to be exposed to contaminants that may remain in treated or untreated stormwater will be reduced by the distance between the project area and stream reaches that are accessible to these species. Under future conditions and if all downstream barriers that impede fish access are removed, the potential exists for fish to access habitats in the action area and be exposed to project generated stormwater.

Runoff from PGIS that is created or replaced by the project will be treated in accordance with the guidelines found in King County's most recent Surface Water Design Manual, which represents the best available science for stormwater treatment and flow control. Implementation of these practices is expected to minimize the frequency and intensity of exposure of ESA-listed fish to elevated concentrations of pollutants (including dissolved metals and other chemical contaminants) in runoff from impervious surfaces created or replaced by the project.

Nevertheless, according to scientific research, residual contaminants in stormwater runoff from PGIS can harm ESA-listed fish, even after the water has been treated to reduce pollutant loads. ESA-listed fish in receiving waters may be exposed to contaminants in stormwater that is discharged to the receiving waters, or they may be exposed by consuming contaminated prey. Effects of exposure may range from avoidance of affected areas, to reduced growth, altered immune function, or mortality. The intensity of effects depends largely on the pollutant, its concentration, and/or the duration of exposure (Brette et al. 2014; Feist et al. 2011; Gobel et al. 2007; Incardona et al. 2004, 2005; McIntyre et al. 2012; Meador et al. 2006; Sandahl et al. 2007; Spromberg et al. 2016). Repeated exposure, even at very low concentrations, may also result in adverse effects (Feist et al. 2011; Spromberg and Meador 2006; Spromberg and Scholz 2011).

Examples of stormwater contaminants that may harm ESA-listed fish include polycyclic aromatic hydrocarbons, which have been found to cause reduced growth, increased susceptibility to infection, and increased mortality in salmonids (Meador et al. 2006; Varanasi et al. 1993). Another common component of stormwater runoff is copper, which can impair the olfactory system of salmonids and hinder their predator avoidance behavior (Sandahl et al. 2007).

In addition, recent research has found 6PPD-quinone, a contaminant found in runoff from roadways, to be a major contributor to pre-spawning mortality in coho salmon (Tian et al. 2021). The effects of this contaminant on ESA-listed Chinook salmon, steelhead, and bull trout are still being studied, but some of the early studies indicate that first flush storm events are lethal to juvenile coho, steelhead, and Chinook salmon (French et al. 2022). However, the concentration at which 6PPD-quinone in stormater may have toxic effects on those species is still being evaluated. Research has shown that in addition to juvenile coho, both juvenile steelhead (*Oncorhynchus mykiss*) and juvenile Chinook salmon (*Oncorhynchus tshawytscha*) are also vulnerable to untreated stormwater containing 6PPD-quinone; however, the effects are not as immediate and instead of mortality occurring within a few hours of exposure (up to 4 hours for coho salmon), it can take one or two days for steelhead and Chinook salmon to display mortality (Fresh et al., 2022). A recent study looked at the sensitivity of early life stage (~ three weeks post swim-up [newly feeding] coho salmon and Chinook salmon) and found that juvenile coho salmon are three orders of magnitude more sensitive to 6PPD-quinone than Chinook salmon (Lo et al., 2023). This study found only 7.1% survival for coho salmon exposed to the lowest concentration treatment group, while Chinook salmon showed 61.4% survival in the highest concentration treatment group (Lo et al. 2023). While not showing the degree of sensitivity to stormwater runoff containing 6PPD-quinone as coho salmon, juvenile steelhead and Chinook do appear to exhibit direct mortality, although at higher concentrations and with longer response times (Tien et al. 2021, Fresh et al. 2022, Lo et al. 2023, and Brinkman et al 2022). The use of bioretention facilities, such as the CSTW/DP facilities proposed for this project, has been found to prevent the acute lethal effects of stormwater on salmonids (Spromberg et al. 2015). Other recent studies have found compost-amended bioswales to be effective at removing a variety of contaminants from runoff, including PAHs and heavy metals (Fardel et al. 2020; McIntyre et al. 2015). Similar to compost-amended bioswales, the CSTW/DP facilities proposed for this project include large amounts of organic matter that can bind or otherwise remove contaminants from the stormwater. As such, CSTW/DP facilities are likely to have a similar degree of effectiveness.

The concentrations of contaminants that remain in stormwater discharged to receiving waters are unknown, and they are expected to be highly variable. Similarly, the distance from the outfall to the point where the contaminants dilute to levels too low to cause detectable effects is also unknown and expected to be highly variable. Runoff volumes vary and depend on the timing, intensity, and duration of individual storm events. Contaminant concentrations are likely to be greatest during first-flush events, after contaminants have accumulated on roadways during long periods of dry weather. Such events are most common in early and mid-autumn.

Another factor is the system that conveys the stormwater to receiving waters. Where water is conveyed in open, vegetated ditches, contaminant concentrations are reduced through infiltration and adsorption to organic matter. Fewer opportunities for such reductions occur in conveyance systems that consist primarily of pipes.

The following subsections evaluate potential project-related changes in contaminant levels in each of the two receiving waters (East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C)). As discussed in Section 2.2, under current conditions, ESA-listed fish are neither known nor expected to be present within 1.5 miles of any discharge points from project SWM facilities, and no critical habitat is present in any of those streams. The potential for ESA-listed species and critical habitat farther downstream to be exposed to elevated contaminant levels is addressed in the subsection that follows discussions of impacts on the two streams.

4.2.1.1 East Fork Hylebos Creek Tributary 0016A

Water from all 16 TDAs in this basin will receive treatment and flow control. In seven TDAs, treated water from SWM facilities will discharge to the stream, in seven TDAs treated stormwater from will enter pipes that discharge to the stream channel, in one TDA treated stormwater will have a surface discharge and then enter the stream, and in one TDA, treated stormwater will have a surface discharge only. Overall, treatment is expected to reduce the loading of contaminants in stormwater that is discharged from the project site to East Hylebos Creek Tributary 0016A, compared to current conditions.

The project will add 1.53 acres of PGIS in the East Fork Hylebos Creek Tributary 0016A watershed (Table 4-2). All treated stormwater that enters East Fork Hylebos Creek Tributary 0016A will undergo substantial mixing, dilution, infiltration, and adsorption in the approximately 1.9 miles of stream channel between the project area and waters where ESA-listed fish are known or expected to be present.

4.2.1.2 West Fork Hylebos Creek Tributary 0014C

Water from all 8 TDAs in this basin will receive enhanced treatment and flow control. All treated stormwater will be conveyed via existing or new conveyance facilities to discharge points at the S 336th Street crossing of West Fork Hylebos Creek Tributary 0014C or to the outlet (flow control structure) of the regional stormwater detention/treatment facility located between S 336th Street and SR-99, which is an inline impoundment of West Fork Hylebos Creek Tributary 0014C. Overall, treatment is expected to reduce the loading of contaminants in stormwater that is discharged from the project site to West Hylebos Creek Tributary 0014C, compared to current conditions. In addition to the treatment already provided, stormwater discharged at S 336th Street will receive additional polishing as it passes through the regional stormwater detention/treatment facility.

Overall, there will be a 0.26 acre reduction in PGIS in the West Fork Hylebos Creek Tributary 0014C watershed. Water that leaves the project area will pass through several large wetland complexes and ponded areas before entering any streams where ESA-listed fish are known or expected to be present. Treated water discharged from existing and new SWM facilities (See Figure 1-13) in this watershed will receive additional treatment, detention, and possibly infiltration as it passes through these areas downstream of the project area.

It should be noted that approximately 1.8 acres of the regional stormwater detention/treatment facility mentioned above will be filled to accommodate the proposed extension of 18th Place S. This facility, along with other regional facilities along West Fork Hylebos Creek Tributary 0014C, when combined, are part of a larger effort to reduce downstream flooding. Overall, this facility (also a regulated Category II forested wetland) provides some limited flow control and what water quality treatment provided is incidental, but nevertheless important to maintain or improve water quality conditions in the Hylebos watershed. Compensatory wetland mitigation is anticipated to offset the incidental water quality benefits provided by the facility, and redundant flow control capacity provided throughout the system, in addition to flow control and water quality treatment provided by large natural wetland systems farther downstream, are anticipated to minimize potential adverse impacts to water quality and quantity downstream.

4.2.1.3 Potential for ESA Listed Fish to be Exposed to Contaminants

In the Hylebos Creek basin, the potential for ESA-listed fish to be exposed to harmful levels of contaminants in stormwater runoff will be minimized through the provision of the described stormwater BMPs. In many TDAs, contaminant levels will be further reduced during flow overland and/or through wetlands or other large waterbodies. Given the approximate 6.5 mile distance between the project area stormwater discharges and the Hylebos Waterway, any residual contaminants in runoff from project related PGIS will be diluted to levels too low to detectably degrade water quality.

The following are evaluations of the exposure potential for the various life stages of ESA-listed fish that may be present in streams in the Hylebos Creek watershed.

- Bull trout are not expected to spawn in the Hylebos Creek system. Exposure to runoff from project related PGIS would occur only if individual bull adults or subadults from other systems were to venture or stray into Hylebos Creek. The probability of bull trout presence is anticipated to be extremely low and coupled with extremely small numbers and lack of supporting habitat within the Hylebos Creek drainage basin, the potential for bull trout presence to occur simultaneously with a storm event that discharges large amounts of contaminants to the stream is discountable. In addition, the impacts of any such exposure would likely be insignificant because the visit would be brief and transitory.
- Adult Chinook salmon may be present in the lower watershed in accessible streams from August through December. Accessible stream reaches are more than 2 miles downstream from the discharge points of proposed stormwater treatment facilities. Spawning has been documented in West Fork Hylebos Creek approximately 1.5 miles downstream from the discharge point of the nearest TDA.
- Chinook juveniles may spend up to a year in freshwater habitats of the Hylebos Creek watershed with most juvenile use anticipated in the lower portion of the watershed.
- Adult steelhead may be present in the lower watershed in accessible stream reaches from January through June, with the highest probability of presence occurring during the peak migration period (April and May). Accessible stream reaches are more than 1.8 miles downstream from the discharge points of proposed stormwater treatment facilities. Steelhead may spawn in the Hylebos Creek watershed, albeit in low numbers and probably not every year. Stream reaches most likely to provide spawning habitat are in West Fork Hylebos Creek approximately 2.5 miles downstream from the discharge point of the nearest TDA.
- Juvenile steelhead could be present at any time of year, albeit in low numbers and with low probability. Juvenile steelhead are most likely to rear in lower reaches of the Hylebos Creek watershed.
- Larval bocaccio and yelloweye rockfish could be swept into the lower tidally influenced portion of Hylebos Creek on incoming tides; however, their brief residence time within the tidally influenced portion of the stream limits the potential for exposure to stormwater related contaminants.
- In the future, when access is restored to the tributaries near the project area, they are unlikely to provide suitable spawning habitat for bull trout, Chinook salmon, or steelhead due to unsuitable habitat conditions, such as intermittent flows and a high proportion of fine sediments. These upper tributary streams could support some limited rearing by steelhead following barrier corrections in the watershed.

4.2.2 Changes in Land Use

The OMF South is not likely to affect land use patterns outside of the project site boundary. This conclusion is based on Sound Transit's determination that the major components of the regional light rail system are not likely to induce land use changes that would not otherwise occur. Light rail transit may influence specific aspects of transit-oriented development, but it is not expected to result in development that would not otherwise occur in the context of existing transit- and density-oriented development plans (Sound Transit 2011).

The OMF South would support the operations of FWLE, future planned light rail extensions to the south (TDLE) and other major components of the Link light rail system but would not alter them in any way that is likely to induce land use change. OMF South operations would be discernable from nearby properties but are unlikely to materially affect the nature or timing of land use changes outside of the project site. Therefore, the proposed action is not likely to result in indirect effects, to listed or proposed species or designated or proposed critical habitat, related to changes in land use.

4.2.3 Changes in Prey Species Abundance

Chinook salmon (a primary prey species for SRKW) and coho salmon (a primary prey species for bull trout) could be adversely affected by residual contaminants in stormwater that is discharged from treatment facilities. As discussed above, the potential for substantial adverse effects will be minimal, for the following reasons:

- Runoff from new and replaced PGIS will undergo water quality treatment in accordance with applicable requirements.
- The project will result in a net increase in PGIS within the Hylebos Creek watershed; however, the increase in PGIS can be largely attributed to parking lots and roadways that have low average daily traffic volumes. In addition, the overarching goal of the light rail project is to reduce vehicle use on local roadways by providing efficient and cost effective means of non-vehicular travel. This reduction in roadway traffic, while not quantified, is anticipated to have beneficial effects on pollutant loadings within the Puget Sound region.
- Stream reaches that will receive discharge from stormwater facilities are currently inaccessible to Chinook and coho salmon.
- If all public and private crossing structures that currently impede fish access are removed, the small, fine-substrate-dominated, headwater tributaries in the project area are not expected to provide suitable spawning habitat for Chinook salmon, and they are far enough upstream from suitable spawning areas to be unlikely to provide rearing habitat for Chinook salmon juveniles.
- Substantial infiltration, dilution, and adsorption will occur over the distance between stormwater facility discharge points and waters where critical habitat has been designated, further reducing contaminant levels in treated water that leaves the facilities.

Even if residual contaminants, including 6PPD quinone, in stormwater were to measurably reduce the number of Chinook or coho salmon in the Hylebos Creek system, that number represents a small proportion of the overall populations of these species in Puget Sound. Any such effects would not translate into population-level effects that would measurably reduce the availability of prey species for SRKWs or bull trout. Based on the above, the potential for adverse impacts on the availability of food resources for SRKWs or bull trout is discountable, and the outcome of any such impacts would be insignificant.

If water is present in stream channels where ground-disturbing work occurs, in-water work would have the potential to displace prey species for both Chinook salmon and steelhead. The effects of any such displacement would be localized and temporary, and prey species would be expected to return following construction. Moreover, the stream reaches where in-water work will take place are inaccessible to Chinook salmon and steelhead. Given the availability of prey in adjacent habitats, the proposed action is anticipated to have an insignificant effect on the availability of prey for Chinook salmon and steelhead.

4.2.4 Riparian and Wetland Habitat Impacts

Listed species do not currently occupy instream habitats adjacent to riparian and/or wetland habitats in the project area; therefore, removal of vegetation/alteration of streambed material will have no direct effect on listed species. The only potential is related to the time it takes for vegetation to regrow and the timing of barrier replacements that would allow listed fish access to the project area. Over the long-term, there would be a permanent loss of forested wetlands and forested riparian corridor and the inability of these habitats to become established because of the vegetation clear zone established on either side of the guideway. Vegetation will be re-established along the stream corridor; however, vegetation will be restricted to low-growing tree and shrub species. This change in vegetative structure around the affected portion of streams will likely result in degraded habitat conditions if salmonid access were to be restored. This includes a loss of LWD recruitment to the channel, which will result in reduced channel complexity; loss of organic input into the stream, which can result in reduced food-web interactions, loss of thermal cover, and reduced hyporheic exchange, which can degrade water quality within the project area as well as areas downstream.

Table 4-1 below includes a summary of stream and stream buffer impacts. Overall, there will be approximately 3,050 linear feet of permanent impact to streams in the project area because of stream channel modifications and culvert replacement activities. Where the stream channel conflicts with guideway supports, the stream will be relocated around footings. Approximately 7.2 acres of riparian vegetation will be permanently impacted by guideway construction and conversion of forested riparian habitat to scrub/shrub dominated vegetation.

Table 4-1 Summary of Potential Stream and Stream Buffer Impacts

Project Element	Stream[1]	Permanent Impact (linear feet)[2]	Temporary Impact[3] (linear feet)	Permanent Stream Buffer Impact[4] (acres)	Temporary Stream Buffer Impact (acres)[4]
OMF South Site	East Fork Hylebos Creek Tributary 0016A	900	250	2.8	1.4
	West Fork Hylebos Creek Tributary 0014C[5]	600	50	0.5	2.9
Mainline Track	East Fork Hylebos Creek Tributary 0016A	1,550	250	3.9	2.2
Total		**3,050**	**550**	**7.2**	**6.5**

Notes:

(1) Both affected streams are Type F, per WAC 22216030.

(2) Includes the total length of surface-flowing stream within the permanent impact footprint defined for this analysis.

(3) Includes the total length of surface-flowing stream within the construction-related impact footprint defined for this analysis.

(4) Impact numbers presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(5) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. For this reason, stream impacts are based on the approximate centerline of the mapped stream, and buffer impacts are based on the affected area of Wetland WFW02. See text for further discussion.

Table 4-2 below includes a summary of wetland and wetland buffer impacts. Overall, there will be 4.3 acres of permanent wetland impact and approximately 3.2 acres of temporary wetland impact. These impacts are primarily associated with riverine wetlands. Similar to the stream impacts discussed above, these impacts will contribute to reduced habitat complexity, reduced flood storage, and reduced hyporheic exchange in the affected watersheds. This can ultimately result in altered peak/base flows, degraded water quality, and altered vegetative communities.

Table 4-2 Summary of Wetland and Wetland Buffer Impacts (Acres)

Project Element	Wetland Rating[1]	Permanent Wetland Impact	Temporary Wetland Impact	Permanent Wetland Buffer Impact[2]	Temporary Buffer Impact[2]
OMF South Site	Category II	1.8	2.7	7.8	1.7
	Category III	0.90	0.3		
	Category IV	0.00	<0.05		
Mainline Track	Category III	1.6	<0.05	4.7	3.5
	Category IV	<0.10	<0.05		
Total		**4.3**	**3.0-3.1**	**12.5**	**5.2**

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) Impact numbers presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream buffers; therefore, this table likely overestimates the extent of buffer impact areas. Stream areas, defined by the OHWL, are excluded from wetland buffer areas.

Sound Transit is currently developing mitigation strategies to compensate for the loss of wetland, stream, and their associated buffers. This will likely include a combination of on-site mitigation, off-site mitigation, and use of fee in lieu programs established in the watershed.

4.2.5 Stream Habitat Enhancement

The culvert replacements described in Section 1.3.2 will facilitate fish access to headwater habitats in East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C upstream of the project area. According to the WDFW fish passage site report for culvert 935271 on East Fork Hylebos Creek Tributary 0016A, removal of this barrier has the potential to facilitate access to approximately 2.5 miles of stream channel, including approximately 4,600 square feet of potential spawning habitat and approximately 164,000 square feet of potential rearing habitat. Access to this habitat will be possible only after multiple downstream and upstream barriers to fish passage are removed, however. The WDFW fish passage site report for culvert 933224 on West Fork Hylebos Creek does not identify any habitat gain; however, removal of this barrier has the potential to facilitate access to approximately 3,800 feet of stream channel. Similar to the East Fork Hylebos Creek Tributary 0016A, access to this habitat will be possible only after multiple downstream and upstream barriers to fish passage are removed, however.

The project will remove/replace approximately 890 feet of culverted stream with approximately 520 feet of fish-passable culverts and daylighting of approximately 570 linear feet of channel. By daylighting the stream channel, the project will allow increased interaction between the stream and associated riparian vegetation, restoring natural processes such as organic input and flow attenuation. Even if access to the reaches in and upstream of the project limits is not fully restored, the benefits of these restoration activities will likely translate into improvements in ecological functions in downstream reaches.

4.3 Effects on the Physical and Biological Features of Critical Habitat

The project includes no work in or near any waters that have been designated as critical habitat for any ESA listed species. As such, the project will have no direct effects on the physical or biological components of critical habitat for ESA-listed fish. Analyses in this section address the potential for residual contaminants in stormwater runoff to degrade water quality in waters where critical habitat has been designated for ESA-listed fish.

4.3.1 PBFs for Puget Sound ESU Chinook Salmon and Puget Sound DPS Steelhead

PBFs essential to the conservation of the Puget Sound ESU Chinook salmon and Puget Sound DPS steelhead in freshwater and estuarine habitats are present in the action area, as identified in Section 2.3.2 and Section 2.3.3. Potential project-related effects on each of those PBFs are discussed below. The project will not affect riparian habitat or physical in-stream habitat in or near any waters where critical habitat has been designated for either of these species. As such, the project will have no direct effects on the physical or biological components of freshwater habitats; the discussions below address potential impacts on water quality.

PBF 1 (freshwater spawning sites)

Designated critical habitat in the lower reaches of West Fork Hylebos Creek provides freshwater spawning sites for Chinook salmon and (infrequently) steelhead. Contaminants in runoff from PGIS may degrade water quality for spawning adults and for incubating eggs and fry of both species.

PBF 2 (freshwater rearing sites)

Designated critical habitat in Hylebos Creek, the lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek provides potential freshwater rearing sites for Chinook salmon. Designated critical habitat in the lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek provides potential freshwater rearing sites for steelhead. Contaminants in runoff from PGIS may degrade water quality for rearing juveniles of both species in these streams.

PBF 3 (freshwater migration corridors)

Designated critical habitat in Hylebos Creek, the lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek provides freshwater migration corridors for Chinook salmon. Designated critical habitat in the lower reaches of West Fork Hylebos Creek and East Fork Hylebos Creek provides freshwater migration corridors for steelhead. Contaminants in runoff from PGIS may degrade water quality for adults that migrate through these areas to spawning areas upstream, as well as for outmigrating juveniles.

PBF 4 (estuarine habitats)

The project will have no direct effects on physical or biological components of estuarine habitats that have been designated as critical habitat for Chinook salmon and/or steelhead. As discussed in Section 4.2.1, any residual contaminants in runoff from project-related impervious surfaces will be diluted to levels too low to detectably degrade water quality almost immediately upon entering estuarine or marine waters.

4.4 Effects of Interrelated and Interdependent Actions

Traffic detours and compensatory mitigation activities required for compliance with local critical areas rules are considered interrelated and interdependent actions for this project. None of the detours described in Section 1.3.2 will result in substantial increases in traffic volumes on the affected roads. Noise impacts from detours will not exceed those expected under normal conditions. As such, the detours are not expected to result in impacts that have not already been addressed in this analysis.

Compensatory mitigation actions will not contribute to the noise impacts above the planned project impacts, nor will they expand or degrade the aquatic action area. Therefore, interrelated and interdependent actions will not contribute to project impacts on listed species.

4.5 Cumulative Impacts

Consistent with the requirements specified in 50 CFR 402.02, the analysis of cumulative effects is based on future actions that are (1) reasonably certain to occur in the action area, and (2) not expected to include a federal nexus that would trigger ESA Section 7 compliance requirements.

In the action area, the only reasonably foreseeable future actions that have no federal nexus and that could contribute to increased pollutant loading in waters that support ESA-listed fish consist of urban development projects on private lands. One such project includes a planned 94-unit attached single-family development (Creekside Commons) located on two undeveloped parcels, one immediately north of S 333rd Street and one immediately south of S 333rd Street along West Fork Hylebos Creek Tributary 0014C's riparian corridor. A mitigation plan has been prepared for the project's impacts to the buffers of two adjacent riparian wetlands and the project would also be required to meet current City of Federal stormwater regulations.

The Creekside Commons and any future projects will have to comply with state and local regulations that protect wetlands, streams, and other critical areas. Such reviews will trigger the implementation of mitigation measures and practices aimed at avoiding or minimizing the potential for adverse effects on wetlands, aquatic species and habitat, and other natural resources such as fish and wildlife habitat conservation areas. Compliance with those requirements will ensure that any future development projects in the action area will be unlikely to result in adverse impacts on water quality in waterbodies that support ESA-listed fish.

Based on the above, this project is not expected to contribute to adverse cumulative effects on ESA-listed species when considered in conjunction with other reasonably foreseeable future projects.

5 CONCLUSIONS AND EFFECT DETERMINATIONS

The following subsections present effect determinations and rationales for the ESA-listed species and designated critical habitat. Table 5-1 provides a summary of effect determinations.

Table 5-1 Summary of Effect Determinations for the OMF South Project

Species or Critical Habitat	Effect Determinations
Bull Trout	Not Likely to Adversely Affect
Puget Sound Chinook Salmon	Likely to Adversely Affect
Puget Sound Chinook Salmon Critical Habitat	Likely to Adversely Affect
Puget Sound Steelhead	Likely to Adversely Affect
Puget Sound Steelhead Critical Habitat	Likely to Adversely Affect
Puget Sound/Georgia Strait Bocaccio	Not Likely to Adversely Affect
Puget Sound/Georgia Strait Yelloweye Rockfish	Not Likely to Adversely Affect
Southern Resident Killer Whale	Not Likely to Adversely Affect
Southern Resident Killer Whale Critical Habitat	Not Likely to Adversely Affect

5.1 Bull Trout

The project **may affect** bull trout for the following reasons:

- A single subadult bull trout or Dolly Varden was observed in West Fork Hylebos Creek.
- The project will increase the area of PGIS in areas that drain the headwaters of tributaries to Hylebos Creek.
- The project will remove crossing structures on East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C that impede fish passage, improving access to upstream habitat.
- The project will result in the permanent conversion of forested riparian habitat to scrub/shrub dominated habitat.

The project is **not likely to adversely affect** bull trout for the following reasons:

- Stream reaches that will directly receive discharge from stormwater facilities are currently inaccessible to bull trout.
- If all public and private crossing structures that currently impede fish access are removed, the small, fine-substrate-dominated, headwater tributaries in the project area are not expected to provide suitable habitat for bull trout.
- Runoff from new and replaced PGIS will undergo water quality treatment in accordance with applicable requirements.
- Substantial infiltration, dilution, and adsorption will occur over the distance between stormwater facility discharge points and waters where this species might be present, further reducing contaminant levels in treated water that leaves the facilities.

- Bull trout are not expected to spawn in the Hylebos Creek system due to the lack of suitable spawning habitat. Exposure to runoff from project related PGIS would occur only if bull trout adults or subadults from other systems were to venture into these waters. The potential for such a visit to correspond with a storm event that discharges large amounts of contaminants to the stream is discountable. In addition, the impacts of any such exposure would likely be insignificant because the visit would be brief and transitory.
- The potential for delivery of sediment or contaminants during culvert replacement and stream channel construction in East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C will be minimized through implementation of the measures specified in Section 1.4.
- The overarching goal of the light rail program is to reduce vehicle use on local roadways by providing efficient and cost effective means of travel for daily commuters and the public. This reduction in roadway traffic cannot be directly attributed to the OMF South project; however, the OMF South project is an integral part of the overall program and is anticipated to have some level of indirect beneficial effects on vehicle related pollutant loadings within the Puget Sound region.

5.2 Puget Sound Chinook Salmon

The project **may affect** Puget Sound Chinook salmon for the following reasons:

- Chinook salmon are present in the Hylebos Creek watershed.
- The proposed action will result in a net increase in PGIS in the Hylebos Creek watershed and will discharge treated stormwater in the headwaters of tributaries to Hylebos Creek.
- Chinook salmon spawn in West Fork Hylebos Creek approximately 1.5 miles downstream of the discharge point from the nearest TDA.
- The project will remove crossing structures on East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C that impede fish passage, improving access to upstream habitat.

The project is **likely to adversely affect** Puget Sound Chinook salmon for the following reasons:

- Water discharged from detention and treatment facilities may contain residual concentrations of contaminants that may affect Chinook salmon.

The project will not likely appreciably reduce the survival and recovery of Puget Sound Chinook salmon for the following reasons:

- Stream reaches that will receive direct discharge from stormwater facilities are currently inaccessible to Chinook salmon and any work below the OHWL would occur during the in-water work window when salmon are least likely to occur.
- If all public and private crossing structures that currently impede fish access are removed, the small, fine-substrate-dominated, headwater tributaries in the project area are not expected to provide suitable spawning habitat for Chinook salmon, and they are far enough upstream from suitable spawning areas to be unlikely to provide rearing habitat for juveniles.
- Runoff from new and replaced PGIS will undergo water quality treatment in accordance with applicable requirements.

- Substantial infiltration, dilution, and adsorption will occur over the distance between stormwater facility discharge points and waters where Chinook are currently distributed, further reducing contaminant levels in treated water that leaves the facilities.
- The potential for delivery of sediment or contaminants during construction in East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C will be minimized through implementation of the measures specified in Section 1.4.
- The overarching goal of the light rail program is to reduce vehicle use on local roadways by providing efficient and cost effective means of travel for daily commuters and the public. This reduction in roadway traffic cannot be directly attributed to the OMF South project; however, the OMF South project is an integral part of the overall program and is anticipated to have some level of indirect beneficial effects on vehicle related pollutant loadings within the Puget Sound region.

5.3 Puget Sound Chinook Salmon Critical Habitat

The project **may affect** critical habitat for Puget Sound ESU Chinook salmon for the following reasons:

- Designated critical habitat for Puget Sound Chinook salmon is present in the action area.
- The project will discharge treated stormwater to waters designated as critical habitat.

The project is **likely to adversely affect critical** habitat for Puget Sound Chinook salmon for the following reasons:

- Contaminants in runoff from PGIS may degrade water quality in waters that are designated as critical habitat and that support the spawning, rearing, and migration PBFs of critical habitat for Puget Sound Chinook salmon.

5.4 Puget Sound Steelhead

The project **may affect** Puget Sound steelhead for the following reasons:

- Steelhead are present in the Hylebos Creek watershed.
- Steelhead occasionally spawn in West Fork Hylebos Creek approximately 2.5 miles downstream of the discharge point from the nearest TDA.
- The project will result in a net increase in PGIS in the Hylebos Creek watershed and will discharge treated stormwater to headwater tributaries to Hylebos Creek.
- The project will remove crossing structures on East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C that impede fish passage, improving access to upstream habitat.

The project is **likely to adversely affect** Puget Sound steelhead for the following reasons:

- Water discharged from detention and treatment facilities may contain residual concentrations of contaminants that may affect steelhead.

The project will not likely appreciably reduce the survival and recovery of Puget Sound steelhead for the following reasons:

- Stream reaches that will receive direct discharge from stormwater facilities are currently inaccessible to steelhead.
- If all public and private crossing structures that currently impede fish access are removed, the small, fine-substrate-dominated, headwater tributaries in the project area are not expected to provide suitable spawning habitat for steelhead. However, this habitat may be used by juvenile steelhead, albeit in low numbers.
- Runoff from new and replaced PGIS will undergo water quality treatment in accordance with applicable requirements.
- Substantial infiltration, dilution, and adsorption will occur over the distance between stormwater facility discharge points and waters where critical habitat has been designated, further reducing contaminant levels in treated water that leaves the facilities.
- The potential for delivery of sediment or contaminants during construction in East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C will be minimized through implementation of the measures specified in Section 1.4.
- The overarching goal of the light rail program is to reduce vehicle use on local roadways by providing efficient and cost effective means of travel for daily commuters and the public. This reduction in roadway traffic cannot be directly attributed to the OMF South project; however, the OMF South project is an integral part of the overall program and is anticipated to have some level of indirect beneficial effects on vehicle related pollutant loadings within the Puget Sound region.

5.5 Puget Sound Steelhead Critical Habitat

The project **may affect** critical habitat for Puget Sound steelhead for the following reasons:

- Designated critical habitat for Puget Sound steelhead is present in the action area.
- The project will discharge treated stormwater in areas that ultimately drain to waters designated as critical habitat.

The project is **likely to adversely affect** critical habitat for Puget Sound steelhead for the following reasons:

- Contaminants in runoff from PGIS may degrade water quality in waters that are designated as critical habitat and that support the spawning, rearing, and migration PBFs of critical habitat for Puget Sound steelhead.

5.6 Bocaccio

The project **may affect** Bocaccio for the following reasons:

- Current-borne larvae of bocaccio could be present in the lower tidally influenced portion of Hylebos Creek.
- The project will discharge treated stormwater to headwater tributaries to Hylebos Creek.

The project is **not likely to adversely affect** bocaccio for the following reasons:

- Sub-adults and adults of this species typically occupy waters deeper than 120 feet and are therefore not expected to be present in the lower, tidally influenced reach of Hylebos Creek.
- The project area is located 3 to 5 miles upstream of the lower tidally influenced portion of Hylebos Creek. Given the distance and potential for additional treatment via wetlands and infiltration into groundwater, the effects of stormwater on bocaccio is considered insignificant.
- Larval rockfish are dispersed by currents, making the concentration or probability of the presence of larvae in any one location extremely small. Similarly, the limited number of adult ESA-listed rockfish in Puget Sound further reduces the probability of larval presence and exposure to project activities.
- The overarching goal of the light rail program is to reduce vehicle use on local roadways by providing efficient and cost effective means of travel for daily commuters and the public. This reduction in roadway traffic cannot be directly attributed to the OMF South project; however, the OMF South project is an integral part of the overall program and is anticipated to have some level of indirect beneficial effects on vehicle related pollutant loadings within the Puget Sound region.

5.7 Yelloweye Rockfish

The project **may affect** yelloweye rockfish for the following reasons:

- Larval yelloweye rockfish could be present in the lower tidally influenced portion of Hylebos Creek.
- The project will discharge treated stormwater to headwater tributaries to Hylebos Creek.

The project is **not likely to adversely** affect yelloweye rockfish for the following reasons:

- Sub-adults and adults of this species typically occupy waters deeper than 120 feet and are therefore not expected to be present in the lower, tidally influenced reach of Hylebos Creek.
- The project area is located 3 to 5 miles upstream of the lower tidally influenced portion of Hylebos Creek. Given the distance and potential for additional treatment via wetlands and infiltration into groundwater, the effects of stormwater on yelloweye rockfish is considered insignificant.
- Larval rockfish are dispersed by currents, making the concentration or probability of the presence of larvae in any one location extremely small. Similarly, the limited number of adult ESA-listed rockfish in Puget Sound further reduces the probability of larval presence and exposure to project activities.
- The overarching goal of the light rail program is to reduce vehicle use on local roadways by providing efficient and cost effective means of travel for daily commuters and the public. This reduction in roadway traffic cannot be directly attributed to the OMF South project; however, the OMF South project is an integral part of the overall program and is anticipated to have some level of indirect beneficial effects on vehicle related pollutant loadings within the Puget Sound region.

5.8 Southern Resident Killer Whale

The project **may affect** southern resident killer whales for the following reason:

- The project may adversely affect Chinook salmon, a primary prey source for this species.

The project is **not likely to adversely affect** southern resident killer whales for the following reasons:

- The project will not appreciably reduce the survival and recovery of Chinook salmon and will not, therefore, result in any population-scale reductions in the availability of this prey resource for southern resident killer whales.
- Southern resident killer whales are not known or expected to use habitats in the action area and will not be exposed to any other potential project-related impacts.

5.9 Southern Resident Killer Whale Critical Habitat

The project **may affect** critical habitat for southern resident killer whale for the following reasons:

- Availability of sufficient prey resources is an important PBF of critical habitat for this species.
- The project will discharge treated stormwater in an area that drains to waters that support Chinook salmon—the preferred prey of southern resident killer whales.
- Project-generated pollutants may further degrade water quality, leading to adverse effects on a small number of individual Chinook salmon.

The project is **not likely to adversely affect** critical habitat for southern resident killer whale for the following reason:

- The project will not appreciably reduce the survival and recovery of Chinook salmon and will not, therefore, result in any population-scale reductions in the availability of this prey resource for southern resident killer whales.

6 REFERENCES

Anderson, H.E., and S.F. Pearson. 2015. Streaked Horned Lark Habitat Characteristics. Center for Natural Lands Management and Washington Department of Fish and Wildlife.

Barnard, R. J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J. P. Klavas, D.C. Ponder, P.D. Smith, and P. D. Powers (2013), Water Crossings Design Guidelines, Washington Department of Fish and Wildlife, Olympia, Washington. http://wdfw.wa.gov/hab/ahg/culverts.htm

Brette, F., B. Machado, C. Cros, J.P. Incardona, N.L. Scholz, and B.A. Block. 2014. Crude Oil Impairs Cardiac Excitation-Contraction Coupling in Fish. Science Vol 343. February 14, 2014. 10.1126/science.1242747. 5 pp.

Brinkman, M., D. Montgomery, S. Selinger, J.G.P. Miller, E. Stock, A.J. Alcaraz, J.K. Challis, L. Weber, D. Janz, M. Hecker, and S. Wiseman. 2022. Acute Toxicity of the Tire Rubber-Derived Chemical 6PP-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance. Environmental Science and Technology Letters. Volume 9, 4, pp 333-338.

Cavanaugh, W.J. and G.C. Tocci. 1998. Environmental Noise. Published in E.S.C., USC Journal of Public Affairs, Vol. 1 Num. 1, Los Angeles, California.

City of Federal Way. 2016. City of Federal Way Critical Areas Map. Available at: sensitive_2016.pdf (cityoffederalway.com). Accessed on June 20, 2023.

Drake J. S., E. A. Berntson, J. M. Cope, R. G. Gustafson, E. E. Holmes, P. S. Levin, N. Tolimieri, R. S. Waples, S. M. Sogard, and G. D. Williams. 2010. Status of five species of rockfish in Puget Sound, Washington: Bocaccio (Sebastes paucispinis), Canary Rockfish (Sebastes pinniger), Yelloweye Rockfish (Sebastes ruberrimus), Greenstriped Rockfish (Sebastes elongatus) and Redstripe Rockfish (Sebastes proriger). U.S. Department of Commerce, NOAA Technical Memorandum. NMFS- NWFSC-108, 234 pages

EarthCorps. 2016. Hylebos Watershed Plan. July 2016. Seattle, WA. 62 pp.

eBird. 2023. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org. Accessed April 14, 2021.

Ecology (Washington State Department of Ecology). 2022. 6PPD in Road Runoff: Assessment and Mitigation Strategies. Prepared for Model Toxics Control Act Legislative Program, Washington State Legislature. Environmental Assessment and Water Quality Programs, Olympia, Washington. October 2022. 234 pp.

Ecology. 2023. Washington State Water Quality Atlas. Available at: https://apps.ecology.wa.gov/waterqualityatlas/wqa/map. Accessed May 2022.

EPA (Environmental Protection Agency). 2022. Superfund Site: Commencement Bay, Near Shore/Tide Flats, Tacoma, WA. Available at https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=1000981#bkground. Accessed May 23, 2022.

Fardel, A., P. Peyneau, B. Béchet, A. Lakel, and F. Rodriguez. 2020. Performance of two contrasting pilot swale designs for treating zinc, polycyclic aromatic hydrocarbons and glyphosate from stormwater runoff. Science of the Total Environment, 743: 140503

Feist, B.E., E.R. Buhle, P. Arnold, J.W. Davis, and N.L. Scholz. 2011. Landscape ecotoxicology of coho salmon spawner mortality in urban streams. Plos One 6(8):e23424.

French, B.F., D.H. Baldwin, J. Cameron, J. Prat, K. King, J.W. Davis, J.K. McIntyre, and N.L. Scholz. 2022. Urban Roadway Runoff is Lethal to Juvenile Coho, Steelhead, and Chinook salmonids, But Not Congeneric Sockeye. Environmental Science and Technology Letters. Volume 9, pp 733-738.

Gobel, P., C. Dierkes, and W.C. Coldewey. 2007. Storm water runoff concentration matrix for urban areas. Journal of Contaminant Hydrology, 91: 26–42.

Grosboll, D. 2011. Taylor's checkerspot (Euphydryas editha taylori) oviposition habitat selection and larval hostplant use in Washington State. Thesis submitted in partial fulfillment of the requirements for the degree Master of Environmental Studies at The Evergreen State College. June 2011.

Hallock, L. A., A. McMillan, and G. J. Wiles. 2017. Periodic status review for the Western Pond Turtle in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 19+v pp.

Hays, D.W., K.R. McAllister, S.A. Richardson and D.W. Stinson.1999. Washington state recovery plan for the Western Pond Turtle. Washington Department of Fish and Wildlife, Olympia, Washington. 66 pp.

HDR Engineering, Inc. 2014. City of Federal Way Hylebos Creek fish use and habitat technical memorandum. Prepared for City of Federal Way, WA.

Heltzel, P. Personal communication [e-mail message to C. Tanner, USFWS] on August 14, 2018. Fisheries Biologist, The Watershed Company, Kirkland, WA.

Hughes, J.M. 1999. Yellow-billed Cuckoo (Coccyzus americanus). In: The Birds of North America, No. 148 (A. Poole and F. Gill, Eds.). The Birds of North America, Inc., Philadelphia, PA.

Incardona, J.P., M.G. Carls, H. Teraoka, C.A. Sloan, T.K. Collier, and N.L. Scholz. 2005. Aryl hydrocarbon receptor-independent toxicity of weathered crude oil during fish development. Environmental Health Perspectives 113: 1755-1762.

Incardona, J.P., T.K. Collier, and N.L. Scholz. 2004. Defects in cardiac function precede morphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. Toxicology and Applied Pharmacology 196: 191-205.

Kerwin, J. 1999. Salmon Habitat Limiting Factors for the Puyallup River Basin (WRIA 10). Prepared by John Kerwin for the Washington Conservation Commission, Olympia, Washington. Included as Appendix E of Volume II, Puyallup River Plan as part of the Puget Sound Salmon Recovery Plan. Available at: http://www.psp.wa.gov/SR_map.php.

King County. 1990. Hylebos Creek and Lower Puget Sound Watershed, Current and Future Conditions Report. Prepared by King County Surface Water Management Division for the City of Federal Way in Cooperation with Pierce County, Cities of Des Moines, Fife, Kent, Milton, and Tacoma. July 1990. 28 pp.

King County. 2002. East Hylebos 2001 Monitoring Report, Final Report. King County Department of Natural Resources and Park. Water and Land Resources Division.

King County. 2021. King County Surface Water Design Manual. July 23, 2023. 1132pp.

Ladley, R. 2021a. Personal communication [virtual meeting with C. Buitrago, Parametrix] of June 30, 2021. Director, Puyallup Tribal Fisheries, Puyallup, WA.

Ladley, R. 2021b. Personal communication [e-mail message] of April 19, 2021. Director, Puyallup Tribal Fisheries, Puyallup, WA.

Lister, D.B., and H.S. Genoe. 1970. Stream habitat utilization by cohabiting underyearlings of Chinook (Oncorhynchus tshawytscha) and coho (O. kisutch) salmon in the Big Qualicum River, British Columbia. Journal of the Fisheries Research Board of Canada 27:1215-1224.

Lo, B.P, V.L Marlatt, X, Liao, S. Reger, C. Gallilee, A.R.S. Ross, and T.M. Brown. 2023. Acute Toxicity of 6PPD-Quinone to Early Life Stage Juvenile Chinook (Oncorhynchus tshawytscha) and Coho (Oncorhynchus kisutch) Salmon. Environmental Toxicology and Chemistry. Volume 4, pp 815-822.

Love, M. S., M. Yoklavich, and L. Thorsteinson. 2002. The Rockfishes of the Northeast Pacific. University of California Press, Berkeley. 404pp.

Love, M.S., M. Carr, and L. Haldorson. 1991. The ecology of substrate-associated juveniles of the genus Sebastes. Env. Bio. Fish. 30:225-243.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2021. Puyallup Tribal Fisheries annual salmon, steelhead and bull trout report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2020-2021. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger, T.G. Sebastian, and K. Williamson. 2018. 2017-2018 annual salmon, steelhead, and bull trout report: Puyallup/White River Watershed – Water Resource Inventory Area 10. Puyallup Tribal Fisheries, Puyallup, WA.

McIntyre J.K., J.W. Davis, C. Hinman, K.H. Macneale, B.F. Anulacion, N.L. Scholz, and J.D Stark. 2015. Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff. Chemosphere 132:213–219.

McIntyre, J.K, D.H. Baldwin, D.A. Beauchamp, and N.L. Scholz. 2012. Low-level copper exposures increase visibility and vulnerability of juvenile coho salmon to cutthroat trout predators. Ecological Applications, 22(5), 2012, pp. 1460–1471.

McShane, C., T. Hamer, H.R. Carter, G. Swartzman, V. Friesen, D. Ainley, G. Tressler, S.K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the marbled murrelet in Washington, Oregon, and California. Seattle, WA: EDAW Inc. (21 April 2021).

Meador, J.P., F.C. Sommers, G.M. Ylitalo, and C.A. Sloan. 2006. Altered growth and related physiological responses in juvenile Chinook salmon (Oncorhynchus tshwaytscha) from dietary exposure to polycyclic aromatic hydrocarbons (PAHs). Canadian Journal of fisheries and Aquatic Sciences. 63: 2364-2376.

NCEI. 2022. Water Temperature Map of the Northern Pacific Coast. Available at https://www.ncei.noaa.gov/access/coastal-water-temperature-guide/npac_tmap.html. Accessed May 2022.

NMFS (National Marine Fisheries Service). 1998. Factors contributing to the decline of Chinook salmon: an addendum to the 1996 west coast steelhead factors for decline report. Protect Resources Division, Portland, Oregon.

NMFS. 2001. Biological Opinion for the Port of Tacoma Maersk Sealand Project. NMFS, Northwest Region, Lacey, Washington.

NMFS and USFWS. 2009. Endangered Species Act – Section 7 Consultation biological opinion and Magnuson-Stevens Fishery Conservation and Management Act essential fish habitat consultation: I-5 Tacoma/Pierce County HOV Program. March 16, 2009.

NMFS. 2008. Recovery plan for Southern Resident killer whales (Orcinus orca). Northwest Region, Seattle, Washington.

NMFS. 2017. Rockfish Recovery Plan for Puget Sound / Georgia Basin Yelloweye Rockfish and Bocaccio. Prepared for the Office of Protected Resources, West Coast Regional Office, National Marine Fisheries Service. October 2017.

NMFS. 2021. Southern Resident Killer Whales (Orcinus orca) 5-Year Review: Summary and Evaluation. National Marine Fisheries Service., Northwest Region, Seattle, Washington. Available at https://media.fisheries.noaa.gov/2022-01/srkw-5-year-review-2021.pdf.

NMFS. 2023. Protected Resources Web Application. Available at: Protected Resources App (noaa.gov). Accessed on June 20, 2023.

NWIFC. 2023. Statewide Integrated Fish Distribution (SWIFD) Web Map. Available at: https://geo.nwifc.org/SWIFD/. Accessed May 2023.

Orr, J. W., M. A. Brown, and D. C. Baker. 2000. Guide to rockfishes (Scorpaenidae) of the genera Sebastes, Sebastolobus, and Abelosebastes of the northeast Pacific Ocean, Second Edition. NOAA Technical Memorandum NMFS-AFSC-117. 56 pages.

Palsson, W. A., T. Tsou, G. G. Bargmann, R. M. Buckley, J. E. West, M. L. Mills, Y. W. Cheng, and R. E. Pacunski. 2009. The biology and assessment of rockfishes in Puget Sound. Washington Department of Fish and Wildlife, FPT 09-04, Olympia, WA.

Parametrix. 2021. Draft Wetland and Stream Assessment Report. Prepared by Parametrix, Seattle, Washington. March 2021.

Plissner, J.H., B.A. Cooper, R.H. Day, P.M. Sanzenbacher, A. Burger, and M.G. Raphael. 2015. A review of marbled murrelet research related to nesting habitat use and nest success. Report prepared for the Oregon Department of Forestry, Salem, OR.

Port of Tacoma. 2022. Port of Tacoma: Cleanup and Remediation. Available at https://www.portoftacoma.com/environment/cleanup-remediation. Accessed May 2022.

Raphael, M.G., G.A. Falxa, D. Lynch, S.K. Nelson, S.F. Pearson, A.J. Shirk, and R.D. Young. 2016. Status and trend of nesting habitat for the marbled murrelet under the Northwest Forest Plan. In: Falxa, G.A., and M.G. Raphael, tech. coords. Northwest Forest Plan—the first 20 years (1994–2013): status and trend of marbled murrelet populations and nesting habitat. Gen. Tech. Rep. PNWGTR-933. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 37–94. Chapter 2.

Sandahl, J.F., D. Baldwin, J.J. Jenkins, and N.L. Scholz. 2007. A Sensory System at the Interface between Urban Stormwater Runoff and Salmon Survival. Environmental Science and Technology. 2007(41): 2998-3004.

Shaffer, J. A. Doty, D. C., Buckley, R. M., and J. E. West. 1995. Crustacean community composition and trophic use of the drift vegetation habitat by juvenile sp1itnose rockfish Sebastes diplopora. Marine Ecology Progress Series. Vol. 123, pages 13-21.

Spromberg, J.A, D.H. Baldwin, S.E. Damm, J.K. McIntyre, M. Huff, C.A. Sloan, B.F. Anulacion, J.W. Davis, and N.L. Scholz. 2016. Coho salmon spawner mortality in western US urban watersheds: bioinfiltration prevents lethal storm water impacts. Journal of Applied Ecology. DOI: 10.1111/1365-2264.12534.

Spromberg, J.A, D.H. Baldwin, S.E. Damm, J.K. McIntyre, M. Huff, C.A. Sloan, B.F. Anulacion, J.W. Davis, and N.L. Scholz. 2015. Coho salmon spawner mortality in western U.S. urban watersheds: bioinfiltration prevents lethal storm water impacts. Journal of Applied Ecology.

Spromberg, J.A., and J.P. Meador. 2006. Relating chronic toxicity responses to population-level effects: A comparison of population-level parameters for three salmon species as a function of low-level toxicity. Ecological Modeling 199: 240-252.

Spromberg, J.A., and N.L. Scholz. 2011. Estimating future decline of wild coho salmon populations resulting from early spawner die-offs in urbanizing watersheds of the Pacific Northwest, USA. Integrated Environmental Assessment and Management 7(4): 648-656.

Stinson, D.W. 2005. Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor’s Checkerspot. Washington Department of Fish and Wildlife, Olympia. 129+ xii pp.

Studebaker, R. S., K. N. Cox, and T. J. Mulligan. 2009. Recent and historical spatial distributions of juvenile rockfish species in rocky intertidal tide pools, with emphasis on black rockfish. Transactions of the American Fisheries Society. Volume 138, pages 645-651.

Tian, Z., and 28 others. 2021. A ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon. Science. Volume 371, Issue 6525, January 8, 2021, pp 185-189.

U.S. Army Corps of Engineers. 2012. Supplement to the Programmatic Biological Evaluation for Maintenance Dredging of the Swinomish Channel, Washington. February.

USFWS (US Fish and Wildlife Service). 2012. Recommended fish exclusion, capture, handling, and electroshocking protocols and standards. U.S. Fish and Wildlife Service; Washington Fish and Wildlife Office, Lacey, WA. Available at: https://www.fws.gov/wafwo/documents/FishExclusionProtocolsStds2012.pdf.

USFWS. 2023. Critical habitat online mapper. Available at: https://ecos.fws.gov/ecp/report/table/critical-habitat.html. Accessed May 2022.

Varanasi, U., E. Casillas, M.R. Arkoosh, T. Hom, D.A. Misitano, D.W. Brown, S.L. Chan, T.K. Collier, B.B. McCain, and J.E. Stein. 1993. Contaminant Exposure and Associated Biological Effects in Juvenile Chinook Salmon (Oncorhynchus tshawytscha) from Urban and Nonurban Estuaries of Puget Sound. NOAA Technical Memorandum NMFS-NWFSC-8. NMFS NFSC Seattle, WA. April 1993. 69 pp.

WDFW (Washington Department of Fish and Wildlife). 2023a. Washington State Fish Passage Map. Available at: https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html. Accessed May 2022.

WDFW 2023b. PHS on the Web: An interactive map of WDFW priority habitats and species information for project review. Available at: http://apps.wdfw.wa.gov/phsontheweb/. Accessed May 2022.

WDFW 2023c. Wolf Packs in Washington: An interactive map of Wolf Pack in Washington. Available at: Wolf packs in Washington | Washington Department of Fish & Wildlife. Accessed October 2023.

WDFW. 2020a. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 9935274. Available at: 935274_Report.pdf (wa.gov).

WDFW. 2020b. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 9935060. Available at: 935060_Report.pdf (wa.gov).

WDFW. 2020c. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 935271c. Available at: 935271_Report.pdf (wa.gov).

WDFW. 2020d. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 935276. Available at: 935276_Report.pdf (wa.gov).

WDFW. 2020e. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 935275. Available at: 935275_Report.pdf (wa.gov).

Washington Department of Fish and Wildlife. 2019. Fish Passage Inventory, Assessment, and Prioritization Manual. Olympia, Washington.

WDFW. 2015. WDFW Fish Passage and Screening Database Level A Culvert Assessment Report for Site ID 933224. Available at: https://apps.wdfw.wa.gov/fishpassagephotos/Reports/933224_Report.pdf.

Washington Department of Fish and Wildlife (WDFW). 2013. Puget Sound Recreational Salmon and Marine Fish Enhancement Program Goals and Objectives. http://wdfw.wa.gov/about/advisory/psrfef/docs/psrfef_goals_and_objectives_final_01022014.pdf.

WDNR (Washington Department of Natural Resources). 2023a. List of surveyed land sections in Washington identified by the Natural Heritage Program as reported to contain Natural Heritage Features. Available at https://www.dnr.wa.gov/publications/amp_nh_trs.pdf

WDNR. 2023b. Washington Natural Heritage Program geographic information system data set. Data current as of January 2021.

Williams, G. D., P.S. Levin, and W. A. Palsson. 2010. Rockfish in Puget Sound: An ecological history of exploitation. Marine Policy. Volume 34, pages 1,010-1,020.

WSDOT (Washington State Department of Transportation). 2023a. Fish Exclusion – Protocol and Standards. Available at WSDOT Fish Exclusion Protocols and Standards [Aug (wa.gov)

WSDOT. 2023b. WSDOT Current Traffic Counts (AADT) Webmap. Available at: WSDOT - Traffic Counts (AADT) Current | WSDOT - Traffic Counts (AADT) Current | WSDOT Geospatial Open Data Portal (arcgis.com).

WSDOT. 2023c. Biological Assessment Training Manual, Chapter 7 – Construction Noise Impact Assessment. Available at: BA Manual Chapter 7 (wa.gov).

Weis, L.J. 2004. The effects of San Juan County, Washington, marine protected areas on larval rockfish production. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science, University of Washington. Wydoski, R.S. and R.R. Whitney. 2003. Inland fishes of Washington. University of Washington Press, Seattle, WA.

Yamanaka, K. L., L. C. Lacko, R. Witheler, C. Grandin, J. K. Lochead, J.-C. Martin, N. Olsen, and S. S. Wallace. 2006. A review of yelloweye rockfish Sebastes ruberrimus along the Pacific coast of Canada: biology, distribution and abundance trends. Research Document 2006/076. Fisheries and Oceans Canada. 54 pages.

APPENDIX A

ESSENTIAL FISH HABITAT ASSESSMENT

Essential Fish Habitat Background

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), includes a mandate that NMFS must identify essential fish habitat (EFH) for federally managed commercially harvestable fish, and federal agencies must consult with NMFS on all activities, or proposed activities, authorized, funded, or undertaken by the agency that may adversely affect EFH. The Pacific Fishery Management Council has designated EFH for the Pacific Coast salmon fishery, the Pacific Coast groundfish fishery, and the coastal pelagic species fishery.

The objective of this assessment is to determine whether the proposed action may adversely affect designated EFH in the project action area. This assessment also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects on designated EFH resulting from the proposed action.

The EFH designation for the Pacific Coast salmon fishery includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by the Pacific Fishery Management Council (PFMC 1999). In estuarine and marine environments, proposed designated EFH extends from near-shore and tidal submerged environments within state territorial waters to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception (PFMC 1999).

The Pacific Coast salmon management unit includes Chinook, coho, and pink salmon. All three species are known or expected to use habitats in the action area, as summarized below.

Chinook salmon (see Section 2.2.2 of this BA for additional details):

- Documented spawning in the lower reaches of West Fork Hylebos Creek
- Documented presence in Hylebos Creek
- Potential presence (i.e., stream reaches are classified as gradient-accessible) in lower reaches of East Fork Hylebos Creek Tributary 0016A).

Coho salmon:

- Documented spawning in West Fork Hylebos Creek and East Fork Hylebos Creek
- Documented presence in Hylebos Creek and the lower reaches of East Fork Hylebos Creek.
- Potential presence (i.e., stream reaches are classified as gradient-accessible) in West Fork Hylebos Creek Tributary 0014C and East Fork Hylebos Creek Tributary 0016A.

Pink salmon:

- Presumed presence in Hylebos Creek and lower reaches of West Fork Hylebos Creek
- Potential presence (i.e., stream reaches are classified as gradient-accessible) in West Fork Hylebos Creek Tributary 0014C and East Fork Hylebos Creek Tributary 0016A.

In estuarine and marine areas, EFH for all three Pacific Coast salmon fishery species extends from the extreme high tide line in nearshore and tidal submerged environments out to the full extent of the Exclusive Economic Zone offshore. The project action area does not extend into the Hylebos Waterway.

Pacific Coast groundfish EFH is generally defined as the aquatic habitat from the mean higher high water line, plus the upriver extent of saltwater intrusion in river mouths seaward (Casillas et al. 1998). In the action area, this includes lower Hylebos Creek. Pacific Coast groundfish that may potentially occur within the action area during some life history phases include spiny dogfish, California skate, ratfish, lingcod cabezon, kelp greenling, Pacific cod, Pacific whiting (hake), sablefish, bocaccio, brown rockfish, copper rockfish, quillback rockfish, English sole Pacific sanddab, rex sole, and starry flounder.

The Coastal Pelagic Species Fishery Management Plan describes the habitat requirements of five pelagic species: northern anchovy, Pacific sardine, Pacific (chub) mackerel, jack mackerel, and market squid (PFMC 1998). These four finfish and market squid are treated as a single species complex because of similarities in their life histories and habitat requirements. EFH for coastal pelagic species is generally defined as all marine and estuarine waters from the shoreline offshore above the thermocline. EFH for coastal pelagic species does not occur in the project action area.

Description of the Proposed Action

The proposed project is described in detail in Section 1.3 of this BA.

Potential Effects of the Proposed Project

Potential impacts of the proposed action to ESA-listed fish species and habitats are discussed in Section 4 of this BA and are expected to be similar for all federally managed fish species that occur in the action area.

Effects on Essential Fish Habitat for Pacific Coast Salmon

If water is present in East Fork Hylebos Creek Tributary 0016A or West Fork Hylebos Creek Tributary 0014C when project construction is underway, ground-disturbing work in and near the stream channel has the potential to introduce sediment to stream reaches in and immediately downstream (i.e., within 100 feet) of the project limits. In addition, the proposed action includes clearing of riparian vegetation and long term change to cover types as a result of the need to maintain lower growing vegetation where the guideway is in proximity to the stream channel and associated riparian zone. Both the temporary and permanent removal of vegetation can have short- and long-term impacts on water temperatures, large woody debris recruitment to the channel and associated loss of channel complexity and instream cover. Such impacts may adversely affect Pacific salmon EFH and its ability to support spawning and rearing life stages of Pacific salmon. Sedimentation may also negatively impact the prey base of benthic invertebrates. However, project impacts are expected to be very minor for the following reasons:

- Construction-related disturbance of sediments will be minimized by adherence to a TESC plan and installation and monitoring of appropriate erosion control BMPs during construction, limiting earthwork to only those areas necessary to complete that phase of construction, stabilization of disturbed soils shortly after work is completed, and adhering to approved in-water work windows. These effects are anticipated to be short in duration and are not expected to persist following construction.
- Reaches of East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C in and within 1 mile of the project limits are currently inaccessible to all anadromous salmonids. As such, temporary increases in sedimentation or turbidity have no potential to affect Chinook, coho, or pink salmon. Restoration of access to these stream

reaches is not expected to be accomplished for many years, long after temporary, construction-related increases in sedimentation or turbidity have disappeared.

As discussed in Section 4.1.1 of this BA, contaminants in stormwater runoff discharged to streams in and near the project limits may degrade water quality in streams that provide EFH for Pacific salmon. Contaminants in stormwater runoff that enters streams in and near the project limits may persist at levels capable of degrading water quality until it is fully diluted in marine waters. If the contaminants are present at levels that have toxic effects on these species, this will constitute an adverse effect on EFH. Potential adverse effects associated with contaminants in stormwater runoff will be minimized by directing runoff to treatment facilities.

In addition to meeting any Washington State and Federal mitigation requirements, unavoidable impacts to streams and associated buffers will be mitigated by using guidance in Federal Way City Code (FWCC) 19.145.430. Ongoing restoration projects in the Hylebos watershed, the King County in-lieu fee program, and the development of a project-specific mitigation site are possible opportunities for mitigation that will comply with all federal, state, and local requirements.

Beneficial effects on Pacific Salmon EFH will be achieved by restoring access to potential stream habitat. The project will remove/replace approximately 890 feet of culverted stream with approximately 520 feet of fish-passable culverts and daylight approximately 570 linear feet of channel. By daylighting almost 570 linear feet of stream channel, the project will allow increased interaction between the stream and associated riparian vegetation, restoring natural processes such as organic input and flow attenuation. Even if access to the reaches in and upstream of the project limits is not fully restored, the benefits of these restoration activities will likely translate into improvements in ecological functions in downstream reaches. According to the WDFW fish passage database, removal of these barriers has the potential to facilitate access to approximately 2.5 miles of stream channel, including approximately 4,600 square feet of potential spawning habitat and approximately 163,850 square feet of potential rearing habitat.

Effects on Essential Fish Habitat for Groundfish

Contaminants in stormwater runoff that enters streams in and near the project limits may persist at levels capable of degrading water quality in lower Hylebos Creek. If the contaminants are present at levels that have toxic effects on groundfish species, this will constitute an adverse effect.

Effects on Essential Fish Habitat for Coastal Pelagic Species

EFH for coastal pelagic species does not extend into the action area. Any potential adverse effects on coastal pelagic species’ EFH due to degraded water quality from the project area are assumed to be negligible by the time runoff reaches marine and estuarine waters.

Essential Fish Habitat Conservation Measures

Conservation measures and BMPs are included for project activities and are described in Section 1.4 (Performance Standards and Impact Avoidance and Minimization Measures) of this BA. In addition, the project includes habitat access improvement measures that will have beneficial effects on EFH for Pacific Coast salmon in freshwater habitats once downstream fish-passage barriers have been corrected.

Conclusions

EFH for Pacific Coast salmon is present in the action area. Contaminants in effluent from stormwater facilities that discharge to streams in and near the project limits may pose adverse effects on EFH for this species group.

Based on the anticipated presence of contaminants in stormwater runoff discharged to receiving waters, combined with the possibility that those contaminants may persist at levels capable of degrading water quality as far downstream as the mouth of Hylebos Creek, the proposed action **may adversely affect** EFH for Pacific Coast salmon and Pacific Coast groundfish. The project **will not adversely affect** EFH for coastal pelagic species.

Literature Cited

Casillas, E., L. Crockett, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson, and T. Pepperell. 1998. Essential Fish Habitat, West Coast Groundfish—Appendix. National Marine Fisheries Service. 778 pp

PFMC (Pacific Fisheries Management Council). 1998. The Coastal Pelagic Species Fishery Management Plan: Amendment 8.

PFMC (Pacific Fisheries Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan, Appendix A, Identification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon.

APPENDIX B

PRE-BA MEETING NOTES

Meeting Agenda

OMF South – Pre-BA Meeting Summary - DRAFT

August 24, 2023, 2:30 to 4 pm
Teams

Meeting objective(s):

Sound Transit will provide an overview of the proposed Operations and Maintenance Facility (OMF) South project, describe potential impacts for the Preferred Alternative to Endangered Species Act-listed species, and receive preliminary feedback on approach to Biological Assessment (BA)

Participants

Phyllis Meyers, NMFS	Curvie Hawkins, Sound Transit
Bonnie Shorin, NMFS	Erin Green, Sound Transit
Joshua Emery, USFWS	Teresa Vanderburg, Sound Transit
Justin Zweifel, FTA	Becki Kniveton, Sound Transit
Chris Moelter, FTA/Anchor	Brooke O’Neill, Sound Transit
	Steve Krueger, Parametrix
	Pablo Lopez-Hilfiker, HDR Engineers

Meeting Summary

Introductions: see participants above.

Project Overview

- Currently the Operations and Maintenance Facility (OMF) South project is in the environmental review process. FTA is the lead federal agency.
- FTA and Sound Transit are studying three alternatives in the Environmental Impact Statement (EIS): South 336th Street (Preferred) Alternative, South 344th Street Alternative, and Midway Landfill Alternative.
- The Preferred and the South 344th Street alternatives would require about a mile and half of track to connect to the existing light rail system.
- The Preferred Alternative and the South 344th Street alternatives are in the upper part of the Hylebos basin. The Midway Landfill Alternative is in the McSorley Creek Basin that drains to the Puget Sound.

Preferred Alternative Overview

- The Preferred Alternative site includes three primary buildings: an OMF building, maintenance of way building, and Link system wide storage building. The site includes storage tracks on the north side for storage of about 144 light rail vehicles.
- The Preferred Alternative includes about 1.4 miles of mainline track (northbound and southbound) that connect the OMF South site to the rest of the system. A third track (test track) runs parallel to the mainline extension that will be used for testing and commissioning light rail vehicles.
- The mainline track runs on an elevated guideway with heights between 12-30 feet above the ground. Phyllis asked if there would be an opportunity to replant shrubs and shorter trees in areas under the guideway. Depending on the guideway height and location, short stature trees and lower growing shrubs/ground cover can be planted below the guideway in critical areas and buffers. The area around columns needs to remain clear for inspection.
- The project includes culvert replacements on the northwest, northeast, and southern portion of the project site. The culvert replacements will be upgraded to fish passable structures. The OMF South project is currently designed to manage stormwater from all of the impervious surfaces.

- Project will include off site wetland mitigation. The location has not been solidified but will be somewhere in the Hylebos basin.

Environmental Review and Project Schedule

- FTA (the lead federal agency) and Sound Transit are currently planning to publish a NEPA Draft / SEPA Supplemental Draft EIS in September. The Final EIS is anticipated to be published in mid-2024 followed by the Sound Transit's Board action to select the project to build and FTA's Record of Decision.
- The project will be constructed under a design build contract. Operation of the facility is anticipated in 2032 for the Preferred or South 344th Street Alternatives. However, Sound Transit is identifying measures to open the facility as early as 2029. The Midway Landfill alternative would open later due to the complexities of constructing on the landfill.

Affects Analysis and Preliminary Effects Determination for Preferred Alternative

- Steve noted that there is no suitable habitat for federally listed terrestrial species in the project area.
- The project is in the Hylebos watershed, WRIA 10. There are two headwater tributaries: West Fork Hylebos Creek Tributary 0014C and East Fork of Hylebos Creek Tributary 0016A. Both are intermittent, seasonal streams.
- The entirety of West Fork Hylebos Creek Tributary 0014C in the project area flows through a regional water detention facility (in-line detention facility) that is also a wetland. There is no defined channel within the detention facility/wetland. The stream exits the detention facility/wetland via a flow control structure (standpipe) where it continues off-site (piped) beneath SR-99 for approximately 960 feet. T The entire reach within the study area has been modified for flood control.
- The terrestrial action area includes the construction footprint and extent of project related noise.
- The aquatic portion of the action area includes the upstream extent of East and West Fork Tributaries to account for the proposed culvert replacement/removals and resulting improved access to upstream habitat. The aquatic portion of the action area also extends downstream to where Hylebos Creek enters the Hylebos Waterway. These areas may be subject to degraded water quality because of construction and operation of the OMF South project.
- Overall, there is a net reduction in PGIS. All new/replaced PGIS will receive enhanced treatment. The analysis assumes that the light rail guideway as NPGIS per the 2019 Memorandum of Understanding with Ecology. Becki noted that the guideway is used by electric vehicles with non-petroleum lubricants. Ecology recently published its Draft 2024 Stormwater Management Manual for Western Washington that has identified light rail as pollution generating. Sound Transit is in the middle of a water quality characterization study in cooperation with Ecology about stormwater runoff. The study is anticipated in early 2024. At this time, Sound Transit continues to consider the guideway non-pollution generating as they await results from the characterization study.
- Steve provided a fish use summary (see slides 20-21). Documented steelhead is 1.5 miles downstream of the project footprint in the West Fork and 1.9 miles downstream of the project footprint for the East Fork. Chinook distribution is similar in the West Fork and in the East Fork Chinook distribution is approximately 2.7 miles downstream of the project footprint. There are multiple "complete" barriers downstream of the project consisting of long culverts with excessive water surface drops and slopes.
- Steve summarized the effects recommendations (see slides 25-26).
- Bonnie made an observation that when considering downstream effects from stormwater, you might want to change the effect determination for Bocaccio and yelloweye rockfish from No Effect to May Affect, Not Likely to Adversely Affect. This is because the measure of take is at the scale of the individual. If there is potential to affect any individual or any features of critical habitat, even if it is insignificant or discountable, that should be a May Affect determination. Steve described that an outcome of the pre-BA meeting for the adjacent City Center Access was a No Effect for these species. Bonnie stated that No Effect determinations should not be submitted to the Services because the metric for a consultation is a May Affect determination.

- Josh noted that if any fish handling is proposed in the lower reaches of Hylebos Creek for the mitigation site, then USFWS may not support the proposed May Affect, Not Likely to Adversely Affect determination for bull trout. Steve explained that the off-site mitigation area has not been selected at this time. Teresa clarified that Sound Transit is coordinating with the Corps to define mitigation and that it will be primarily wetland mitigation. Permanent stream impacts are for realignment and no linear foot reduction in streams is anticipated. The mitigation is to satisfy city and Corps requirements for permanent wetland impacts. The mitigation will likely have beneficial effects for listed species.
- Justin asked if the Services need to concur with the species list. Josh stated that it is up to the action agency to disclose effects to listed species; however, if during formal consultation the Services determine that there is an adverse effect to species that have not been consulted on then that will tie things up. At this time, the Services don't see anything missing in ST's pre-biological assessment shown on the PowerPoint, or other species that should have been addressed.
- Bonnie stated that, in the context of stormwater, it is not out of the ordinary for NMFS to review a project's stormwater analysis and come out with a May Affect determination on Southern Resident Killer Whale (SRKW) Critical Habitat. NMFS may conclude that SRKW Critical Habitat is affected if Chinook, SRKW preferred prey, may be affected over the anticipated life of a project since sufficient quantity, quality and availability of prey species is a primary constituent element for SRKW.
- The group did not identify concerns with the essential fish habitat recommendation.

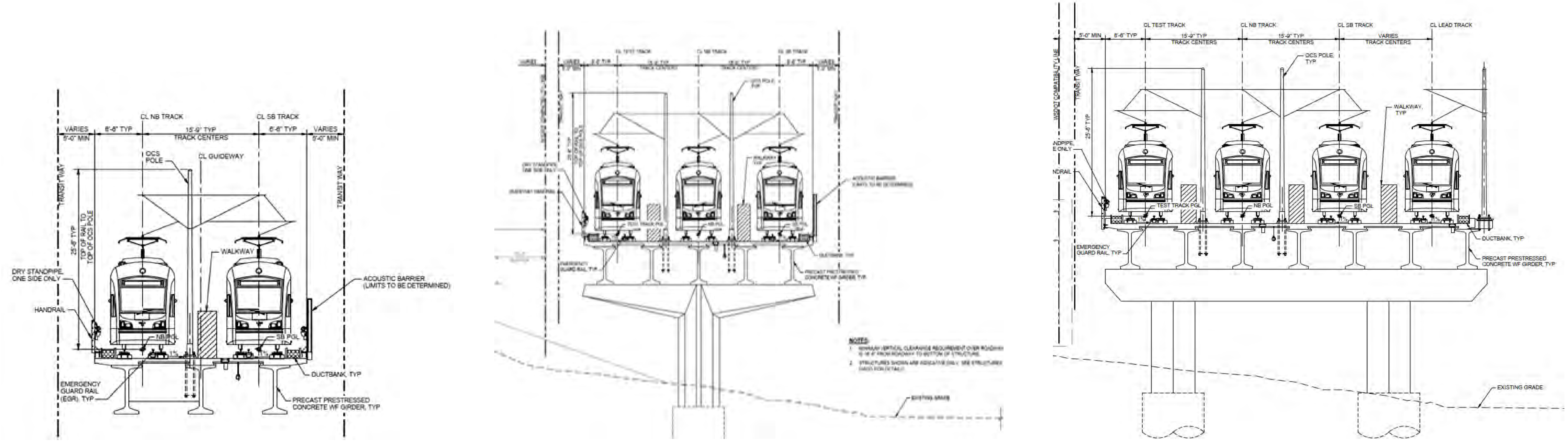
Discussion

- FTA will be the lead federal agency. FTA/ST are planning to submit/begin consultation in December with completion of consultation in May 2024.
- Bonnie described that if the Services conduct consultation with FTA, the Corps will rely on that consultation for its permits based on the concept of late arriving action agency. There is an informal understanding that if an agency has funding involved then they lead for consultation. The BA should include text that would identify the Corps as the Section 404 permitting agency.
- The Corps project manager is Colin Greenan. ST just completed a second pre-app meeting in July.
- Teresa discussed project schedule, noting submittal of the BA later in 2023. Joshua indicated that even 10 months for consultation would be challenging.
- ST and NMFS have a staffing agreement where ST is funding Phyllis's position at NMFS to prioritize consultation on ST projects. Bonnie indicated that NMFS consultation will be more in line with the statutory review time of 145 days due to this agreement. Bonnie noted that NMFS has an interagency agreement between NMFS and USFWS that allows NMFS staff to be loaned to USFWS to work on ESA consultations. It would be ideal if Phyllis could cover consultation for both NMFS and USFWS. Joshua will follow up within USFWS on how this will be administrated.

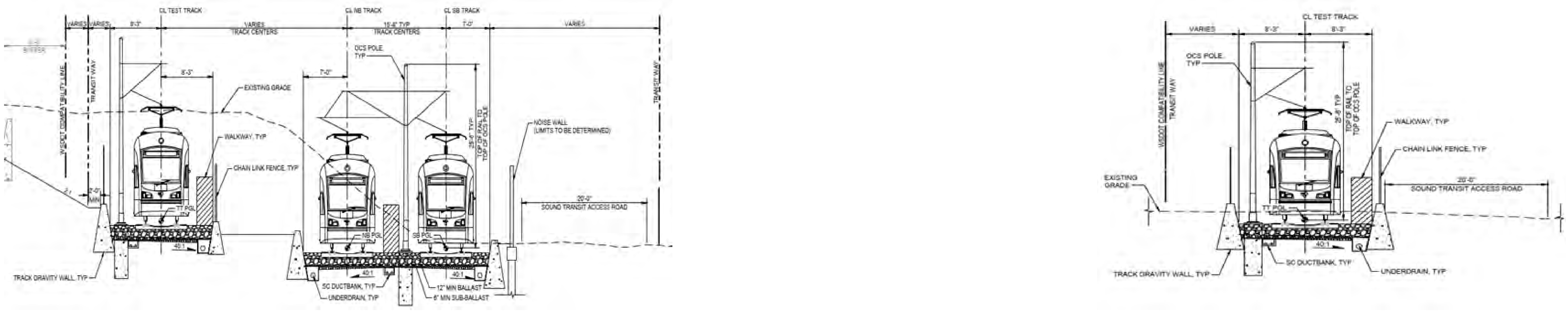
Operations and Maintenance Facility South

APPENDIX C

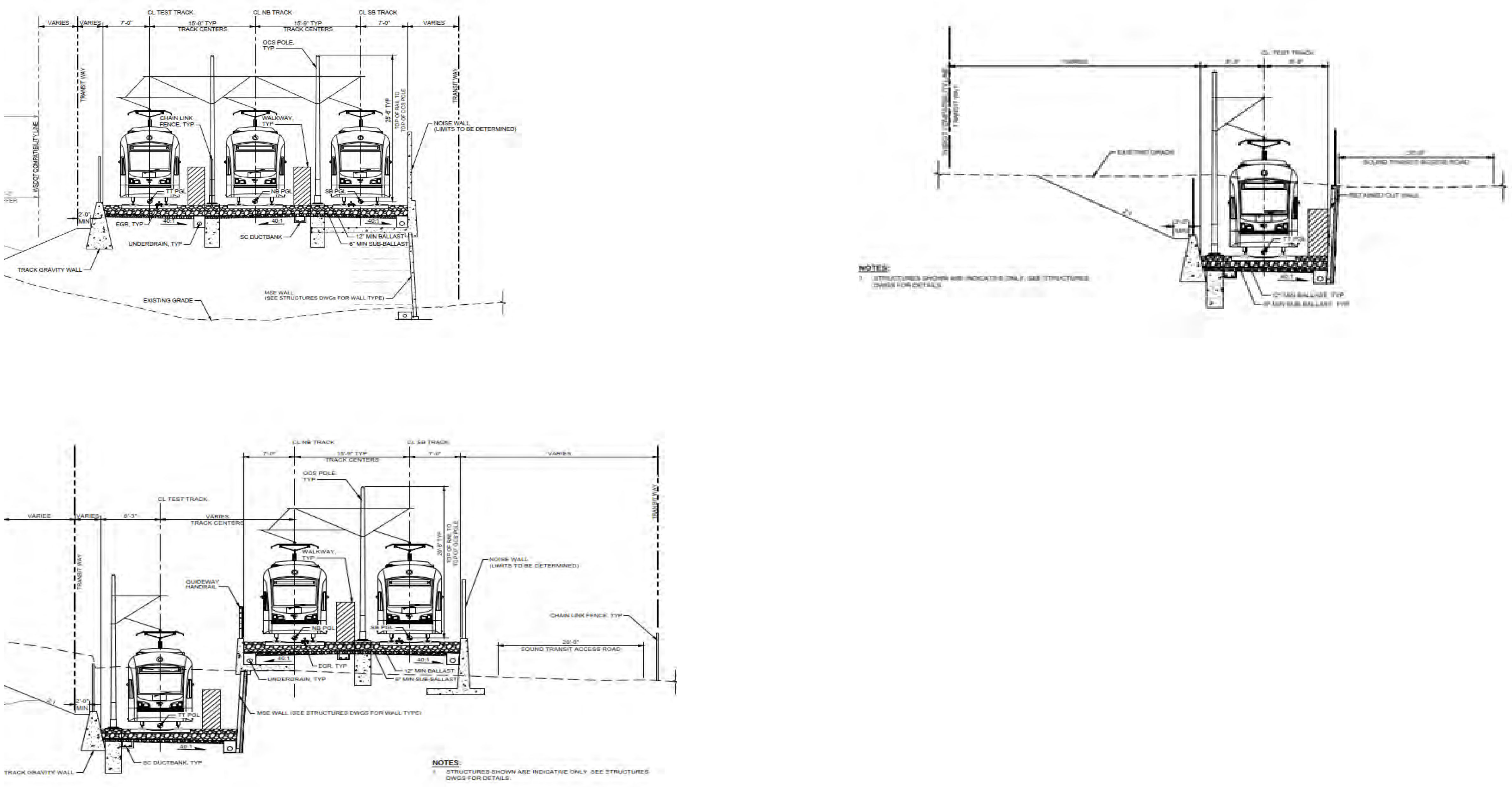
TYPICAL LIGHT RAIL GUIDEWAY CROSS SECTIONS


VARIES
5'-0" MIN
8'-6" TYP
CL NB TRACK
15'-9" TYP
TRACK CENTERS
CL SB TRACK
6'-6" TYP
OCS POLE
CL GUIDEWAY
TRANSIT WAY
25'-6" TYP
TOP OF RAIL TO
TOP OF OCS POLE
DRY STANDPIPE,
ONE SIDE ONLY
HANDRAIL
WALKWAY
ACOUSTIC BARRIER
(LIMITS TO BE DETERMINED)
NB PGL
SB PGL
DUCTBANK, TYP
EMERGENCY
GUARD RAIL
(EGR), TYP
PRECAST PRESTRESSED
CONCRETE WF GIRDER, TYP
NOTES:
EXISTING GRADE
CL TEST TRACK
CL LEAD TRACK
5'-0" MIN
VARIES
TRACK CENTERS
OCS POLE,
TYP
WSDOT COMPATIBILITY LINE
WALKWAY,
TYP
TEST TRACK PGL
EMERGENCY
GUARD RAIL, TYP
PRECAST PRESTRESSED
CONCRETE WF GIRDER, TYP

ELEVATED MAINLINE GUIDEWAY DOUBLE, TRIPLE AND FOUR TRACK PROFILES


VARIES
8'-3"
CL TEST TRACK
TRACK CENTERS
CL NB TRACK
15'-6" TYP
CL SB TRACK
7'-0"
OCS POLE
TYP
WSDOT COMPATIBILITY LINE
TRANSIT WAY
EXISTING GRADE
WALKWAY, TYP
CHAIN LINK FENCE, TYP
25'-6" TYP
TOP OF RAIL TO
TOP OF OCS POLE
NOISE WALL
(LIMITS TO BE DETERMINED)
20'-0"
SOUND TRANSIT ACCESS ROAD
TT PGL
NB PGL
SB PGL
4.0:1
2'-0"
MIN
TRACK GRAVITY WALL, TYP
SC DUCTBANK, TYP
UNDERDRAIN, TYP
12" MIN BALLAST
6" MIN SUB-BALLAST
8'-3"
EXISTING
GRADE

AT GRADE MAINLINE GUIDEWAY AND TEST TRACK AND INDEPENDENT AT GRADE TEST TRACK


CL TEST TRACK
CL NB TRACK
CL SB TRACK
VARIES
VARIES
7'-0"
15'-9" TYP
TRACK CENTERS
15'-9" TYP
TRACK CENTERS
7'-0"
VARIES
OCS POLE,
TYP
WSDOT COMPATIBILITY LINE
TRANSIT WAY
TRANSIT WAY
CHAIN LINK
FENCE, TYP
WALKWAY,
TYP
25'-6" TYP
TOP OF RAIL TO
TOP OF OCS POLE
NOISE WALL
(LIMITS TO BE DETERMINED)
TT PGL
NB PGL
SB PGL
2'-0"
MIN
EGR, TYP
40:1
40:1
40:1
SC DUCTBANK
UNDERDRAIN, TYP
12" MIN BALLAST
6" MIN SUB-BALLAST
TRACK GRAVITY WALL
MSE WALL
(SEE STRUCTURES DWGs FOR WALL TYPE)
EXISTING GRADE
CL TEST TRACK
VARIES
8'-3"
8'-3"
WSDOT COMPATIBILITY LINE
TRANSIT WAY
EXISTING GRADE
20'-0"
SOUND TRANSIT ACCESS ROAD
RETAINED CUT WALL
2:1
2'-0"
MIN
TT PGL
40:1
12" MIN BALLAST, TYP
6" MIN SUB-BALLAST, TYP
CL NB TRACK
CL SB TRACK
7'-0"
15'-9" TYP
TRACK CENTERS
7'-0"
VARIES
OCS POLE
TYP
CL TEST TRACK
VARIES
VARIES
8'-3"
VARIES
TRACK CENTERS
TRANSIT WAY
TRANSIT WAY
GUIDEWAY
HANDRAIL
WALKWAY,
TYP
20'-6" TYP
TOP OF RAIL TO
TOP OF OCS POLE
NOISE WALL
(LIMITS TO BE DETERMINED)
CHAIN LINK FENCE, TYP
NB PGL
SB PGL
20'-0"
SOUND TRANSIT ACCESS ROAD
40:1
40:1
EGR, TYP
UNDERDRAIN, TYP
12" MIN BALLAST
6" MIN SUB-BALLAST
2:1
2'-0"
MIN
TT PGL
MSE WALL (SEE STRUCTURES DWGS FOR WALL TYPE)
40:1
SC DUCTBANK, TYP
TRACK GRAVITY WALL

NOTES:

1. STRUCTURES SHOWN ARE INDICATIVE ONLY. SEE STRUCTURES DWGS FOR DETAILS.

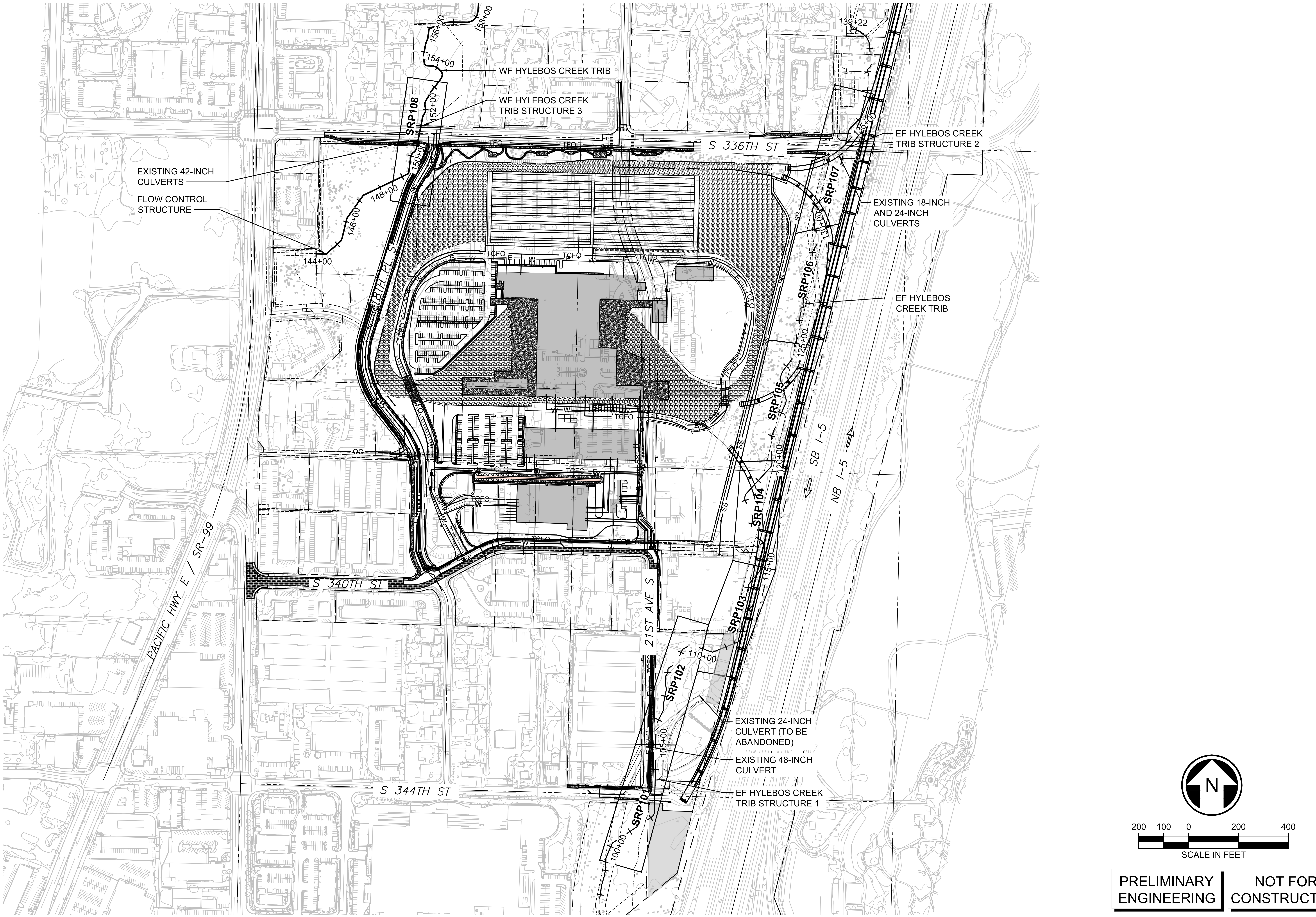
NOTES:

1. STRUCTURES SHOWN ARE INDICATIVE ONLY. SEE STRUCTURES DWGS FOR DETAILS.

TRIPLE TRACK GUIDEWAY ON RETAINED FILL, INDEPENDENT TEST TRACK ON RETAINED CUT AND DOUBLE TRACK ON RETAINED FILL AND INDEPENDENT TEST TRACK ON RETAINED CUT

APPENDIX D

PRELIMINARY STREAM AND CULVERT DESIGN


WF HYLEBOS CREEK TRIB
WF HYLEBOS CREEK TRIB STRUCTURE 3
EXISTING 42-INCH CULVERTS
FLOW CONTROL STRUCTURE
EF HYLEBOS CREEK TRIB STRUCTURE 2
EXISTING 18-INCH AND 24-INCH CULVERTS
EF HYLEBOS CREEK TRIB
EXISTING 24-INCH CULVERT (TO BE ABANDONED)
EXISTING 48-INCH CULVERT
EF HYLEBOS CREEK TRIB STRUCTURE 1
S 336TH ST
S 340TH ST
S 344TH ST
21ST AVE S
18TH PL S
PACIFIC HWY E / SR-99
SB I-5
NB I-5
SRP101
SRP102
SRP103
SRP104
SRP105
SRP106
SRP107
SRP108
100+00
105+00
110+00
115+00
120+00
125+00
130+00
135+00
139+22
144+00
146+00
148+00
150+00
152+00
154+00
156+00
158+00
TFO
TCFO
SS
W
OC
N
200 100 0 200 400
SCALE IN FEET

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

HDR

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 07/03/2023
REVIEWED BY:
DATE: 07/03/2023

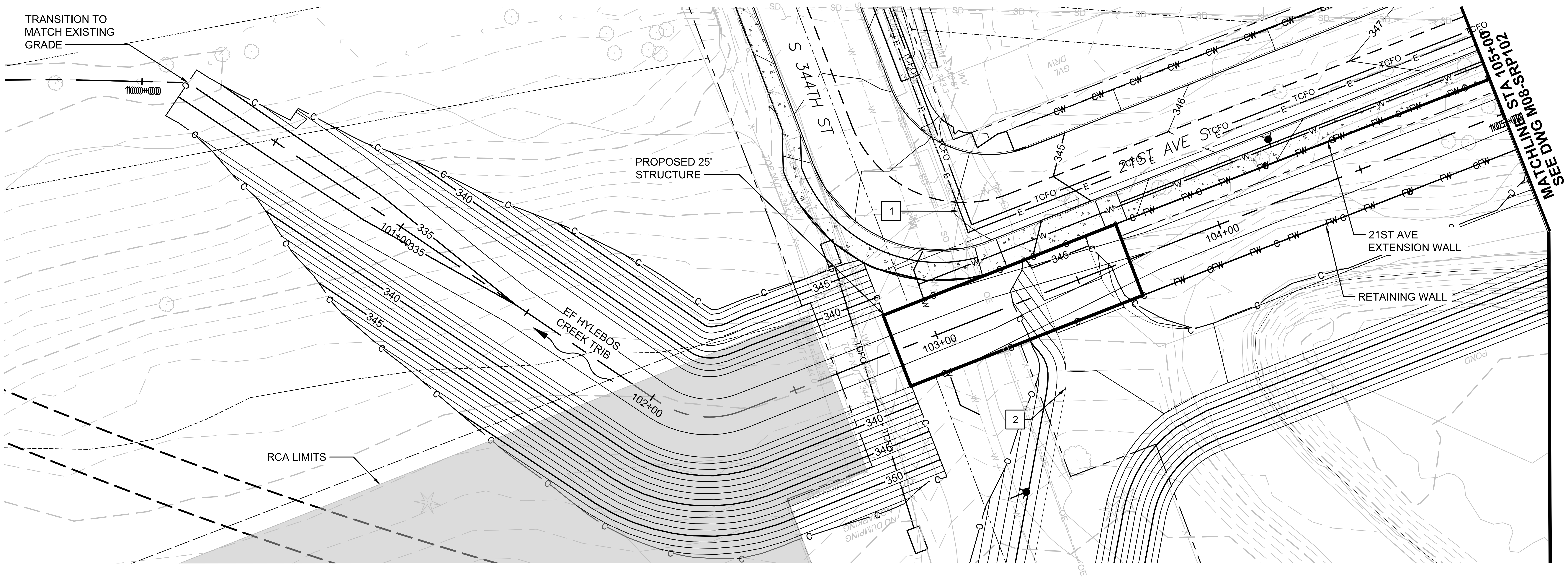
SCALE:
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

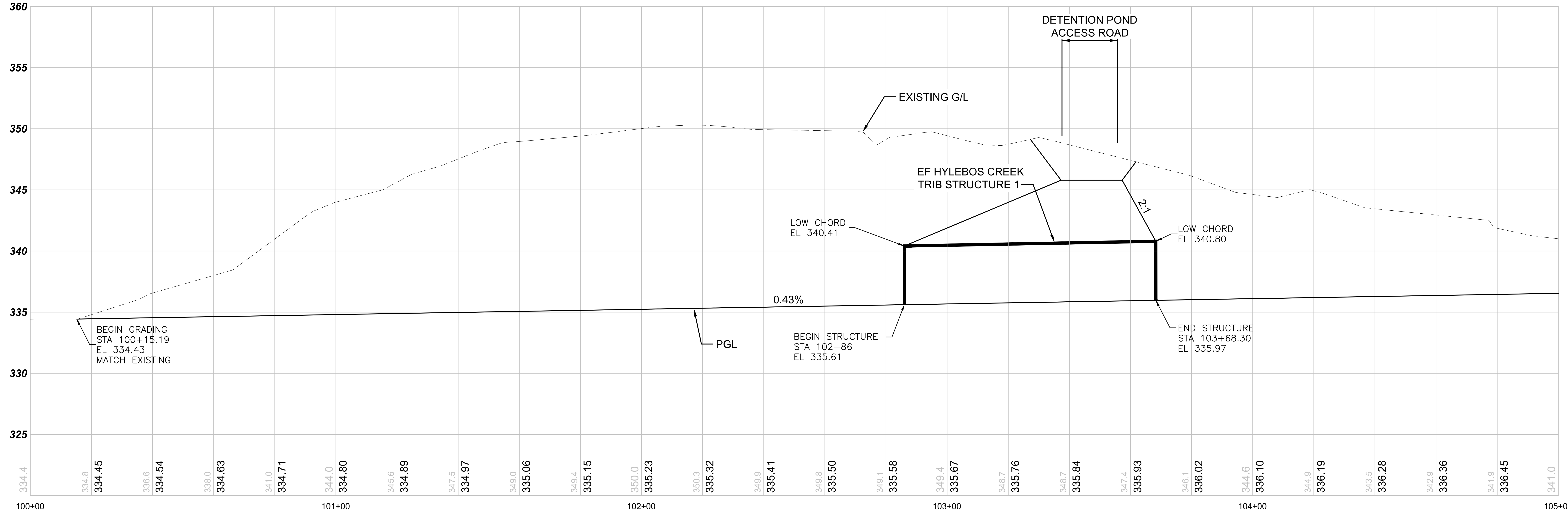
SOUND TRANSIT
PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

STREAM
STREAM KEY PLAN

DRAWING No.: M08-SRP100
FACILITY ID: M08
SHEET No.:
REV:

06/27/23 | 8:39 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG


TRANSITION TO
MATCH EXISTING
GRADE
100+00
101+00
102+00
103+00
104+00
335
340
345
350
S 344TH ST
21ST AVE S
PROPOSED 25'
STRUCTURE
EF HYLEBOS
CREEK TRIB
RCA LIMITS
21ST AVE
EXTENSION WALL
RETAINING WALL
POND
1
2
MATCHLINE STA 105+00
SEE DWG M08-SRP102


360
355
350
345
340
335
330
325
DETENTION POND
ACCESS ROAD
EXISTING G/L
EF HYLEBOS CREEK
TRIB STRUCTURE 1
2:1
LOW CHORD
EL 340.41
LOW CHORD
EL 340.80
0.43%
BEGIN GRADING
STA 100+15.19
EL 334.43
MATCH EXISTING
PGL
BEGIN STRUCTURE
STA 102+86
EL 335.61
END STRUCTURE
STA 103+68.30
EL 335.97
334.4
334.8
334.45
336.6
334.54
338.0
334.63
341.0
334.71
344.0
334.80
345.6
334.89
347.5
334.97
349.0
335.06
349.4
335.15
350.0
335.23
350.3
335.32
349.9
335.41
349.8
335.50
349.1
335.58
349.4
335.67
348.7
335.76
348.7
335.84
347.4
335.93
346.1
336.02
344.6
336.10
344.9
336.19
343.5
336.28
342.9
336.36
341.9
336.45
341.0
100+00
101+00
102+00
103+00
104+00
105+00

06/27/23 | 8:33 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

HDR

LINE IS 1" AT FULL SCALE

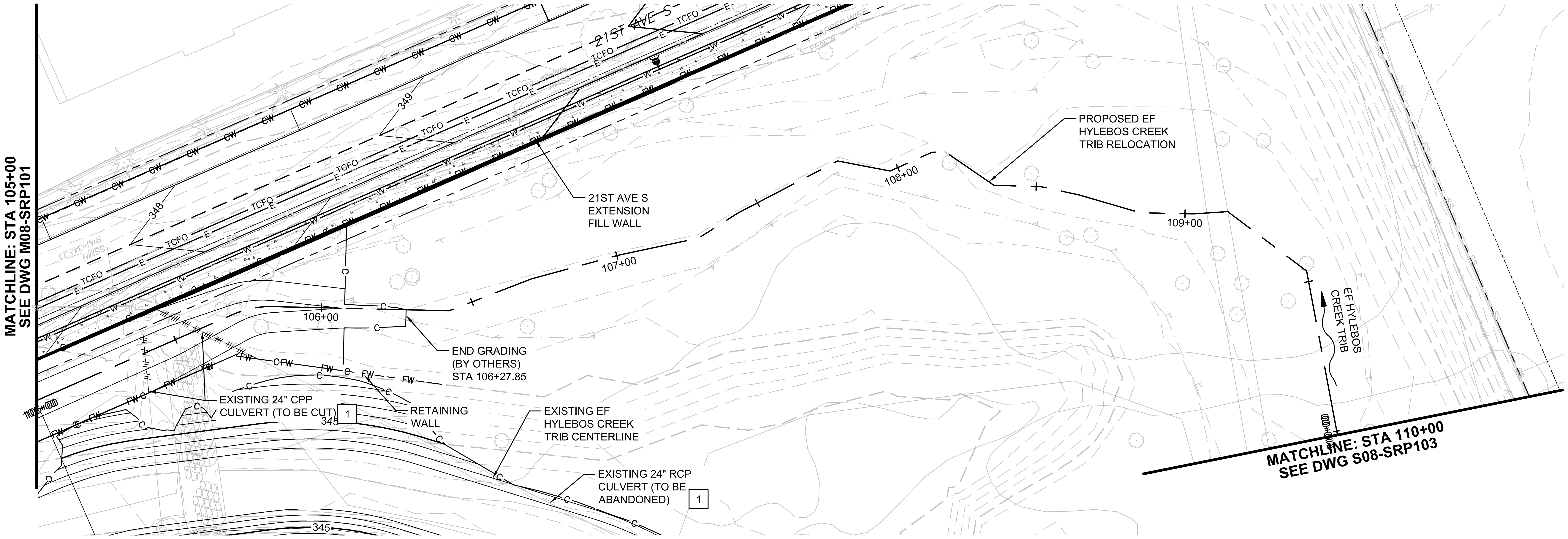
SOUNDTRANSIT

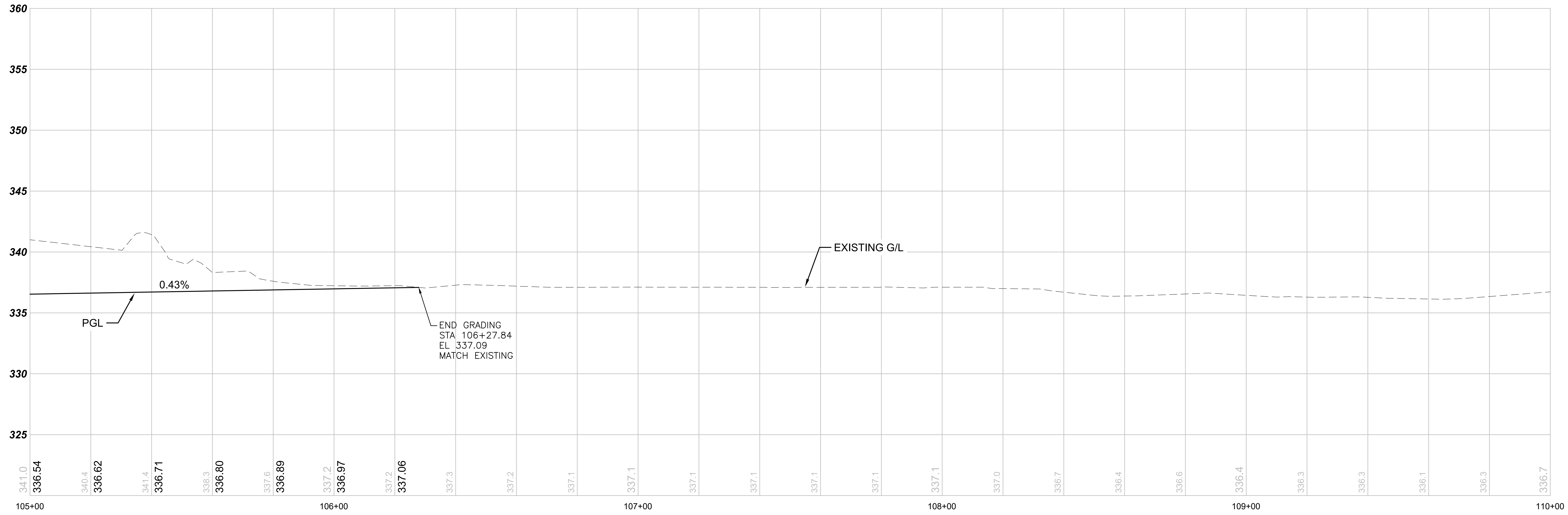
SUBMITTED BY:
PABLO LOPEZ-HILFIKER
DATE:
07/03/2023
REVIEWED BY:
DATE:
07/03/2023

SCALE:
1"=200'
FILENAME:
OMFS-M08-SRP100-109
CONTRACT No.:
DATE:
7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 100+00 TO 105+00


MATCHLINE: STA 105+00
SEE DWG M08-SRP101
21ST AVE S
TCFO
CW
W
E
349
348
SSMH RIM=345.23
21ST AVE S EXTENSION FILL WALL
106+00
107+00
108+00
109+00
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
END GRADING (BY OTHERS) STA 106+27.85
EXISTING 24" CPP CULVERT (TO BE CUT) 1
RETAINING WALL
345
EXISTING EF HYLEBOS CREEK TRIB CENTERLINE
EXISTING 24" RCP CULVERT (TO BE ABANDONED) 1
EF HYLEBOS CREEK TRIB
MATCHLINE: STA 110+00
SEE DWG S08-SRP103
105+00



06/27/23 | 8:33 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

AHJ:

HDR

SUBMITTED BY:
PABLO LOPEZ-HILFIKER
DATE:
07/03/2023
REVIEWED BY:
DATE:
07/03/2023

LINE IS 1" AT FULL SCALE

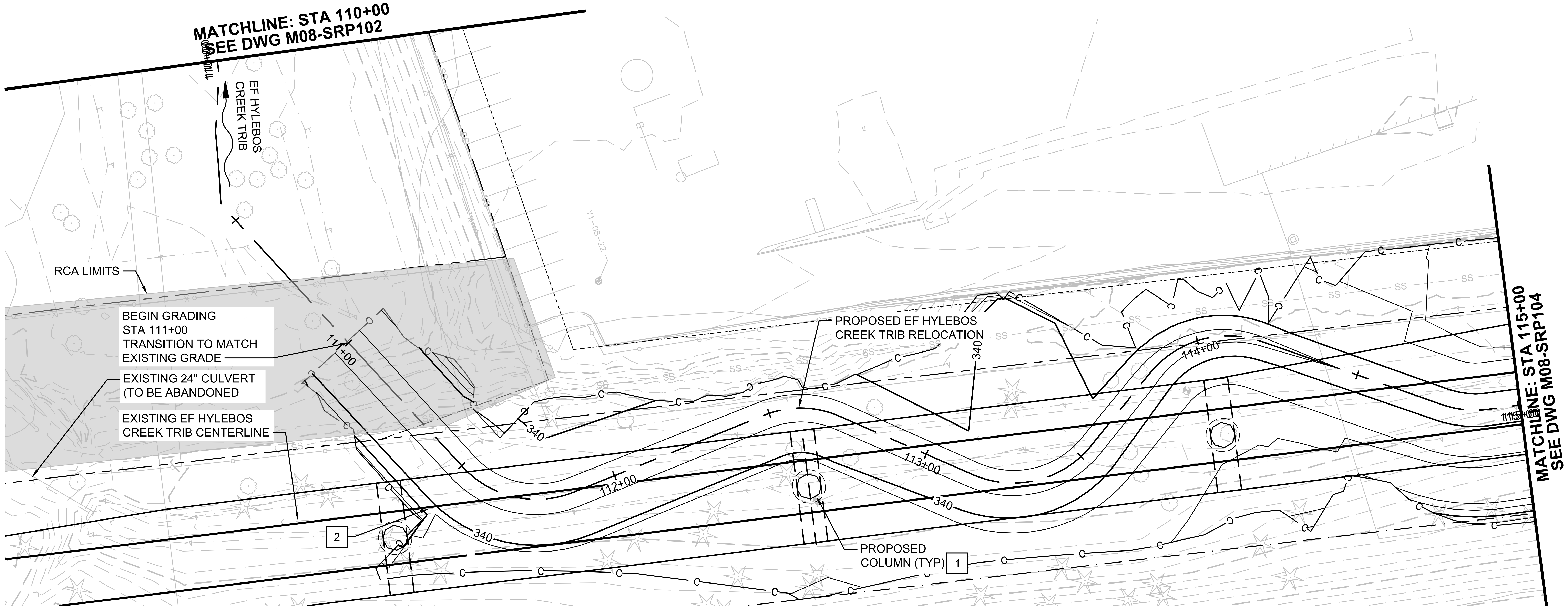
SOUNDTRANSIT

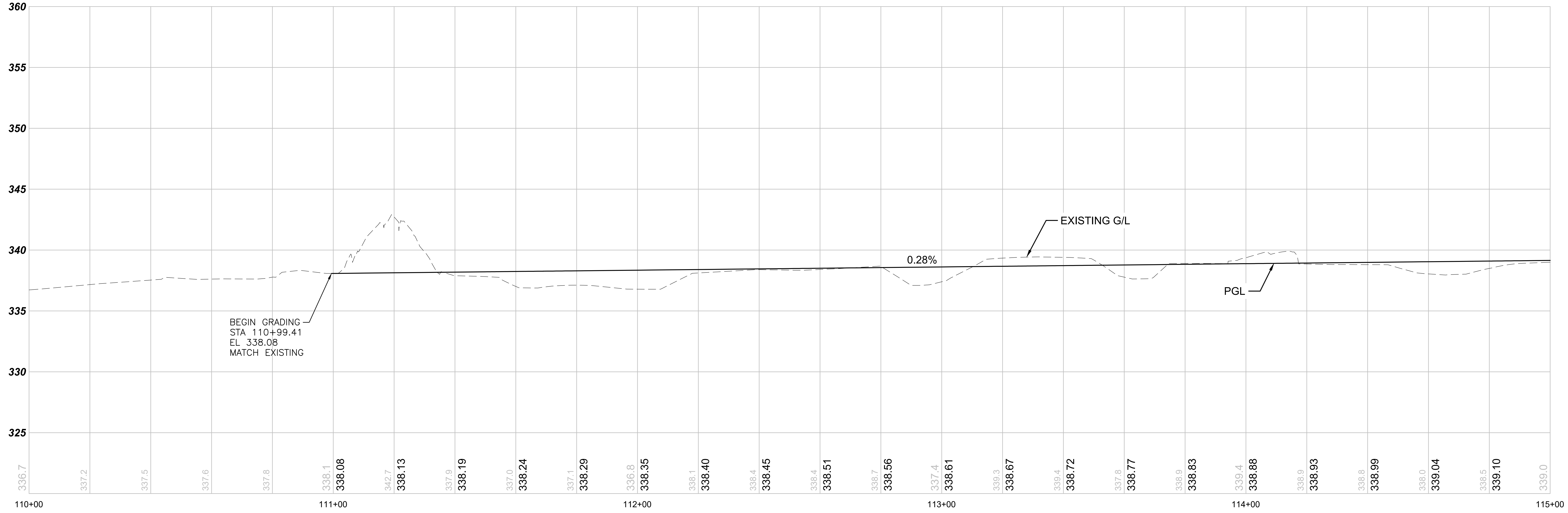
PACKAGE #

SCALE:
AS INDICATED
FILENAME:
OMFS-M08-SRP100-109
CONTRACT No.:
DATE:
7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 105+00 TO 110+00


MATCHLINE: STA 110+00
SEE DWG M08-SRP102
EF HYLEBOS CREEK TRIB
RCA LIMITS
BEGIN GRADING
STA 111+00
TRANSITION TO MATCH
EXISTING GRADE
EXISTING 24" CULVERT
(TO BE ABANDONED
EXISTING EF HYLEBOS
CREEK TRIB CENTERLINE
PROPOSED EF HYLEBOS
CREEK TRIB RELOCATION
PROPOSED
COLUMN (TYP)
1
2
340
111+00
112+00
113+00
114+00
115+00
MATCHLINE: STA 115+00
SEE DWG M08-SRP104



06/27/23 | 8:34 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 07/03/2023
REVIEWED BY:
DATE: 07/03/2023

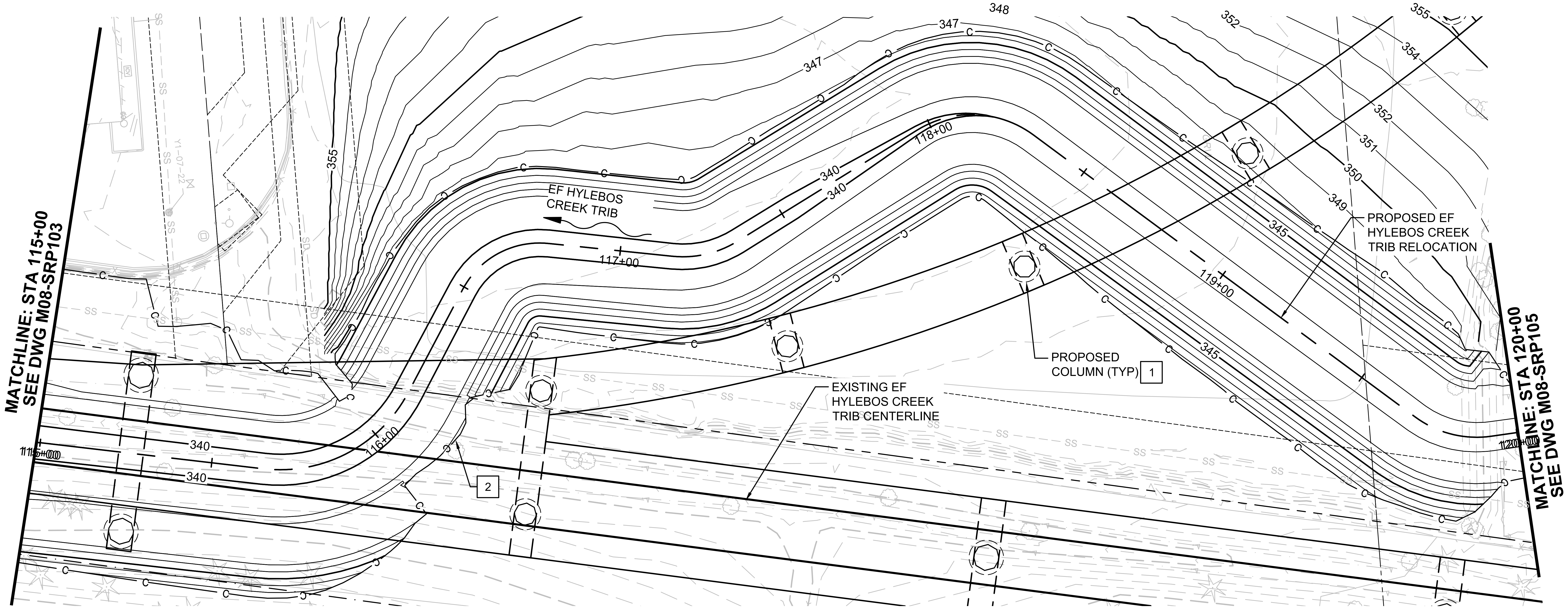
LINE IS 1" AT FULL SCALE

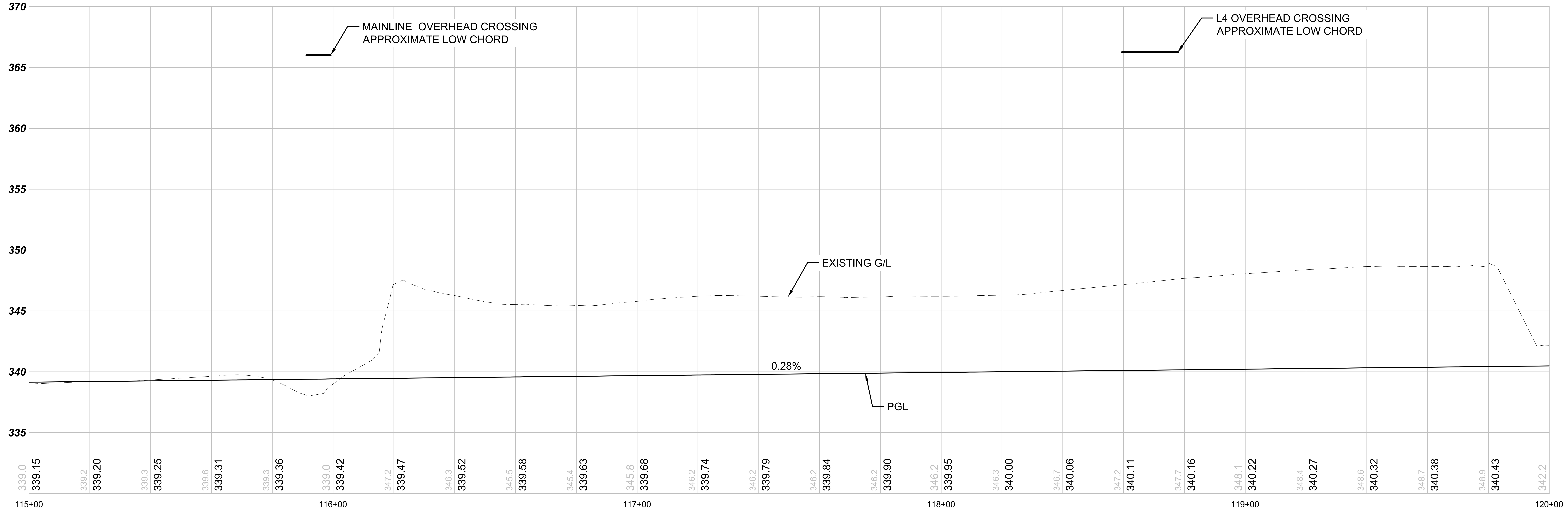
SOUNDTRANSIT

SCALE: H: 1"=20'; V: 1"=5'
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 110+00 TO115+00


MATCHLINE: STA 115+00
SEE DWG M08-SRP103
MATCHLINE: STA 120+00
SEE DWG M08-SRP105
EF HYLEBOS CREEK TRIB
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
PROPOSED COLUMN (TYP) 1
EXISTING EF HYLEBOS CREEK TRIB CENTERLINE
2
115+00
116+00
117+00
118+00
119+00
120+00
340
345
347
348
349
350
351
352
354
355
SS



06/27/23 | 8:34 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

AHJ:

SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 07/03/2023
REVIEWED BY:
DATE: 07/03/2023

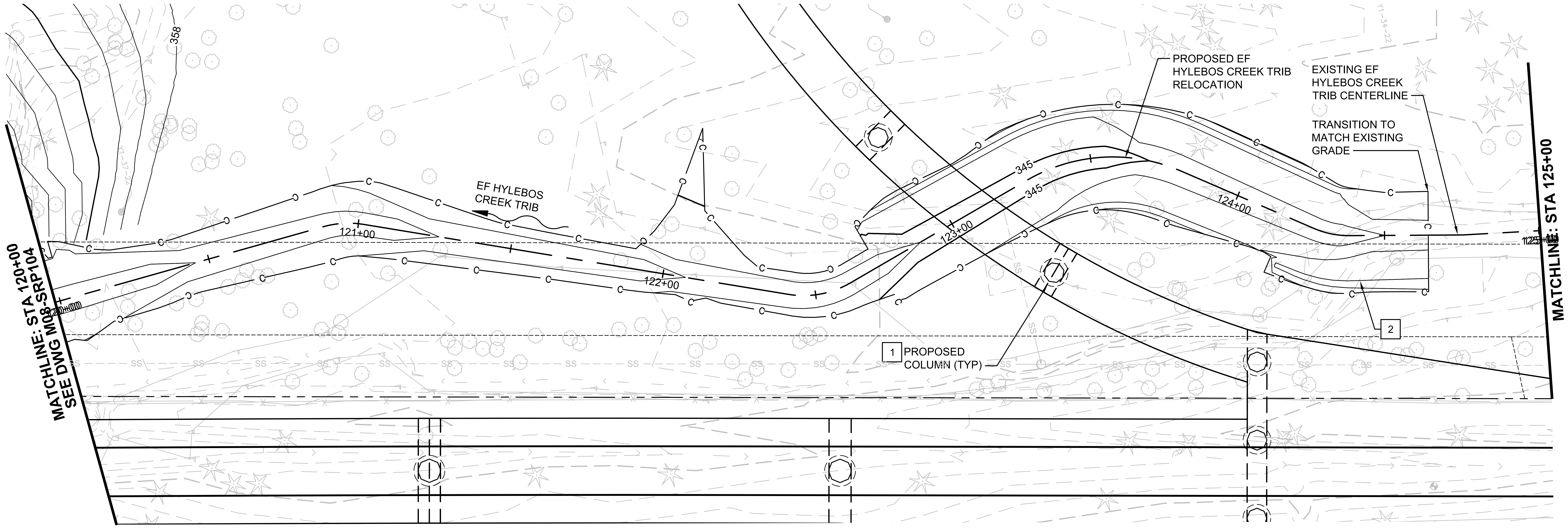
LINE IS 1" AT FULL SCALE

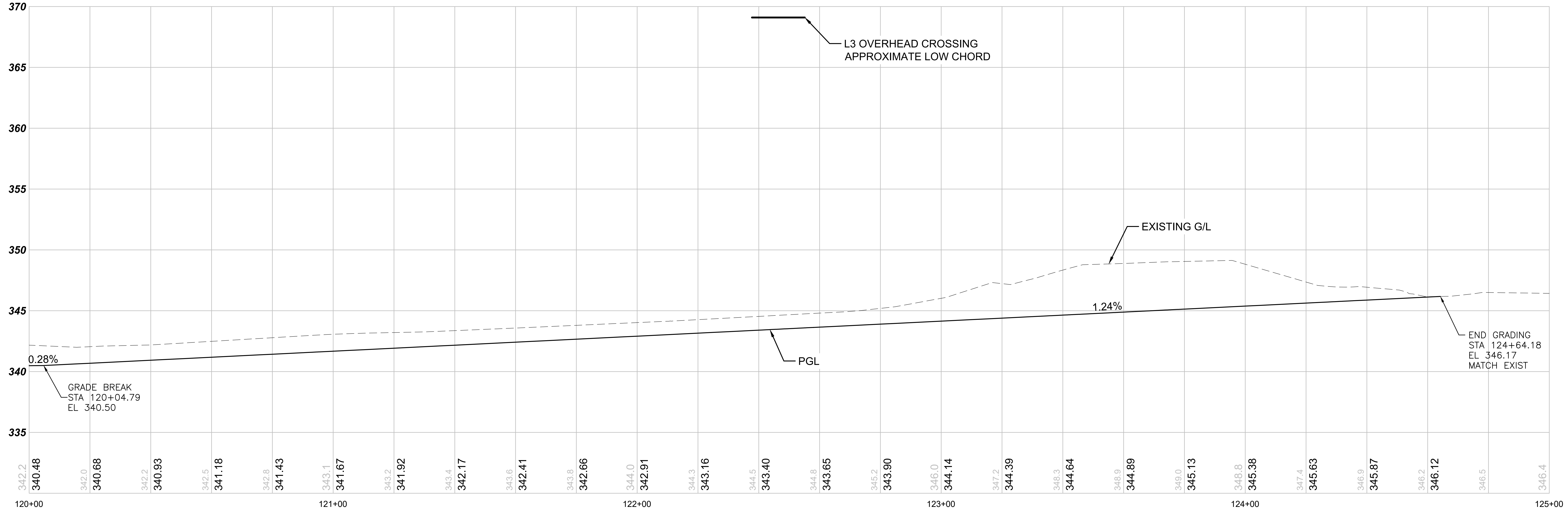
SOUNDTRANSIT

PACKAGE #
SCALE: H: 1"=20'; V: 1"=5'
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 115+00 TO 120+00


358
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
EXISTING EF HYLEBOS CREEK TRIB CENTERLINE
TRANSITION TO MATCH EXISTING GRADE
EF HYLEBOS CREEK TRIB
345
345
121+00
122+00
123+00
124+00
125+00
MATCHLINE: STA 120+00
SEE DWG M08-SRP104
MATCHLINE: STA 125+00
1 PROPOSED COLUMN (TYP)
2
SS



06/27/23 | 8:35 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

HDR

SUBMITTED BY:
PABLO LOPEZ-HILFIKER
DATE:
07/03/2023
REVIEWED BY:

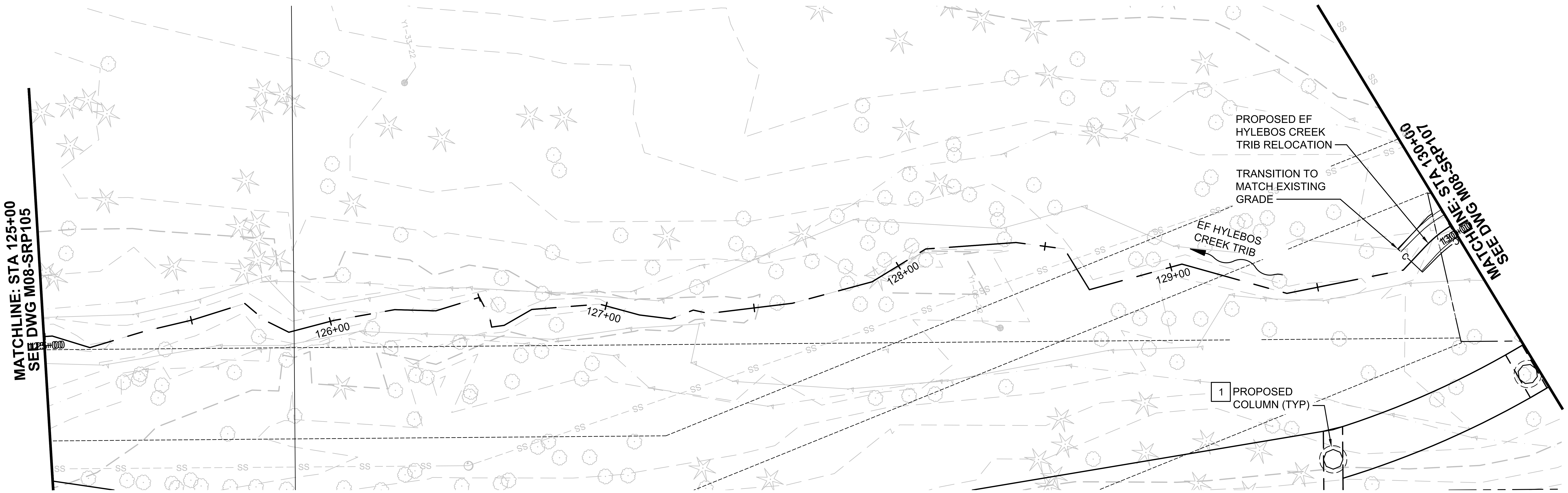
LINE IS 1" AT FULL SCALE

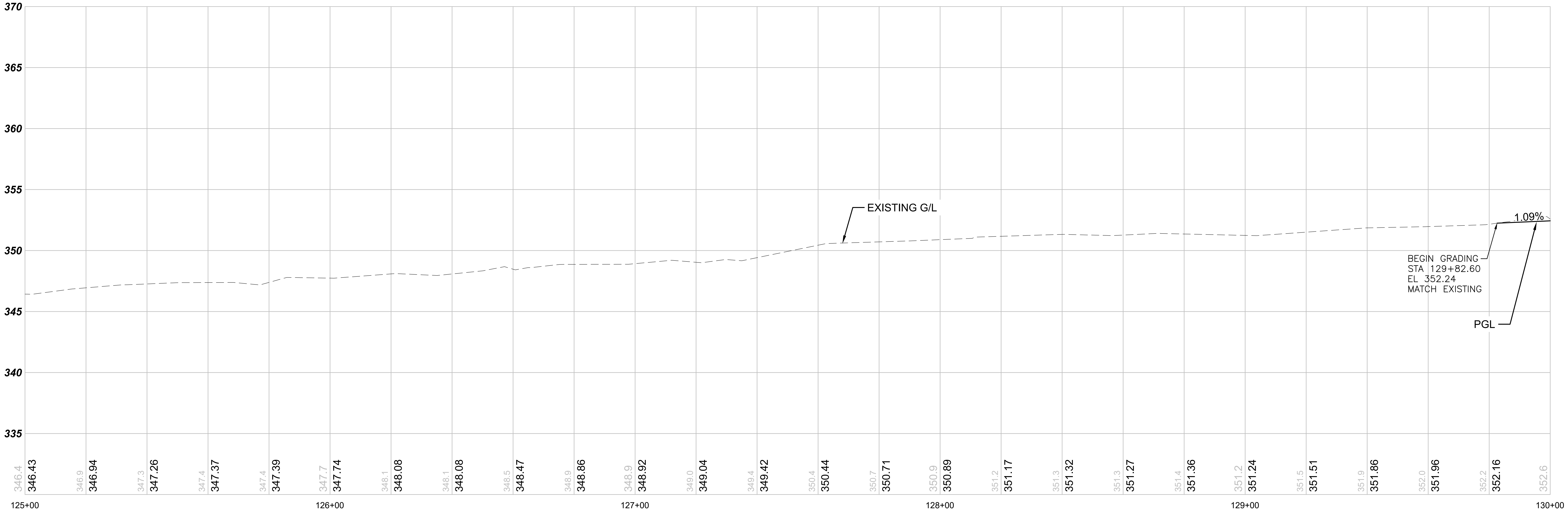
SOUNDTRANSIT
DATE:
07/03/2023

SCALE:
H: 1"=20'; V: 1"=5'
FILENAME:
OMFS-M08-SRP100-109
CONTRACT No.:
DATE:
7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 120+00 TO 125+00


MATCHLINE: STA 125+00
SEE DWG M08-SRP105
MATCHLINE: STA 130+00
SEE DWG M08-SRP107
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
TRANSITION TO MATCH EXISTING GRADE
EF HYLEBOS CREEK TRIB
1 PROPOSED COLUMN (TYP)
125+00
126+00
127+00
128+00
129+00
130+00
SS



AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

HDR

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

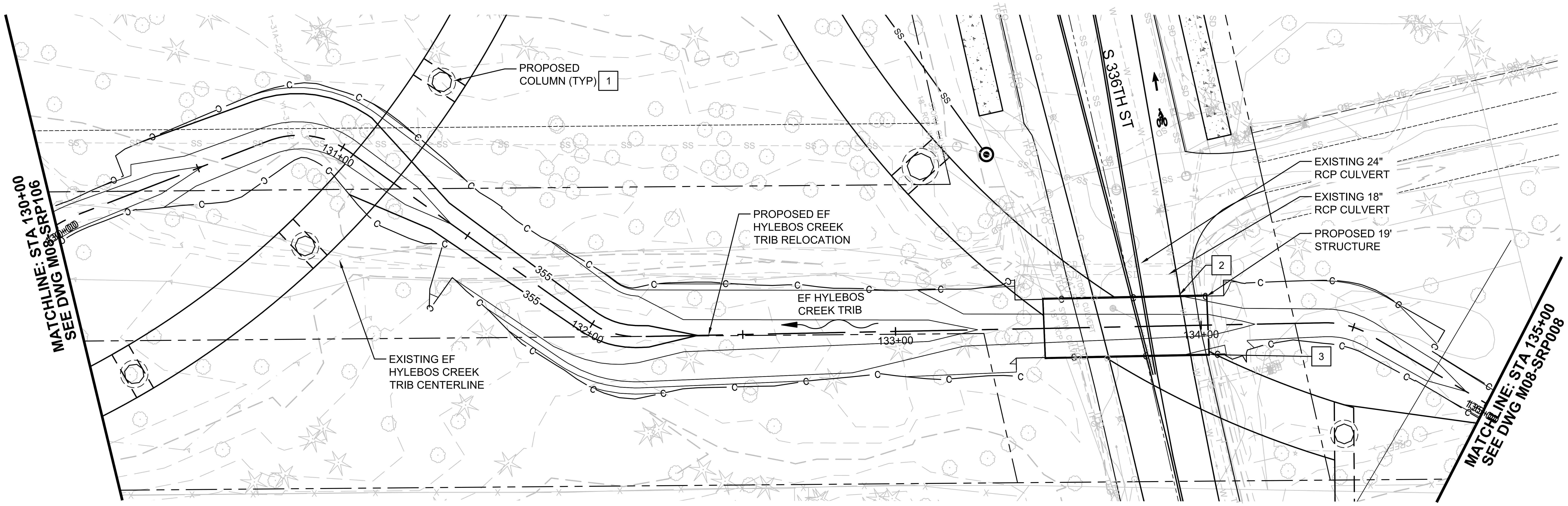
SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 07/03/2023
REVIEWED BY:
DATE: 07/03/2023

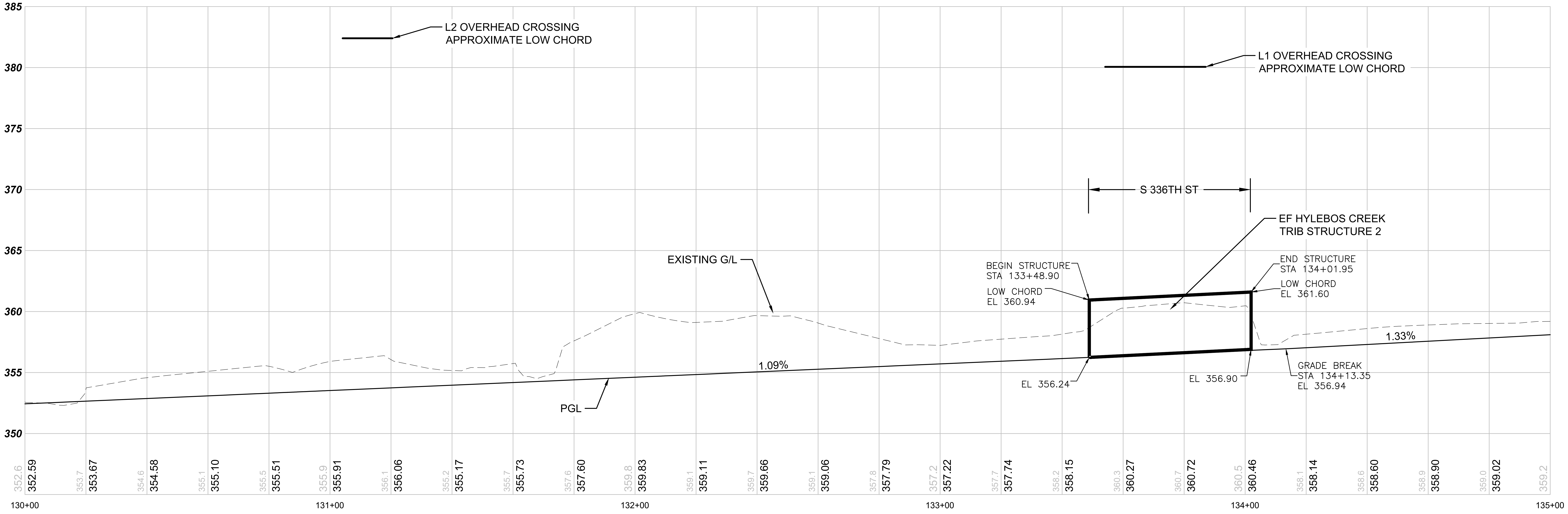
SCALE: H: 1"=20'; V: 1"=5'
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 125+00 TO 130+00

06/27/23 | 8:35 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG


PROPOSED COLUMN (TYP) 1
MATCHLINE: STA 130+00 SEE DWG M08-SRP106
131+00
132+00
133+00
134+00
355
S 336TH ST
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
EF HYLEBOS CREEK TRIB
EXISTING EF HYLEBOS CREEK TRIB CENTERLINE
EXISTING 24" RCP CULVERT
EXISTING 18" RCP CULVERT
PROPOSED 19' STRUCTURE
2
3
MATCHLINE: STA 135+00 SEE DWG M08-SRP008



06/27/23 | 8:36 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

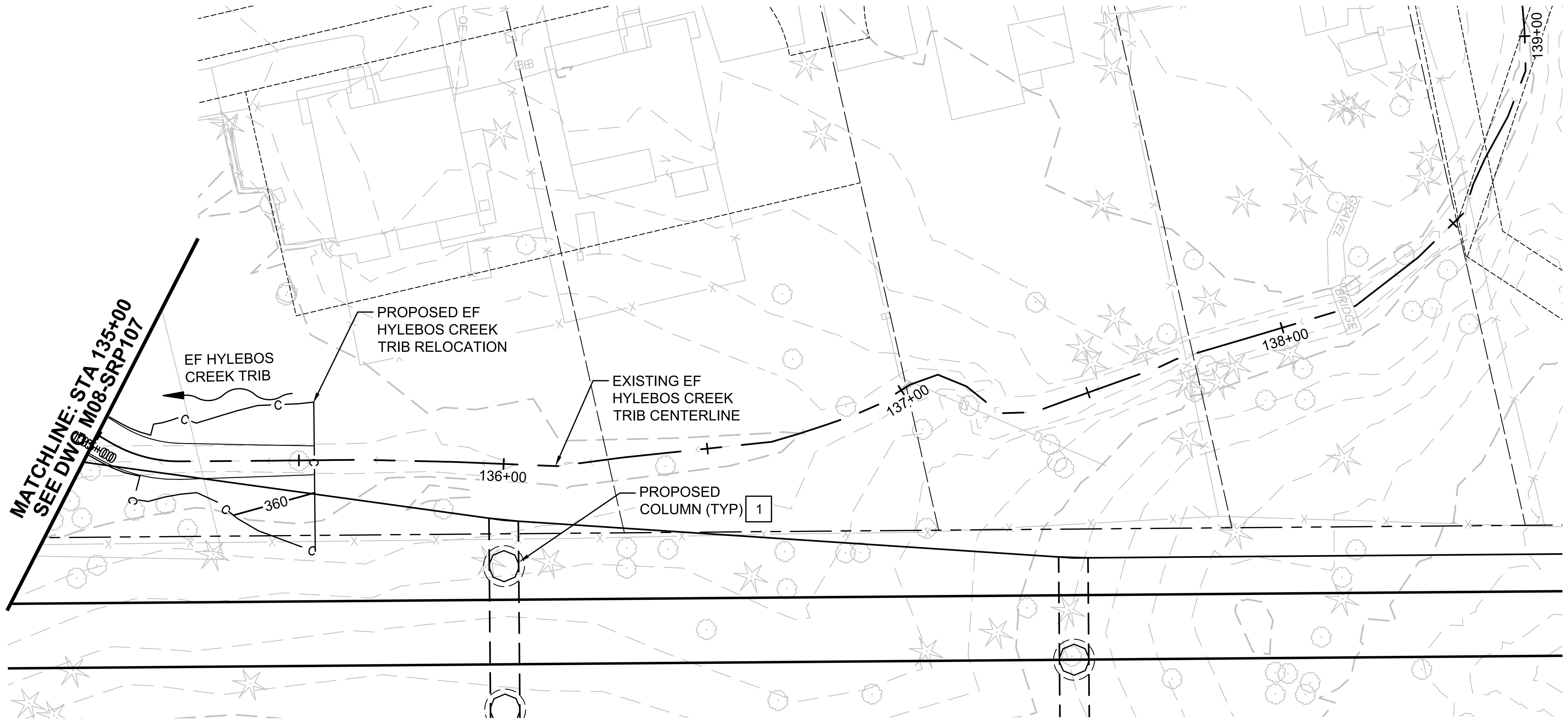
SUBMITTED BY:
PABLO LOPEZ-HILFIKER
DATE:
07/03/2023
REVIEWED BY:
DATE:
07/03/2023

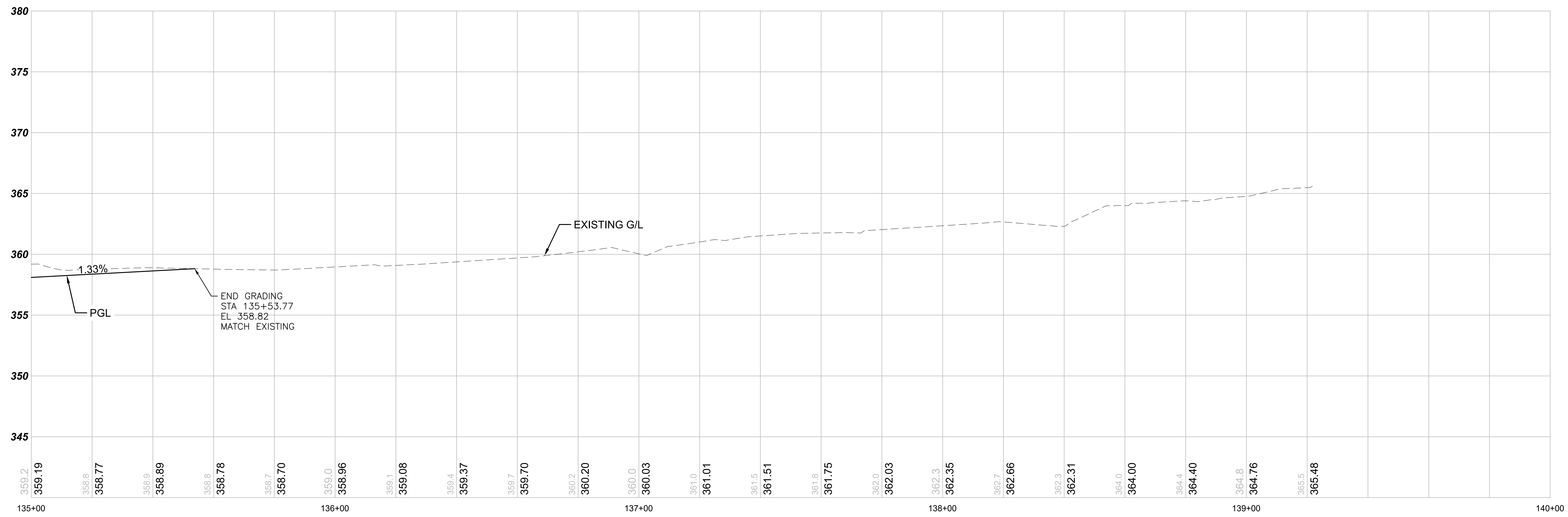
LINE IS 1" AT FULL SCALE

SCALE:
H: 1"=20'; V: 1"=5'
FILENAME:
OMFS-M08-SRP100-109
CONTRACT No.:
DATE:
7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 130+00 TO 135+00


MATCHLINE: STA 135+00
SEE DWG M08-SRP107
EF HYLEBOS CREEK TRIB
PROPOSED EF HYLEBOS CREEK TRIB RELOCATION
EXISTING EF HYLEBOS CREEK TRIB CENTERLINE
PROPOSED COLUMN (TYP) 1
360
136+00
137+00
138+00
139+00



06/27/23 | 8:36 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

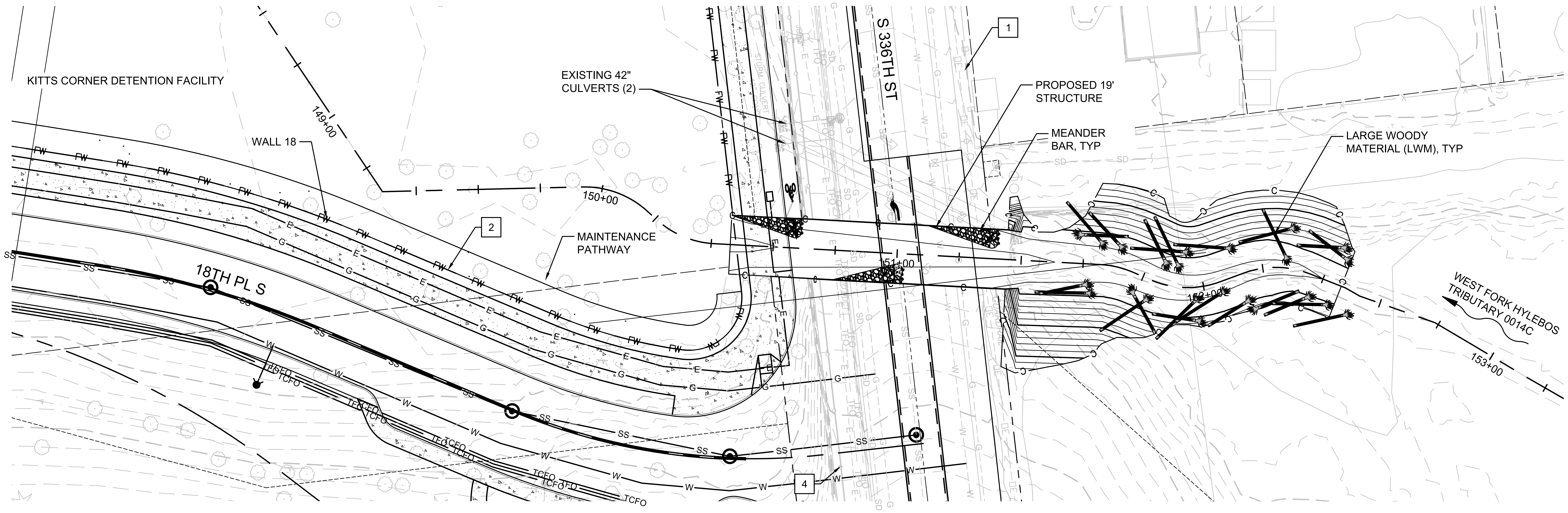
LINE IS 1" AT FULL SCALE

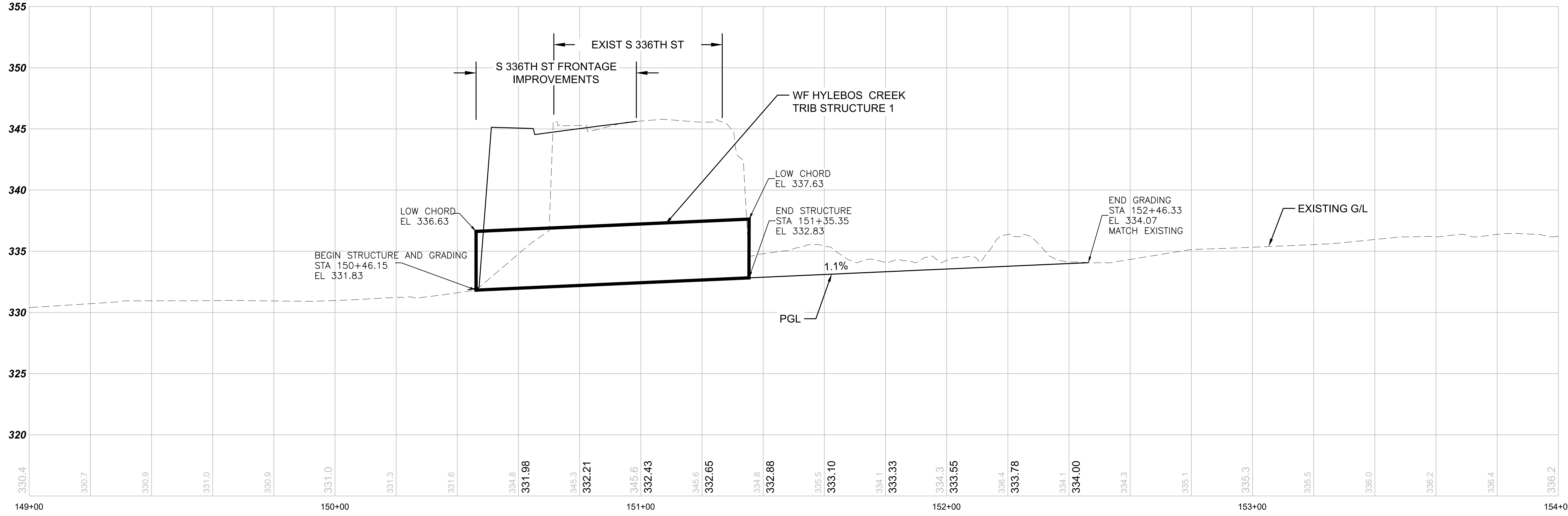
SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 07/03/2023
REVIEWED BY:
DATE: 07/03/2023

SCALE: H: 1"=20'; V: 1"=5'
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A
PLAN AND PROFILE STA 135+00 TO 140+00


KITTS CORNER DETENTION FACILITY
EXISTING 42" CULVERTS (2)
S 336TH ST
1
PROPOSED 19' STRUCTURE
MEANDER BAR, TYP
LARGE WOODY MATERIAL (LWM), TYP
WALL 18
149+00
150+00
151+00
152+00
153+00
2
MAINTENANCE PATHWAY
18TH PL S
WEST FORK HYLEBOS TRIBUTARY 0014C
4
SS
W
G
E
FW
SD
TCFO


355
350
345
340
335
330
325
320
EXIST S 336TH ST
S 336TH ST FRONTAGE IMPROVEMENTS
WF HYLEBOS CREEK TRIB STRUCTURE 1
LOW CHORD EL 336.63
LOW CHORD EL 337.63
END STRUCTURE STA 151+35.35 EL 332.83
END GRADING STA 152+46.33 EL 334.07 MATCH EXISTING
EXISTING G/L
BEGIN STRUCTURE AND GRADING STA 150+46.15 EL 331.83
1.1%
PGL
330.4
330.7
330.9
331.0
330.9
331.0
331.3
331.6
334.8
331.98
345.3
332.21
345.6
332.43
345.6
332.65
334.8
332.88
335.5
333.10
334.1
333.33
334.3
333.55
336.4
333.78
334.1
334.00
334.3
335.1
335.3
335.5
336.0
336.2
336.4
336.2
149+00
150+00
151+00
152+00
153+00
154+00

06/27/23 | 8:37 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRP100-109.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

HDR

LINE IS 1" AT FULL SCALE

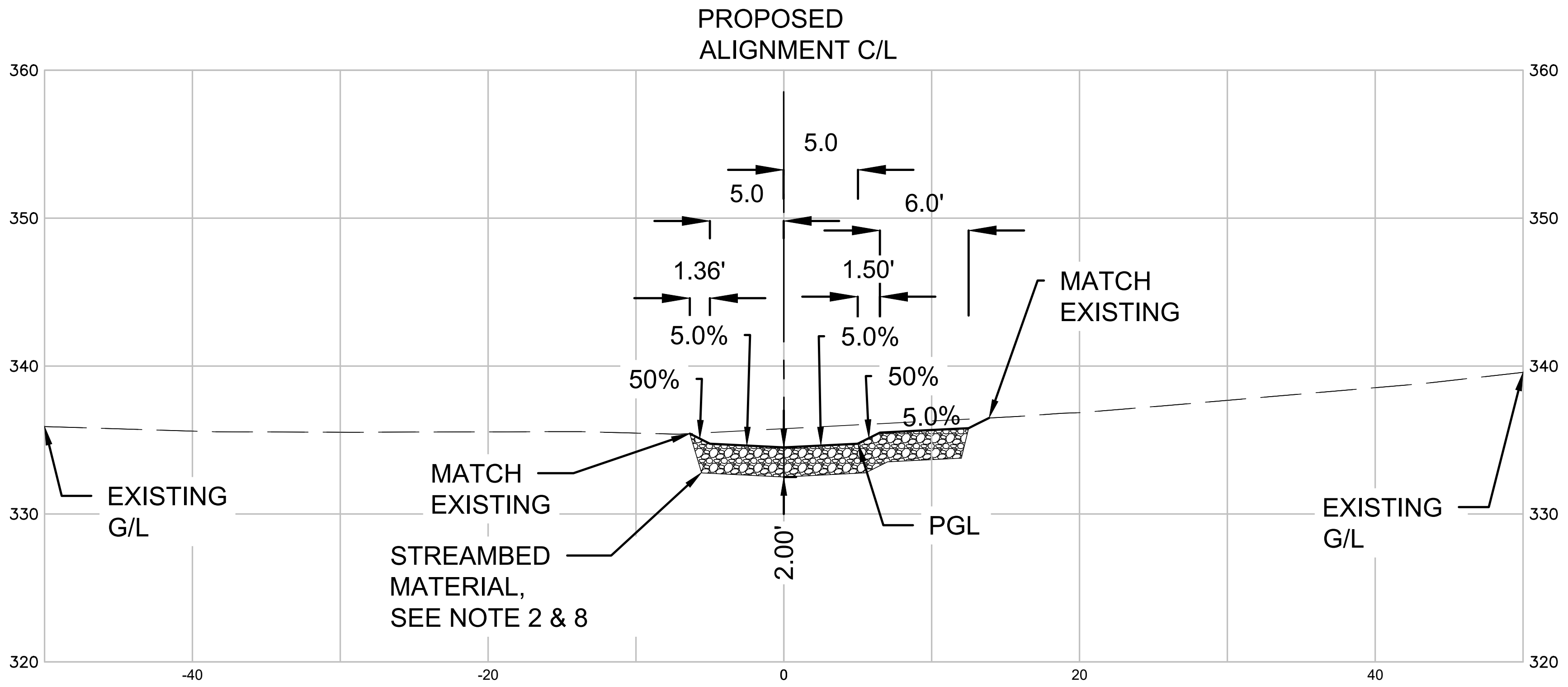
SOUNDTRANSIT

SUBMITTED BY:	DATE:	REVIEWED BY:	DATE:
PABLO LOPEZ-HILFIKER	07/03/2023		07/03/2023

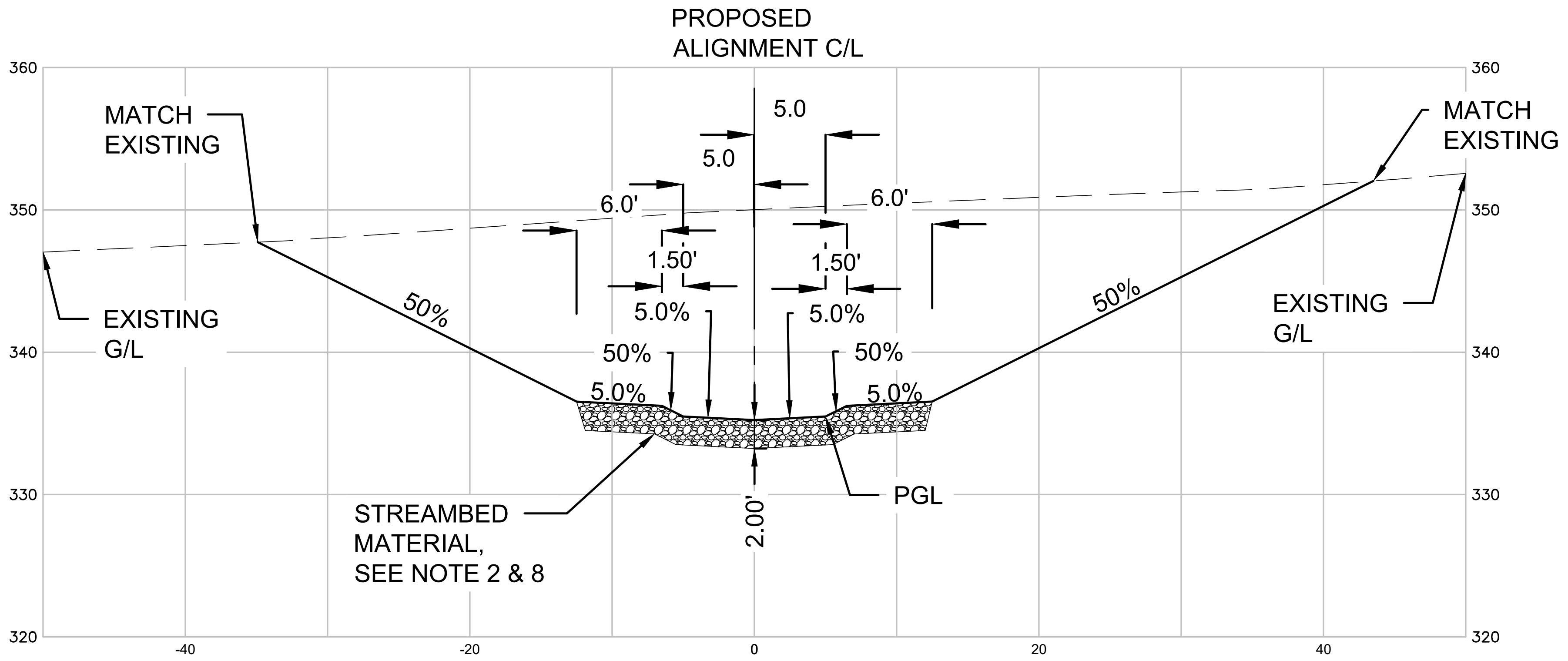
SCALE: H: 1"=20'; V: 1"=5'
FILENAME: OMFS-M08-SRP100-109
CONTRACT No.:
DATE: 7/3/2023

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

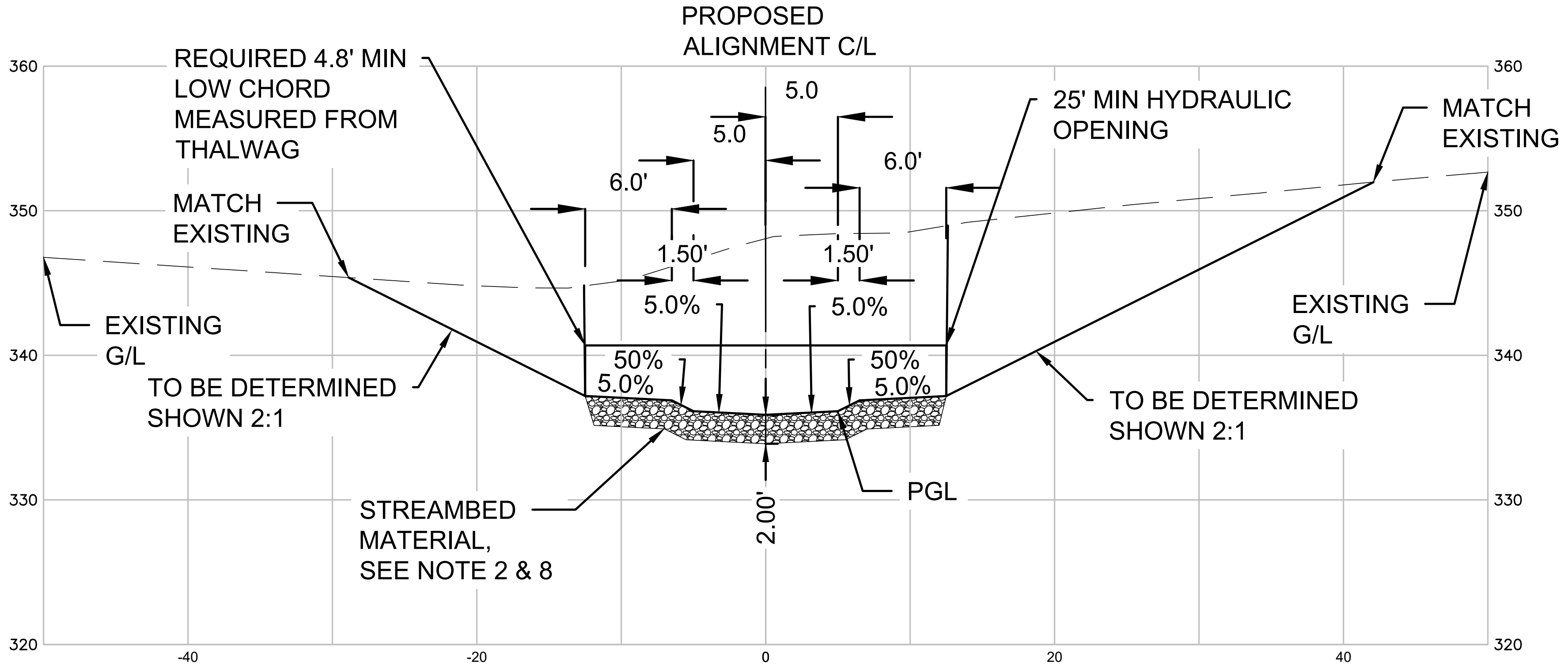
WEST FORK HYLEBOS CREEK TRIB 0014C
PLAN AND PROFILE STA 150+00 TO 154+00


PROPOSED ALIGNMENT C/L
5.0
5.0
6.0'
1.36'
1.50'
5.0%
5.0%
50%
50%
5.0%
MATCH EXISTING
MATCH EXISTING
EXISTING G/L
EXISTING G/L
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
360
350
340
330
320
-40
-20
0
20
40

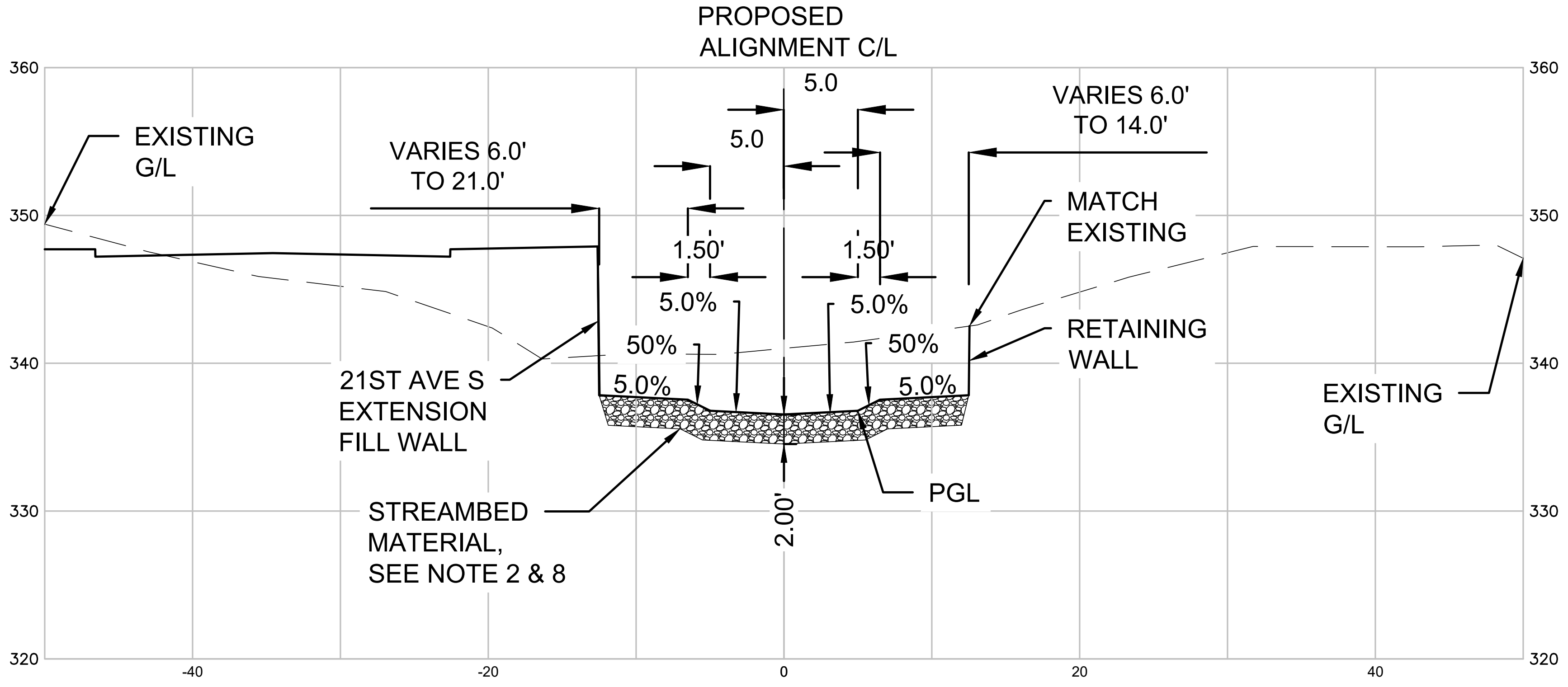
TYPICAL SECTION
STA 100+15 TO STA 100+50 (A)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
5.0
5.0
6.0'
6.0'
1.50'
1.50'
5.0%
5.0%
50%
50%
5.0%
5.0%
50%
50%
MATCH EXISTING
MATCH EXISTING
EXISTING G/L
EXISTING G/L
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
360
350
340
330
320
-40
-20
0
20
40

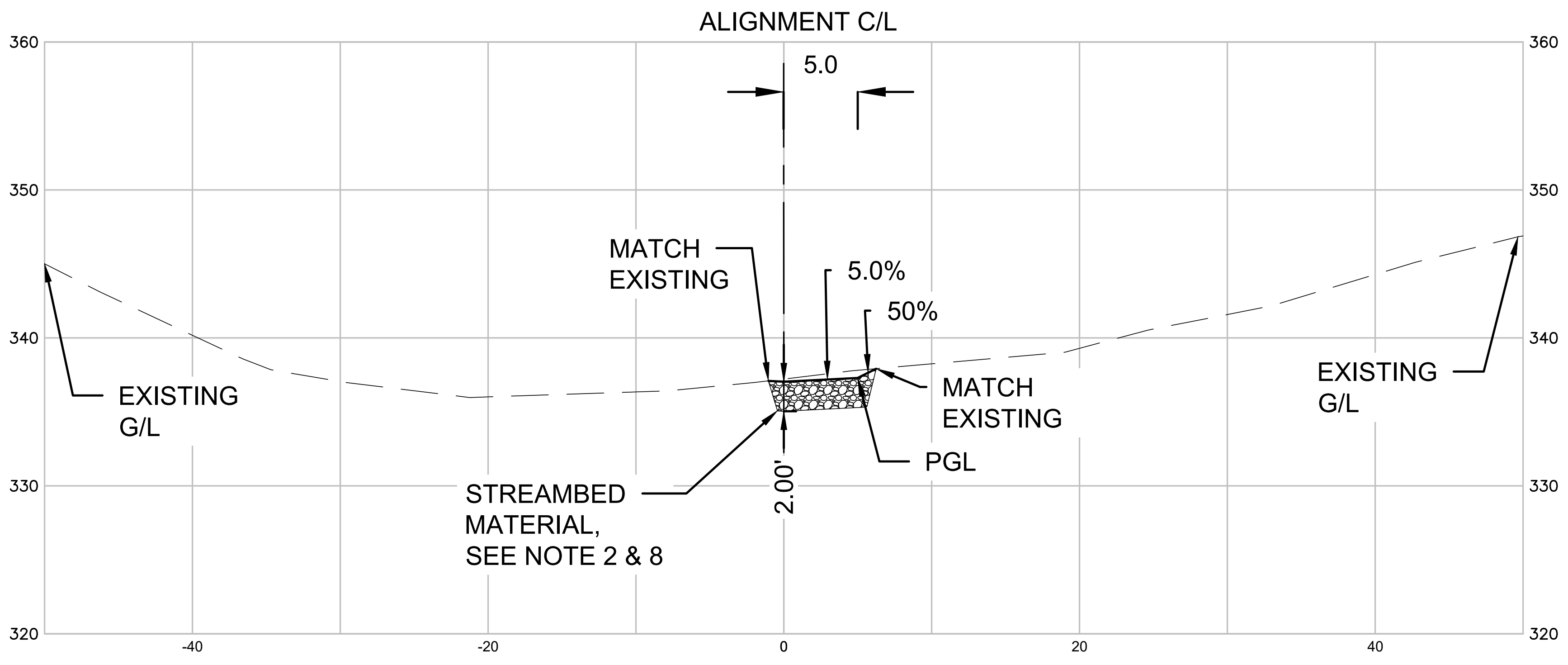
TYPICAL SECTION
STA 100+50 TO STA 102+86 (B)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
REQUIRED 4.8' MIN LOW CHORD MEASURED FROM THALWAG
25' MIN HYDRAULIC OPENING
5.0
5.0
6.0'
6.0'
1.50'
1.50'
5.0%
5.0%
50%
50%
5.0%
5.0%
MATCH EXISTING
MATCH EXISTING
EXISTING G/L
EXISTING G/L
TO BE DETERMINED SHOWN 2:1
TO BE DETERMINED SHOWN 2:1
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
360
350
340
330
320
-40
-20
0
20
40

STRUCTURE 1
TYPICAL SECTION
STA 102+86 TO STA 103+70 (C)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
5.0
5.0
VARIES 6.0' TO 21.0'
VARIES 6.0' TO 14.0'
1.50'
1.50'
5.0%
5.0%
50%
50%
5.0%
5.0%
EXISTING G/L
EXISTING G/L
MATCH EXISTING
RETAINING WALL
21ST AVE S EXTENSION FILL WALL
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
360
350
340
330
320
-40
-20
0
20
40

TYPICAL SECTION
STA 103+70 TO STA 106+08 (D)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
5.0
MATCH EXISTING
5.0%
50%
MATCH EXISTING
EXISTING G/L
EXISTING G/L
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
360
350
340
330
320
-40
-20
0
20
40

TYPICAL SECTION
STA 106+08 TO STA 106+28 (E)
SCALE: 1"=10'

06/26/23 | 9:41 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRX101-104.DWG

AHJ:

PACKAGE #

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 02/14/2023
REVIEWED BY:
DATE: 02/14/2023

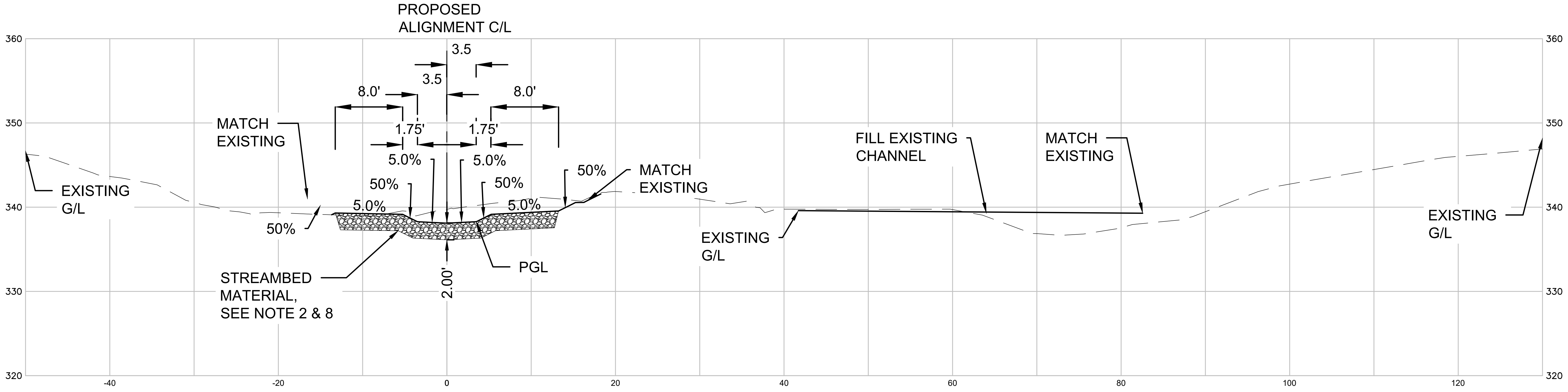
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

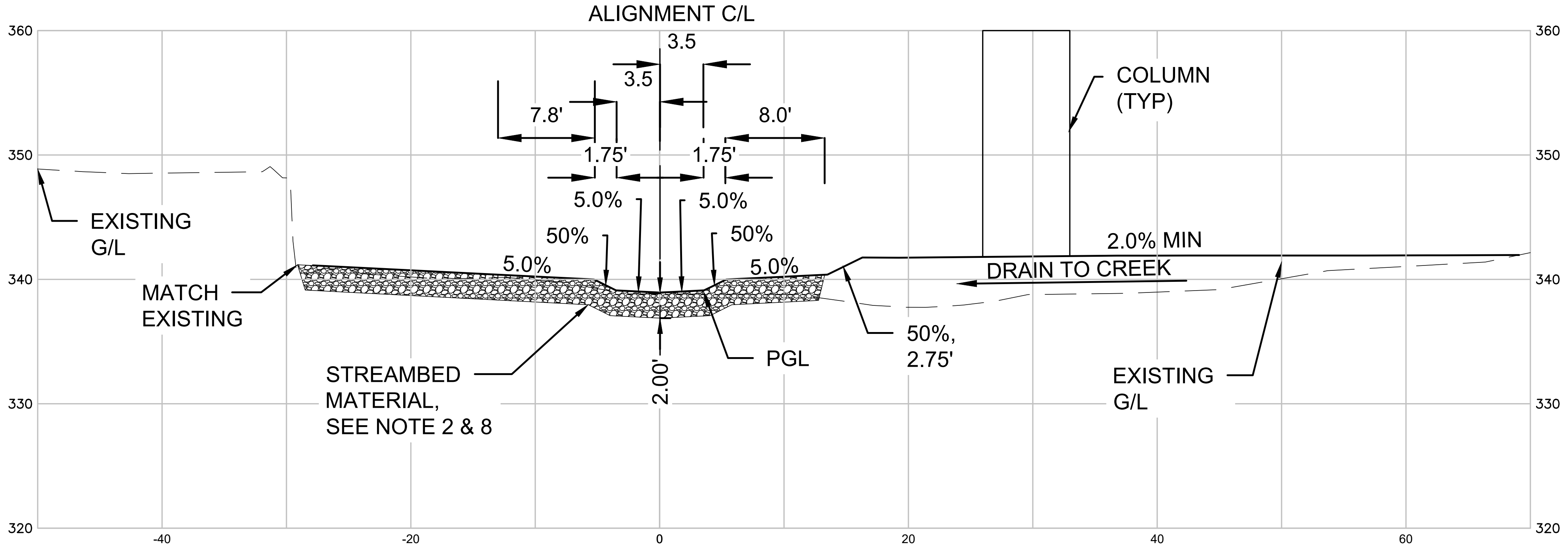
SCALE: 1"=10'
FILENAME: OMFS-M08-SRX101-104
CONTRACT No.:
DATE: 2023/02/14

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

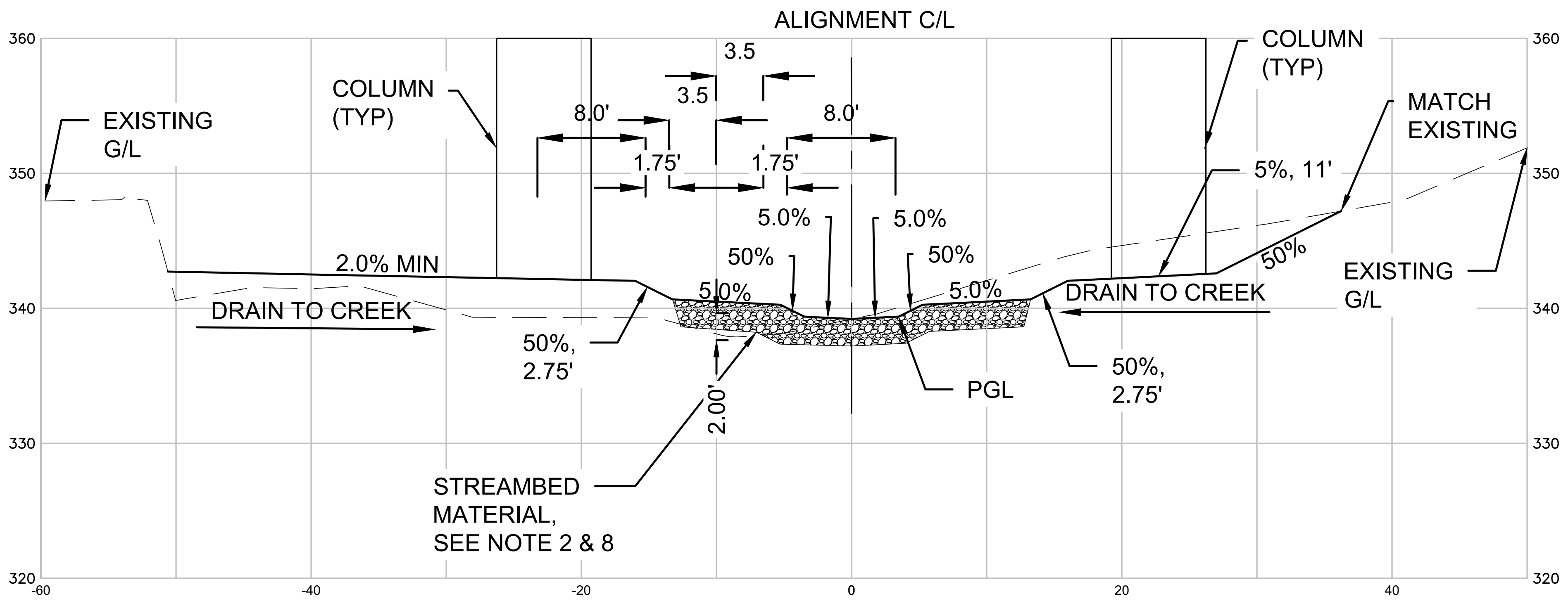
EAST FORK HYLEBOS CREEK TRIB 0016A


PROPOSED ALIGNMENT C/L
3.5
3.5
8.0'
8.0'
1.75'
1.75'
5.0%
5.0%
50%
50%
5.0%
5.0%
50%
50%
MATCH EXISTING
MATCH EXISTING
EXISTING G/L
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
EXISTING G/L
FILL EXISTING CHANNEL
MATCH EXISTING
EXISTING G/L
360
350
340
330
320
-40
-20
0
20
40
60
80
100
120

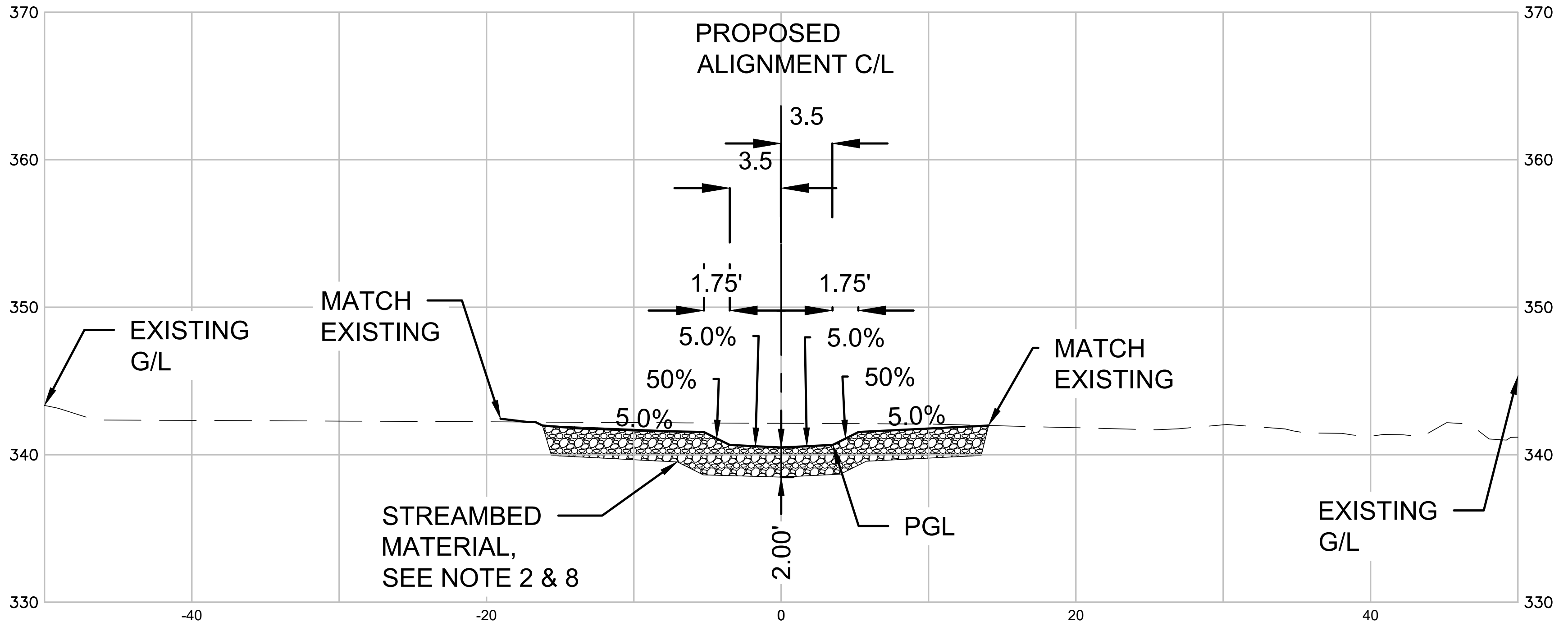
TYPICAL SECTION
STA 110+99 TO STA 111+53
STA 115+98 TO STA 120+01
STA 122+72 TO STA 124+64
STA 131+54 TO STA 133+39 (F)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
3.5
3.5
7.8'
8.0'
1.75'
1.75'
5.0%
5.0%
50%
50%
5.0%
5.0%
COLUMN (TYP)
2.0% MIN
DRAIN TO CREEK
EXISTING G/L
MATCH EXISTING
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
50%, 2.75'
EXISTING G/L
360
350
340
330
320
-40
-20
0
20
40
60

TYPICAL LEFT BANK
COLUMN SECTION
STA 111+53 TO STA 114+58 (G)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
COLUMN (TYP)
COLUMN (TYP)
3.5
3.5
8.0'
8.0'
1.75'
1.75'
EXISTING G/L
MATCH EXISTING
5%, 11'
5.0%
5.0%
50%
50%
50%
5.0%
5.0%
2.0% MIN
DRAIN TO CREEK
DRAIN TO CREEK
EXISTING G/L
50%, 2.75'
50%, 2.75'
PGL
2.00'
STREAMBED MATERIAL, SEE NOTE 2 & 8
360
350
340
330
320
-60
-40
-20
0
20
40

TYPICAL LEFT AND RIGHT
COLUMN SECTION
STA 114+58 TO STA 115+98 (H)
SCALE: 1"=10'


PROPOSED ALIGNMENT C/L
3.5
3.5
1.75'
1.75'
5.0%
5.0%
50%
50%
5.0%
5.0%
EXISTING G/L
MATCH EXISTING
MATCH EXISTING
STREAMBED MATERIAL, SEE NOTE 2 & 8
2.00'
PGL
EXISTING G/L
370
360
350
340
330
-40
-20
0
20
40

TYPICAL SECTION
STA 120+01 TO STA 122+72
STA 135+12 TO STA 135+54 (I)
SCALE: 1"=10'

06/26/23 | 9:41 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRX101-104.DWG

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

AHJ:

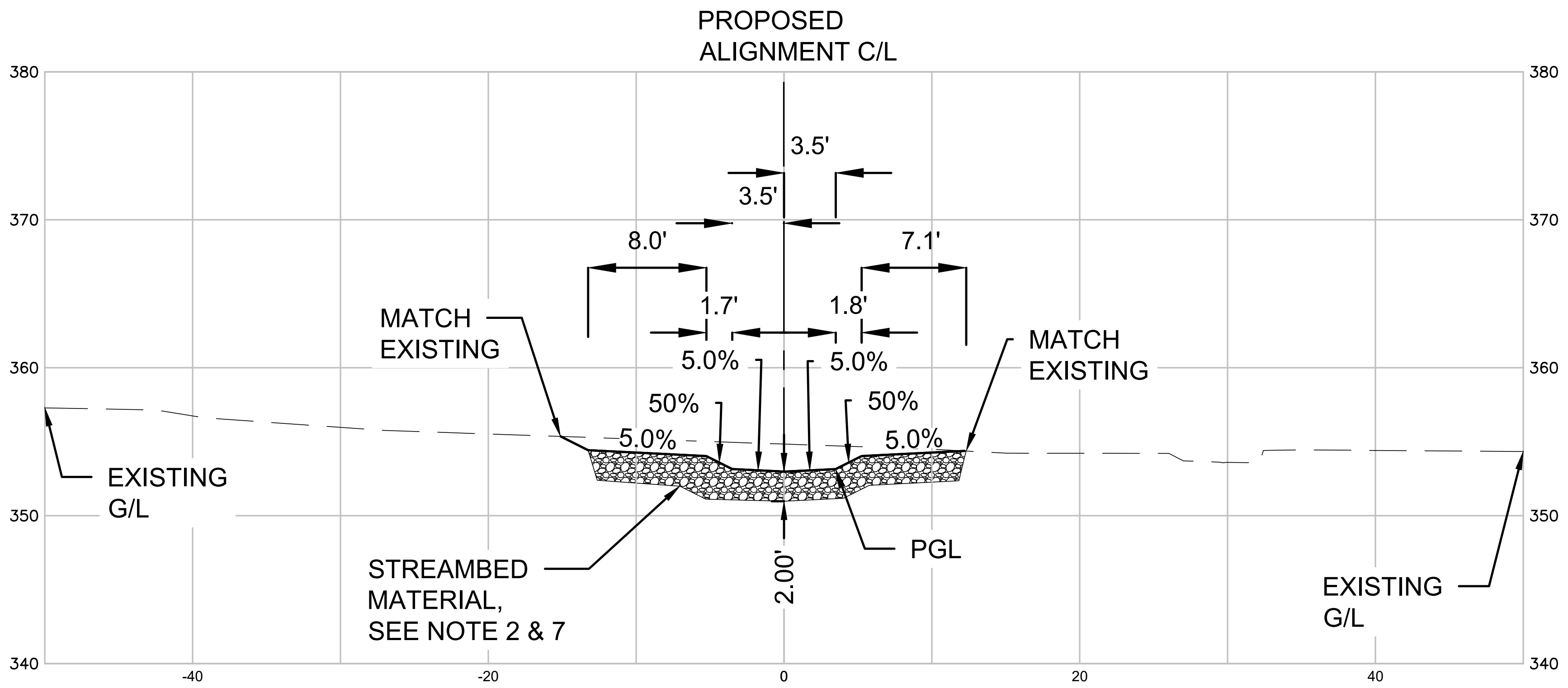
SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 02/14/2023
REVIEWED BY:
DATE: 02/14/2023

LINE IS 1" AT FULL SCALE

PACKAGE #
SCALE: 1"=10'
FILENAME: OMFS-M08-SRX101-104
CONTRACT No.:
DATE: 2023/02/14

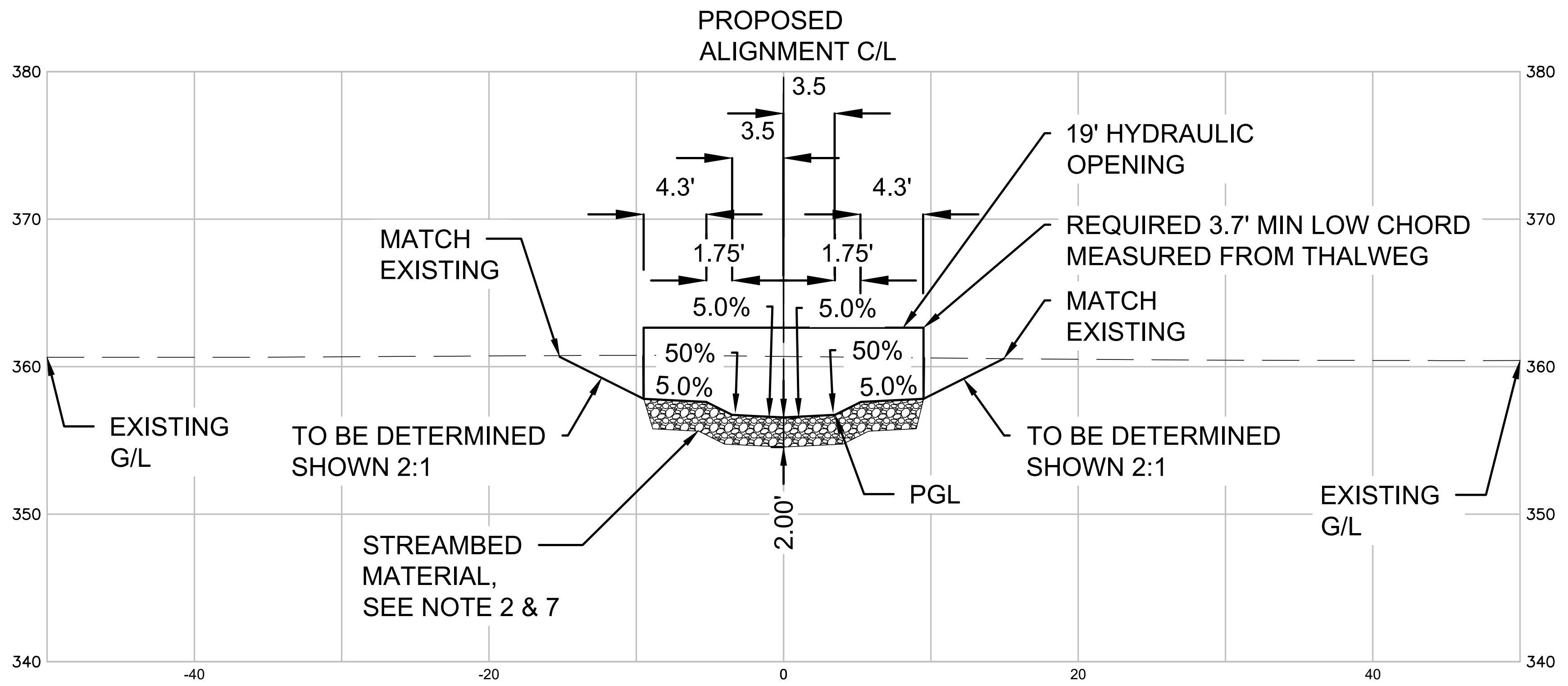
PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A


PROPOSED
ALIGNMENT C/L
3.5'
3.5'
8.0'
7.1'
1.7'
1.8'
MATCH
EXISTING
MATCH
EXISTING
5.0%
5.0%
50%
50%
5.0%
5.0%
EXISTING
G/L
STREAMBED
MATERIAL,
SEE NOTE 2 & 7
2.00'
PGL
EXISTING
G/L
380
370
360
350
340
-40
-20
0
20
40

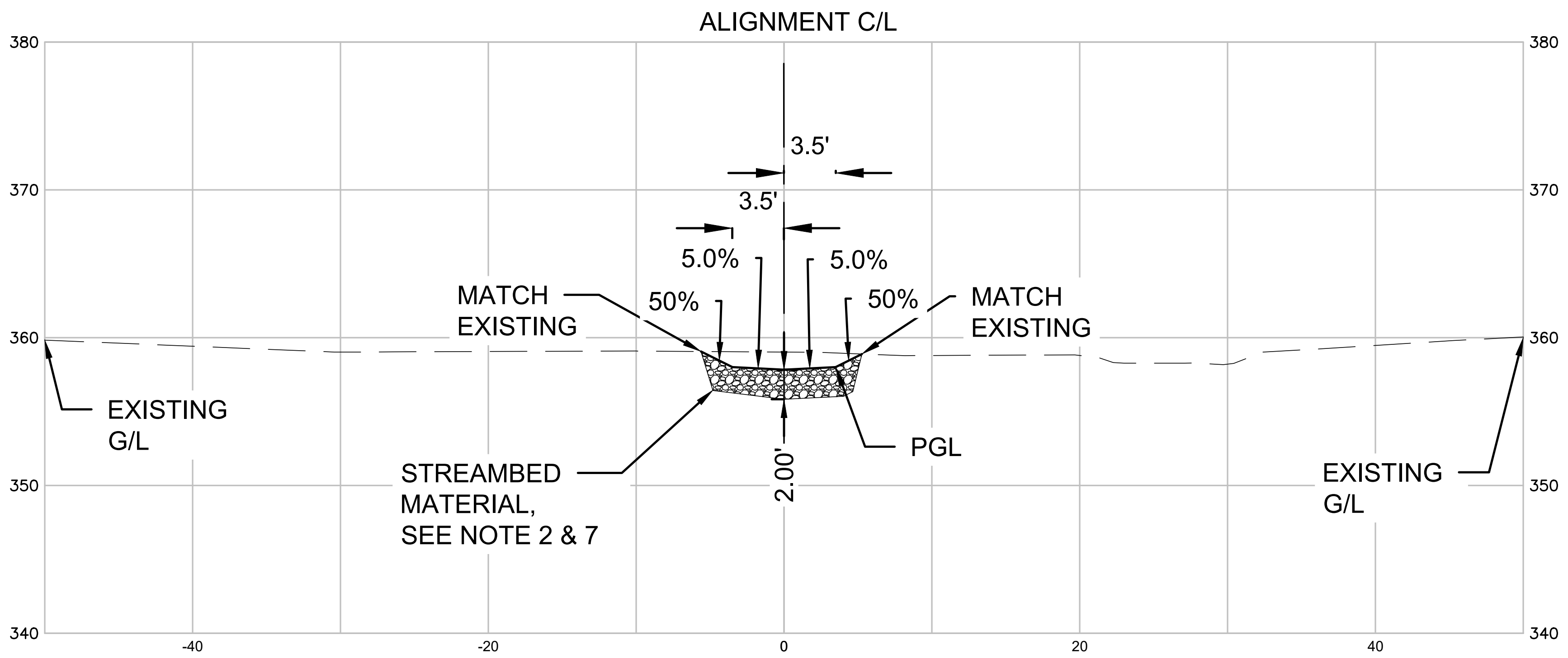
TYPICAL SECTION
STA 130+26 TO STA 131+54
STA 134+08 TO STA 134+76 (J)

SCALE: 1"=10'


PROPOSED
ALIGNMENT C/L
3.5
3.5
4.3'
4.3'
1.75'
1.75'
19' HYDRAULIC
OPENING
REQUIRED 3.7' MIN LOW CHORD
MEASURED FROM THALWEG
MATCH
EXISTING
MATCH
EXISTING
5.0%
5.0%
50%
50%
5.0%
5.0%
EXISTING
G/L
TO BE DETERMINED
SHOWN 2:1
TO BE DETERMINED
SHOWN 2:1
PGL
EXISTING
G/L
2.00'
STREAMBED
MATERIAL,
SEE NOTE 2 & 7
380
370
360
350
340
-40
-20
0
20
40

STRUCTURE 2
TYPICAL SECTION
STA 133+49 TO STA 134+08 (K)

SCALE: 1"=10'


PROPOSED
ALIGNMENT C/L
3.5'
3.5'
5.0%
5.0%
MATCH
EXISTING
50%
50%
MATCH
EXISTING
EXISTING
G/L
STREAMBED
MATERIAL,
SEE NOTE 2 & 7
2.00'
PGL
EXISTING
G/L
380
370
360
350
340
-40
-20
0
20
40

TYPICAL SECTION
STA 129+83 TO STA 130+26
STA 134+76 TO STA 135+12 (L)

SCALE: 1"=10'

06/26/23 | 9:41 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRX101-104.DWG

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY: R. AINSLIE
DRAWN BY: B. WILLIAMS
CHECKED BY: S. BEVAN
APPROVED BY:

AHJ:

HDR

SUBMITTED BY: PABLO LOPEZ-HILFIKER
DATE: 02/14/2023
REVIEWED BY:
DATE: 02/14/2023

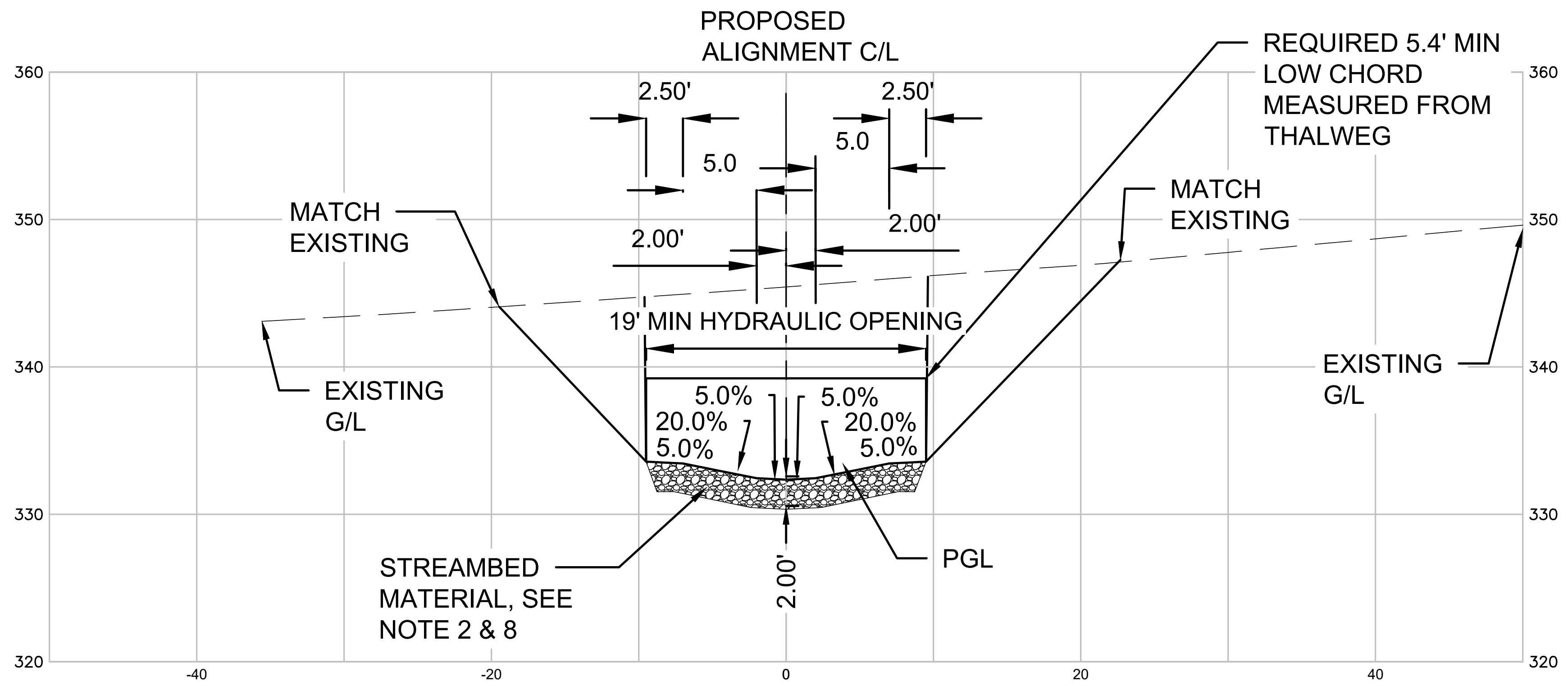
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

PACKAGE #
SCALE: 1"=10'
FILENAME: OMFS-M08-SRX101-104
CONTRACT No.:
DATE: 2023/02/14

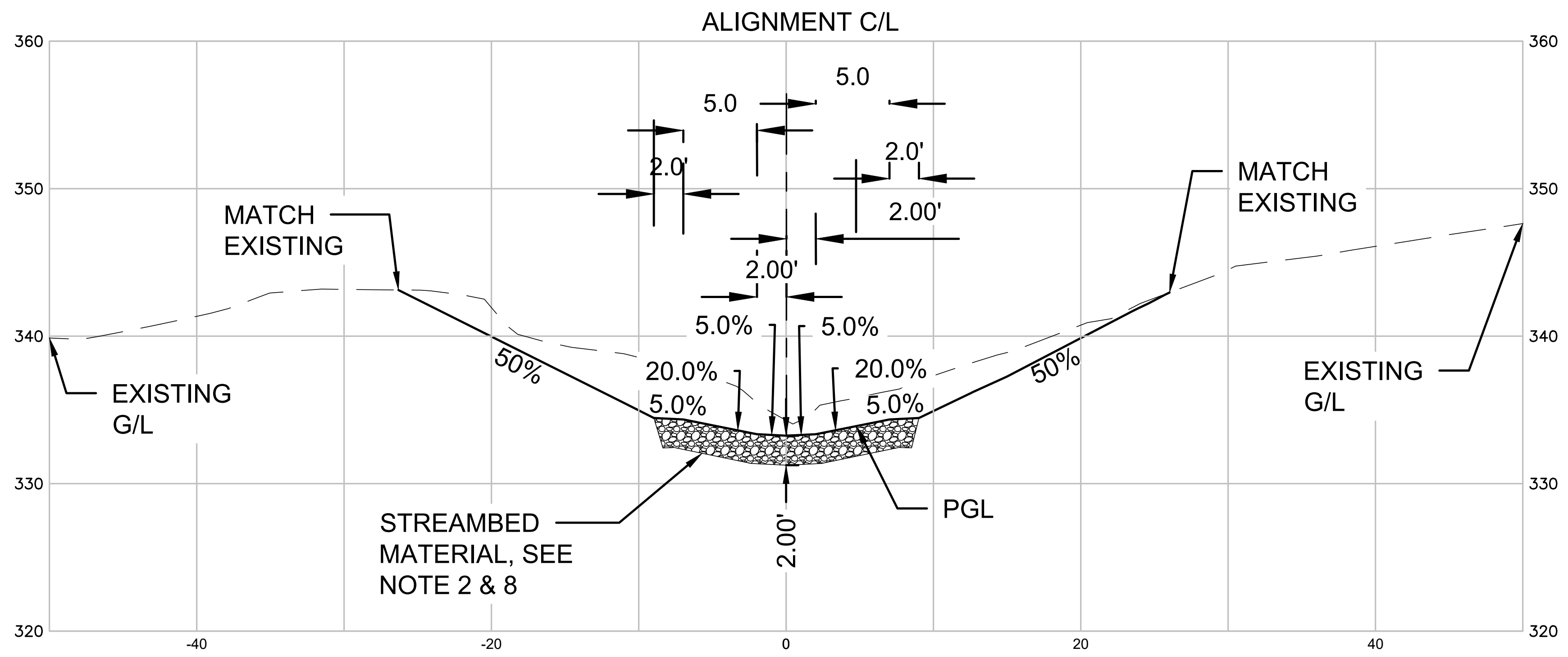
PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

EAST FORK HYLEBOS CREEK TRIB 0016A


PROPOSED
ALIGNMENT C/L
REQUIRED 5.4' MIN
LOW CHORD
MEASURED FROM
THALWEG
2.50'
2.50'
5.0
5.0
2.00'
2.00'
MATCH
EXISTING
MATCH
EXISTING
19' MIN HYDRAULIC OPENING
EXISTING
G/L
EXISTING
G/L
5.0%
5.0%
20.0%
20.0%
5.0%
5.0%
STREAMBED
MATERIAL, SEE
NOTE 2 & 8
PGL
2.00'
360
350
340
330
320
-40
-20
0
20
40

STRUCTURE 3
TYPICAL SECTION
STA 150+46 TO STA 151+36 (A)

SCALE: 1"=10'


PROPOSED
ALIGNMENT C/L
5.0
5.0
2.0'
2.0'
2.00'
2.00'
MATCH
EXISTING
MATCH
EXISTING
5.0%
5.0%
50%
50%
20.0%
20.0%
5.0%
5.0%
EXISTING
G/L
EXISTING
G/L
STREAMBED
MATERIAL, SEE
NOTE 2 & 8
PGL
2.00'
360
350
340
330
320
-40
-20
0
20
40

TYPICAL SECTION
STA 151+36 TO STA 152+46 (B)

SCALE: 1"=10'

06/26/23 | 9:41 AM | WILLIBRE
C:\PWWORKING\WEST01\D2910569\OMFS-M08-SRX101-104.DWG

PRE-FINAL SUBMITTAL

No.	DATE	DSN	CHK	APP	REVISION

DESIGNED BY:
R. AINSLIE
DRAWN BY:
B. WILLIAMS
CHECKED BY:
S. BEVAN
APPROVED BY:

AHJ:

HDR

SUBMITTED BY:
PABLO LOPEZ-HILFIKER
DATE:
02/14/2023
REVIEWED BY:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

DATE:
02/14/2023

PACKAGE #

SCALE:
1"=10'
FILENAME:
OMFS-M08-SRX101-104
CONTRACT No.:
DATE:
2023/02/14

PRELIMINARY ENGINEERING PLANS
OPERATIONS & MAINTENANCE FACILITY SOUTH

WEST FORK HYLEBOS CREEK TRIB 0014C

APPENDIX E

USFWS OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405

In Reply Refer To:
Project Code: 2023-0047264
Project Name: Operations and Maintenance Facility South

November 27, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

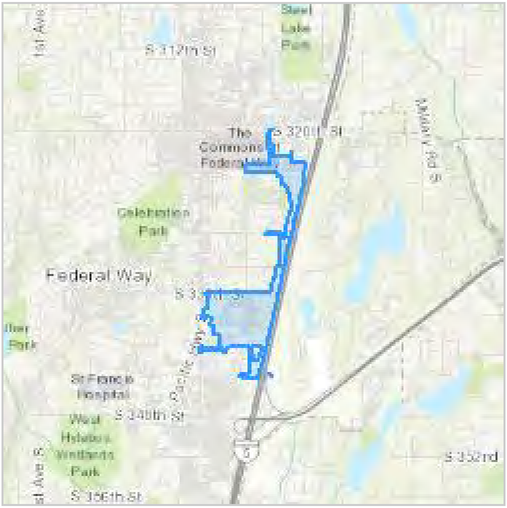
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

PROJECT SUMMARY

Project Code:	2023-0047264
Project Name:	Operations and Maintenance Facility South
Project Type:	Railroad - New Construction
Project Description:	The purpose of the Central Puget Sound Regional Transit Authority (Sound Transit) Operations and Maintenance Facility South (OMF South) project is to construct an operations and maintenance facility (OMF) in the South Corridor to support Sound Transit's Link light rail system expansion. This expansion and the related increase in the light rail vehicle (LRV) fleet and daily operations is identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would: - Provide a facility with the capacity to receive, test, commission, store, maintain, and deploy vehicles to support the intended level of service for the system-wide light rail system expansion. - Support efficient and reliable light rail service that minimizes system operating costs. - Support and connect efficiently to the regional system and be technically and financially feasible to build, operate, and maintain, consistent with the Sound Transit 3 Plan and Sound Transit's Regional Transit Long-Range Plan. - Preserve and promote a healthy and sustainable environment by minimizing adverse impacts to people and the natural and built environments. Project elements would include: construction of over a mile of elevated track and guideway between the terminus of the Federal Way Light Rail Extension in Federal Way, Washington (currently under construction) and the proposed OMFS between 336th Street South and 344th Street South; construction of the operations and maintenance facility, test tracks, stormwater management facilities, culvert replacements, stream channel modifications, compensatory mitigation, and clearing, grading and fill necessary to accommodate the abovementioned actions.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@47.304488649999996,-122.30251289530742,14z


Steel Lake Park
1st Ave
S 312th St
S 320th St
The Commons at Federal Way
Celebration Park
Federal Way
S 336th St
Military Rd S
St Francis Hospital
Pacific Hwy S
S 348th St
West Hylebos Wetlands Park
S 356th St
S 352nd
5

Counties: King County, Washington

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

BIRDS

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark *Eremophila alpestris strigata* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

REPTILES

NAME	STATUS
Northwestern Pond Turtle *Actinemys marmorata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

FISHES

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., conterminous, lower 48 states There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Taylor's (=whulge) Checkerspot *Euphydryas editha taylori* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5907	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Parametrix
Name: Steven Krueger
Address: 719 2nd Avenue, Suite 200
City: Seattle
State: WA
Zip: 98104
Email skrueger@parametrix.com
Phone: 2068417839

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Transportation

Operations and Maintenance Facility South

APPENDIX F

PROJECT AREA PHOTOGRAPHS

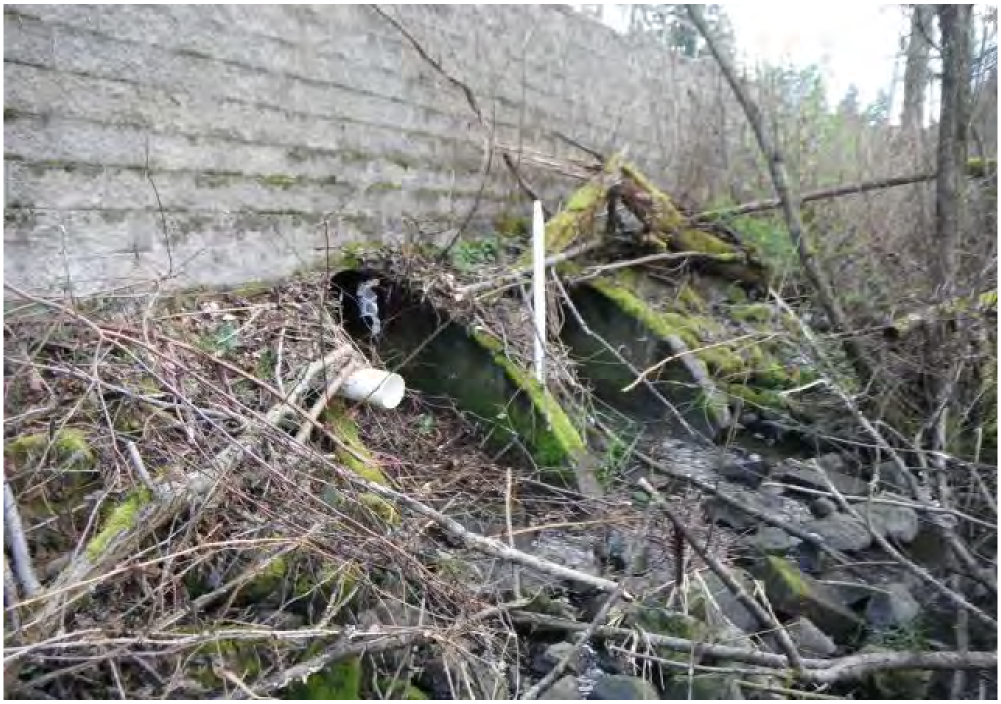


Photo 1: West Fork Hylebos Creek Tributary 0014C, looking at downstream end of S 336th Street Crossing and as it enters large detention facility between S 336th Street and SR 99

Photo 2: Interior of detention facility – No defined channel of West Fork Hylebos Creek Tributary 0014C (October 10, 2019)

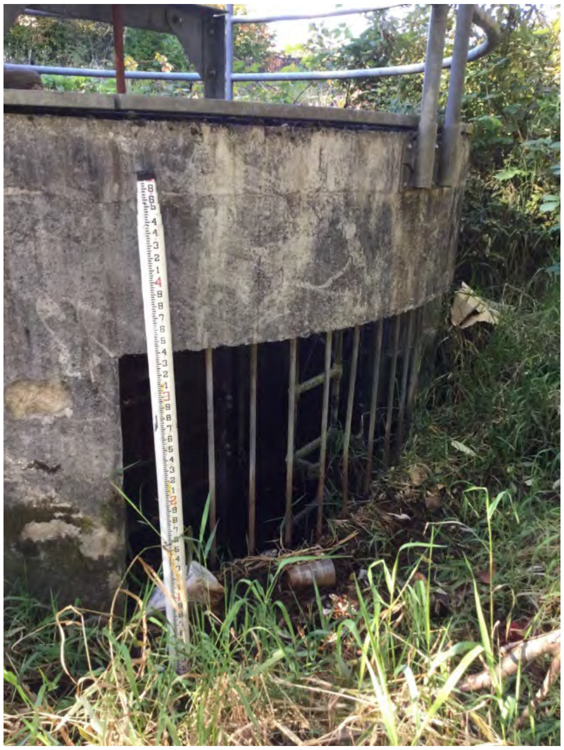


Photo 3: Outlet of Detention facility and West Fork Hylebos Creek Tributary 0014C prior to being piped beneath SR 99 (October 10, 2019)

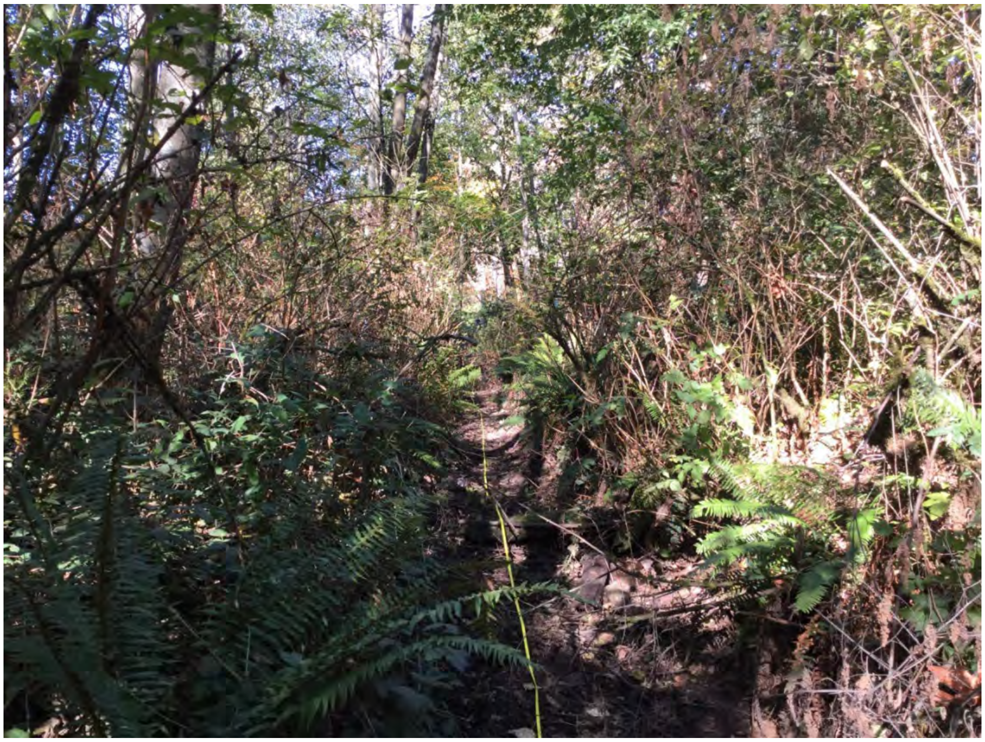


Photo 4: **Dry channel of the East Fork Hylebos Creek Tributary 0016A south of South 336th Street (October 9, 2019)**

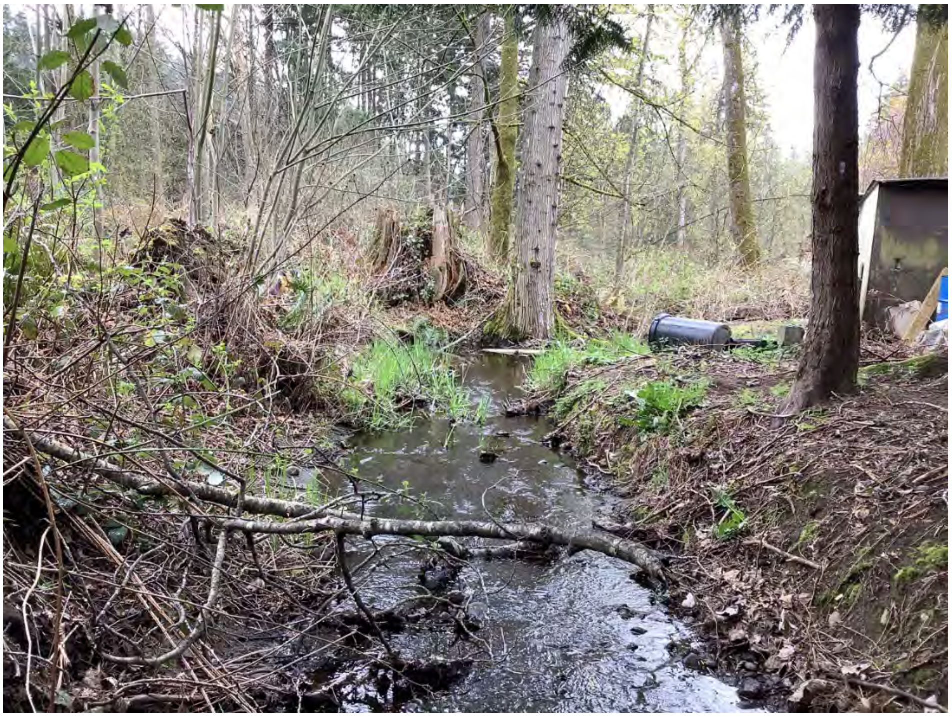


Photo 5: **East Fork Hylebos Creek upstream of S 336th Street (April 20, 2023)**

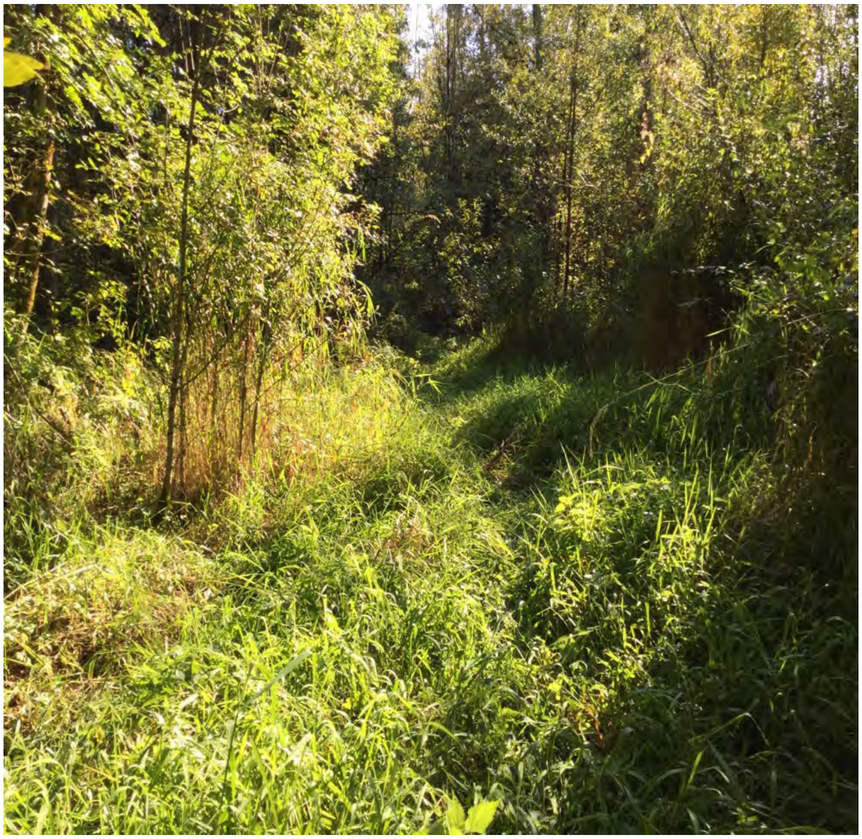


Photo 6: East Fork Hylebos Creek Tributary 0016A looking downstream as channel loses definition through riverine wetland (WFW-01) south of S 336th Street (October 9, 2019)

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix J: Environmental Mitigation Plan

SOUND TRANSIT
140A
Link
154B
SOUND

Federal Transit Administration

SOUNDTRANSIT

June 2024

Appendix J: Environmental Mitigation Plan

This appendix lists the environmental mitigation commitments identified in the Final Environmental Impact Statement (EIS) that would be implemented to mitigate the impacts of the Preferred Alternative identified in the Final EIS. Many of the potential impacts identified through the EIS process will be mitigated through incorporation of avoidance, minimization, or improvement elements that are now included in the definition and design of the project. If the Sound Transit Board ultimately selects another alternative to build differing from the Preferred Alternative, the mitigation plan will be modified accordingly.

Table J-1 describes the mitigation measures associated with the operating (long-term) impacts of OMF South first, then the measures associated with construction. The final mitigation measures will be included as conditions of the Federal Transit Administration's (FTA) Record of Decision (ROD) for the project. FTA will incorporate them in any future grant agreement that FTA may award Sound Transit for construction of OMF South. Sound Transit will track these measures and report regularly to FTA to ensure that the mitigation commitments are being met. Where appropriate, Sound Transit will incorporate mitigation requirements into its contracting documents for final design and construction.

The commitments described in Table J-1 are based on those listed in the Final EIS for the Preferred Alternative. After the Sound Transit Board selects the project to be built, and as the project moves into final design, these measures may be revised, and additional measures or design features may be identified and added to the ROD to address project impacts associated with operations or construction. As additional measures are identified or revised during the final design of the project, FTA would review such measures to ensure that they are consistent with previously awarded federal grants.

Some of the environmental mitigation commitments listed in Table J-1 would require coordination with other parties, such as state and federal agencies or local jurisdictions, as part of the project's permitting or approvals process. These outside agencies and jurisdictions may request additional or other measures than those proposed in the EIS, which would require further coordination.

Measures to avoid potential impacts to the environment would continue to be identified as the project advances to final design. Measures to minimize potential impacts, such as best management practices (BMPs) or other protocols that are typically included in the project during construction, are already documented and included in Sound Transit's general construction specifications and conditions.

For the purposes of identifying environmental mitigation commitments, mitigation is generally required when an environmental impact or effect is determined to be significant and adverse. Measures to avoid or minimize project effects are already part of Sound Transit's established policies, design criteria standards, or procedures, and general construction specifications. These measures would automatically be included as part of the project. Mitigation commitments identified in this Environmental Mitigation Plan will be monitored, implemented, and periodically reported to the lead environmental officials.

Table J-1 Mitigation Plan

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Transportation	3.2	Arterial and Street Operations	Long-Term	No mitigation required.
			Construction	A construction transportation management plan would be implemented to address site access, traffic control, hauling routes, impacts to transit, construction employee parking, impacts to local businesses, and pedestrian and bicycle control. This plan would be developed in coordination with Federal Way and Washington State Department of Transportation (WSDOT).
		Freight Mobility	Long-Term	No mitigation required.
			Construction	No mitigation required.
		Transit	Long-Term	No mitigation required.
			Construction	Transit service modifications would be coordinated with King County Metro to minimize construction impacts and disruptions to bus facilities and service. This could include posting informational signage before construction at existing transit stops that would be affected by construction activities. Prior to closing a portion of the Federal Way/S 320th Street Park & Ride for construction, Sound Transit would work with King County Metro and WSDOT to determine its utilization rates and that of the nearby Federal Way Downtown Station. If the lots are at or near capacity, Sound Transit would implement alternative measures, such as routing transit riders that use these locations to available spaces at nearby park-and-ride lots, such as the Star Lake Park & Ride, or leasing parking lots or new parking areas within the vicinity of the temporarily closed lot.
		Nonmotorized Facilities	Long-Term	No mitigation required.
			Construction	No mitigation required.
		Parking	Long-Term	No mitigation required.
			Construction	No mitigation required.
		Safety	Long-Term	No mitigation required.
			Construction	No mitigation required.

Table J-1 Mitigation Plan (continued)

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Acquisitions, Displacements, and Relocations	3.3	Displacements	Long-Term	Sound Transit would compensate affected property owners that are displaced by the project. This compensation would comply with Sound Transit's Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines; the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the "Uniform Act"); and the State of Washington's relocation and property acquisition laws and regulations, including Revised Code of Washington (RCW) 8.26 and Washington Administrative Code (WAC) 468-100. In addition to compensating property owners for property rights, other forms of compensation, including moving expenses, replacement housing payments, nonresidential reestablishment, and other eligible expenses, could be provided. Sound Transit would consult with WSDOT staff to develop appropriate site-specific measures and off-site mitigation, agreed to by WSDOT and the Federal Highway Administration (FHWA), that would meet the intended function of the original Resource Conservation Areas (RCAs).
			Construction	No mitigation required.
Land Use	3.4	Land Use	Long-Term	No mitigation required.
			Construction	No mitigation required.
Economics	3.5	Local Businesses	Long-Term	No mitigation required.
			Construction	During construction Sound Transit would develop measures to address the potential impacts to local businesses, these measures could include: • Providing a 24-hour construction telephone hotline. • Establishing effective communications with the public through measures such as meetings and construction updates, alerts, and published schedules. • Providing an ombudsman consistent with Sound Transit policy. • Providing detour, open-for-business, and other signage as appropriate. • Maintaining access as much as possible to each business and coordinating in advance with businesses during times of limited access.
Environmental Justice, Social Resources, Community Facilities, and Neighborhoods	3.6	Social	Long-Term	Mitigation would include that identified for Transportation, Acquisition, Displacements and Relocations, Visual and Aesthetic Resources, and Noise and Vibration.
			Construction	No mitigation required.

Table J-1 Mitigation Plan (continued)

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Visual and Aesthetic Resources	3.7	Visual	Long-Term	In addition to design criteria for the final project, specific environmental mitigation commitments will be implemented to reduce long-term visual impacts of the project. These include the following: • **Mitigation Measure 1:** In areas adjacent to residents where there is adequate space, add on-site landscaping adjacent to residential areas to help screen views of project components while ensuring safety and security of residents. • **Mitigation Measure 2**: In areas adjacent to residences where not enough room exists for landscaping to screen views of retaining or noise walls, or in addition to landscaping under Mitigation Measure 1, Sound Transit would treat the walls with visually interesting elements, such as design treatments that incorporate textures, patterns, color, or climbing vines. • **Mitigation Measure 3:** Within the WSDOT right-of-way, Sound Transit would consult with WSDOT to develop appropriate site-specific measures for roadside vegetated areas and mitigate the conversion of these areas to right-of-way with replacement property or with other measures agreed to by WSDOT and FHWA, consistent with the WSDOT Roadside Policy Manual (WSDOT 2022). The manual describes the extent of mitigation that would be required for lost vegetation, vegetation types, and tree replacement ratios, including irrigation requirements and plant establishment criteria. Sound Transit would refine the environmental mitigation commitments as the project design is further developed and feedback from reviewing agencies and the public is received. Environmental mitigation commitments would be compatible with Sound Transit's maintenance and operations requirements, which include long-term maintenance, safety, and security consideration.
			Construction	Where practicable, Sound Transit would place construction screens and/or barriers to limit the visibility of work areas when adjacent to visually sensitive receivers.
Air Quality and Greenhouse Gas Emissions	3.8	Air Quality	Long-Term	No mitigation required.
			Construction	No mitigation required.

Table J-1 Mitigation Plan (continued)

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Noise and Vibration	3.9	Light rail noise	Long-Term	When noise would exceed Federal Transit Administration (FTA) moderate or severe impact criteria, Sound Transit would provide noise environmental mitigation commitments consistent with its Link Light Rail Noise and Vibration Policy (Resolution No. R2023-15) and FTA's 2018 Transit Noise and Vibration Impact Assessment Manual. During final design, an updated Noise and Vibration analysis will be prepared to confirm impacts during operations, incorporating any design changes. All predicted noise levels and environmental mitigation commitments will be reviewed, and mitigation would be modified as needed to reduce noise levels to below the FTA impact criteria. If equivalent mitigation could be achieved by a less costly means or if the final design analysis shows no impact, then the mitigation measure may be modified or eliminated. After light rail operations begin, if the resulting noise were to exceed FTA criteria, Sound Transit would evaluate the need for additional mitigation.
		Vibration and ground borne noise	Long-Term	No mitigation required.
		Traffic Noise	Long-Term	Sound Transit will provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing WSDOT berm and noise wall. Mitigation would be designed to maintain 2042 No-Build noise levels and could include replacement of noise walls and berms. Sound Transit would conduct additional noise analysis during final design in coordination with WSDOT to confirm whether noise mitigation is needed.
		Construction noise and vibration	Construction	Sound Transit will require a detailed Noise and Vibration control plan from the contractor as part of construction.

Table J-1 Mitigation Plan (continued)

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Ecosystem Resources	3.10	Ecosystems	Long-Term	For unavoidable long-term impacts on streams and stream buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. Impacts on streams would be mitigated through restoration actions developed in collaboration with federal, state, local, and Tribal biologists. For unavoidable long-term impacts on wetlands and wetland buffers, Sound Transit would develop a compensatory mitigation plan in accordance with applicable federal, state, and local requirements and guidelines. Sound Transit could use a combination of mitigation strategies to achieve no net loss of wetland function and area, such as off-site compensatory mitigation within the Hylebos Creek watershed, use of King County's in-lieu fee program, use of wetland mitigation banks, and/or other mitigation measures.
			Construction	On-site restoration would be undertaken to offset temporary construction impacts. Examples of such restoration activities include restoring in-stream habitat with large woody debris and planting temporarily disturbed wetlands and riparian buffers with native species. Compensatory mitigation would be provided for construction impacts that last for more than one growing season and for permanent conversion of wetlands from one vegetation type to another (e.g., forested wetland to emergent or scrub-shrub wetland) as well as for indirect impacts on wetlands.
Water Resources	3.11	Water Resources	Long-Term	No mitigation is required. Mitigation related to stream and wetland impacts are described under Ecosystems Resources.
			Construction	Best management practices (BMPs) would be utilized to protect water quality during construction. No mitigation required. Mitigation related to stream and wetland impacts is described under Ecosystems Resources.
Geology and Soils	3.12	Geology and Soils	Long-Term	No mitigation required.
			Construction	No mitigation required.
Hazardous Materials	3.13	Hazardous Materials sites	Long-Term	No mitigation required.
			Construction	No mitigation required.
Public Services	3.14	Public Services	Long-Term	No mitigation required.
			Construction	No mitigation required.

Table J-1 Mitigation Plan (continued)

Resource	Final EIS Chapter/ Section	Impact Topic	Period	Mitigation/Avoidance Description
Utilities, Energy, and Electromagnetic Fields	3.15	Utilities	Long-Term	No mitigation required.
			Construction	No mitigation required.
		Energy	Long-Term	No mitigation required.
			Construction	No mitigation required.
		EMF	Long-Term	No mitigation required.
			Construction	No mitigation required.
Historic and Archaeological Resources	3.16	Historic and archaeological resources	Long-Term	No mitigation required.
			Construction	An Inadvertent Discovery Plan, which addresses the process and procedures for potential archaeological finds during construction, has been developed and would be in place prior to the start of construction.
Parks and Recreational Resources	3.17	Parks and Recreational Resources	Long-Term	No mitigation required.
			Construction	No mitigation required.
Section 4(f) and 6(f) Resources	3.18	Section 4(f) and 6(f) Resources	Long-Term and Construction	No mitigation required.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix K: Potential Preferred Alternative Design Refinements

SOUND TRANSIT
140A
154B
Link

Federal Transit Administration

SoundTransit

June 2024

1 Introduction

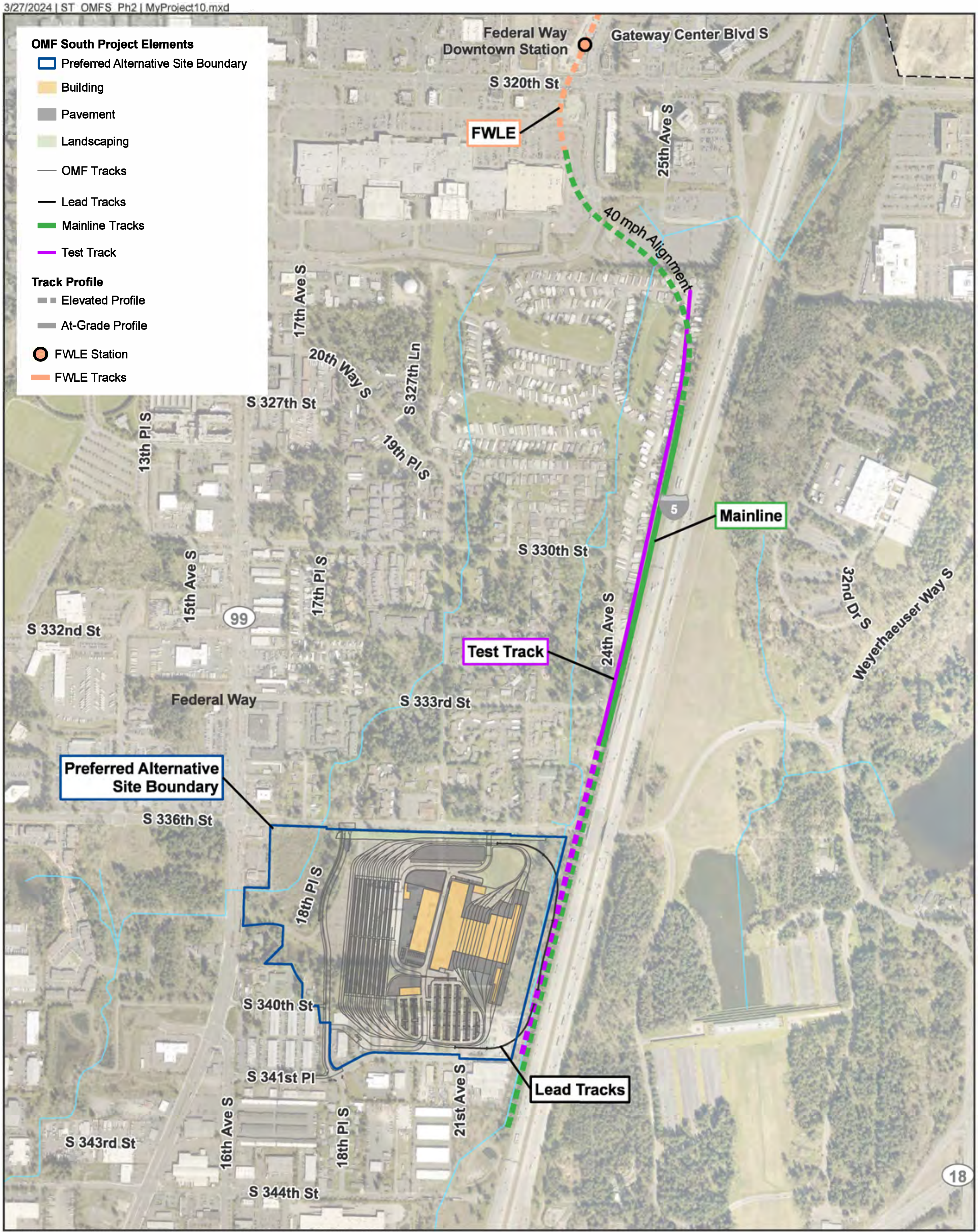
The purpose of this appendix is to provide a description of potential design refinements to the Preferred Alternative and an overview of potential environmental impacts. It also identifies elements of the environment where the potential impacts of the design refinements would differ from those described in the Final Environmental Impact Statement (EIS).

As discussed in the Final Environmental Impact Statement (EIS), of the three build alternatives, the Preferred Alternative would have the greatest impacts to ecosystem resources, specifically streams, mature native forest, and wetlands. The U.S. Army Corps of Engineers expressed concerns over the amount of wetland impacts during environmental review and permit preapplication coordination meetings. Acknowledging these concerns and recognizing the potential scope, budget, and schedule ramifications of a complex environmental permitting and mitigation process, Sound Transit is exploring the feasibility of refining the Preferred Alternative design to further reduce ecosystem impacts. Sound Transit is also exploring the feasibility of reducing utility impacts that could also have scope, budget, and schedule implications. Key site design refinements include the following:

- Rotating the Operations and Maintenance Facility (OMF) South site elements 90 degrees
- Shifting the proposed 18th Place S extension to the east and out of the wetland on the northwestern portion of the site (Wetland WFW-02)
- Reducing the number of lead tracks to access the site from four to two
- Moving the main gate from S 341st Place to 18th Place S and adding a secondary gate on S 336th Street
- Removing Link System-Wide Storage from the site
- Switching the location of the mainline track and test track so that the test track would be on the west side of the mainline track rather than the east side

A conceptual design showing these refinements is provided in Figure K.1-1. All of the design refinements are anticipated to be within the potential construction limits of the Preferred Alternative, as described in Chapter 2 of the Final EIS. The design refinements are anticipated to have similar impacts as described for the Preferred Alternative to most elements of the environment, listed below. As a result, these elements are not discussed further in this appendix.

- Acquisitions, displacements, and relocations
- Land use
- Economics
- Environmental justice, social resources, community facilities, and neighborhoods
- Air quality and greenhouse gas emissions
- Water resources
- Geology and soils
- Hazardous materials


OMF South Project Elements
Preferred Alternative Site Boundary
Building
Pavement
Landscaping
OMF Tracks
Lead Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
FWLE Tracks
Federal Way Downtown Station
Gateway Center Blvd S
S 320th St
FWLE
25th Ave S
40 mph Alignment
17th Ave S
20th Way S
S 327th Ln
S 327th St
13th Pl S
19th Pl S
5
Mainline
S 330th St
15th Ave S
17th Pl S
99
32nd Dr S
Weyerhaeuser Way S
S 332nd St
24th Ave S
Test Track
Federal Way
S 333rd St
Preferred Alternative Site Boundary
S 336th St
18th Pl S
S 340th St
S 341st Pl
21st Ave S
Lead Tracks
16th Ave S
18th Pl S
S 343rd St
S 344th St
18

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE K.1-1
Potential Preferred Alternative Design Refinement

N

0 1,000 2,000 Feet

- Public services
- Utilities, energy, and electromagnetic fields
- Historic and archaeological resources
- Parks and recreational resources
- Section 4(f) and 6(f) resources

For other elements of the environment, the design refinements may have different impacts than described in the Final EIS for the Preferred Alternative. Those elements of the environment are discussed qualitatively below.

- Transportation
- Visual and aesthetic resources
- Noise and vibration
- Ecosystem resources

If the Sound Transit Board selects to build the Preferred Alternative and the design refinements are advanced, additional environmental review of certain elements of the OMF South impact analysis and mitigation measures may be needed.

1.1 Transportation

The potential design refinements would change the access points into the OMF South site. The main gate would be accessed from 18th Place S, north of S 341st Street instead of from S 341st Place east of the S 18th Place intersection as currently shown for the Preferred Alternative (see Figure K-1). A secondary access point would be on S 336th Street and would have limited use for deliveries and possibly emergency services serving the OMF South site. Moving the gate access to S 18th Place would not be expected to substantially change general traffic movements in the area beyond what was analyzed in the Final EIS for the Preferred Alternative. The limited traffic at the S 336th Street secondary access would not be expected to impact traffic volumes along S 336th Street. No new traffic impacts are anticipated with the design refinements.

1.2 Visual and Aesthetic Resources

Changes to 18th Place S, track, and building locations within the OMF South site itself are not anticipated to change visual impacts to sensitive receivers next to the site.

One design refinement would switch the location of the mainline track and test track so that the test track would be on the west side of the mainline rather than the east side, as described for the Preferred Alternative. The Preferred Alternative design has a high visual change and high visual impact to residences along the mainline within Belmor and along 24th Avenue S to just north of S 336th Street. Switching the test track location would change the view of the primarily elevated mainline to the test track. However, it would not change the high visual impact, as identified in the Final EIS for the Preferred Alternative.

1.3 Noise and Vibration

As stated above, the potential design refinements would switch the location of the mainline track and the test track within Belmor and along 24th Avenue S and change the orientation of the OMF site, which would move the location of the northern lead track into the OMF South site to the south. Moving the northern lead track into the OMF South site would position the track and associated crossovers and turnouts farther from residences located to the north of S 336th Street.

The mainline track structure for the Final EIS Preferred Alternative provides shielding for the residences in Belmor from the noise generated by the at-grade test track. Switching the locations of the tracks would remove that shielding. However, most of the transit noise would be generated by the cumulative Tacoma Dome Link Extension (TDLE) operations on the mainline tracks in the future. The change in the location of the test tracks would also potentially affect the exposure to highway traffic noise levels from I-5. The cumulative changes in the OMF South mainline tracks noise, the traffic noise, and the TDLE mainline operations noise could result in additional impacts in the vicinity of Belmor and need for additional noise mitigation.

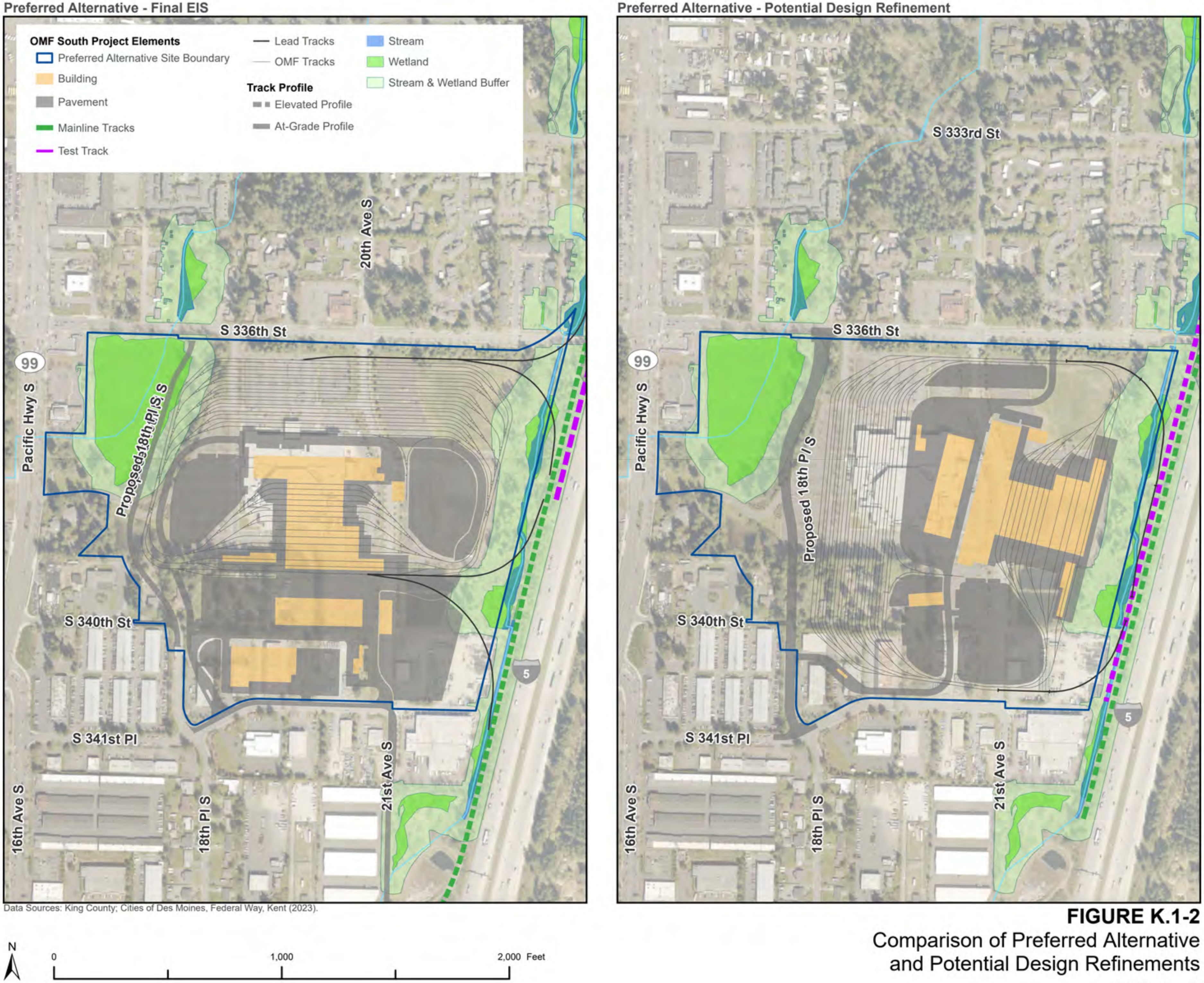
At the northern end of Belmor, the mainline tracks for the Preferred Alternative are on an elevated structure, which reduces the vibration levels relative to at-grade track. Relocating the at-grade test track closer to the residences in the northern portion of Belmor could result in new vibration impacts in this area and the need for vibration mitigation.

If the design refinements or other similar changes were to advance, Sound Transit would conduct noise and vibration analysis during final design. All predicted noise levels and mitigation measures would be reviewed, and mitigation would be modified as needed to reduce noise levels to below the FTA impact criteria. When noise would exceed FTA moderate or severe impact criteria, Sound Transit would provide noise mitigation measures consistent with its Link Light Rail Noise and Vibration Policy (Resolution No. R2023-15) and the Transit Noise and Vibration Impact Assessment Manual (FTA 2018).

1.4 Ecosystem Resources

One of the potential design refinements would shift the proposed alignment of 18th Place S approximately 100 feet east in the vicinity of Wetland WFW-02 and the West Fork Hylebos Creek Tributary 0014C. This would move the proposed road alignment out of Wetland WFW-02 and the West Fork Hylebos Creek Tributary and thus avoid direct impacts to the wetland and stream. This design could potentially reduce long-term wetland impact areas up to 30 percent compared to the Preferred Alternative analyzed in the Final EIS. The shifted alignment of 18th Place S extension would only affect the buffer areas of Wetland WFW-02 and buffer areas of the West Fork Hylebos Creek Tributary. Figure K.1-2 compares the conceptual layouts of the Preferred Alternative and the potential design refinement in relation to the existing wetlands and streams and their buffers.

The eastern site boundary that parallels East Fork Hylebos Creek Tributary could potentially shift to the west 10 to 20 feet, which may allow for a larger stream corridor than currently analyzed in the Final EIS.


Preferred Alternative - Final EIS
Preferred Alternative - Potential Design Refinement
OMF South Project Elements
Preferred Alternative Site Boundary
Building
Pavement
Mainline Tracks
Test Track
Lead Tracks
OMF Tracks
Track Profile
Elevated Profile
At-Grade Profile
Stream
Wetland
Stream & Wetland Buffer
S 333rd St
20th Ave S
S 336th St
99
Pacific Hwy S
Proposed 18th Pl S
S 340th St
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
5
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2023).

FIGURE K.1-2
Comparison of Preferred Alternative and Potential Design Refinements
OMF South

2 NEXT STEPS

If the Sound Transit Board selects the Preferred Alternative as the project to be built, Sound Transit would continue to explore the feasibility of the Potential Preferred Alternative Design Refinements or other measures that could reduce project impacts. If the design refinements are advanced, additional environmental review of certain elements of the OMF South impact analysis and mitigation measures may be needed.

3 REFERENCES

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Federal Transit Administration, John A. Volpe National Transportation System Center and Cross-Spectrum Acoustics Inc. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix C: Conceptual Design Drawings and Engineering Information

SOUND TRANSIT
140A
SOUND TRANSIT
SOUND TRANSIT
Link
154B

Federal Transit Administration

SOUNDTRANSIT

June 2024

SOUND TRANSIT - LINK LIGHT RAIL

DRAFT EIS ENGINEERING DRAWINGS

OPERATIONS AND MAINTENANCE FACILITY SOUTH (OMF SOUTH)

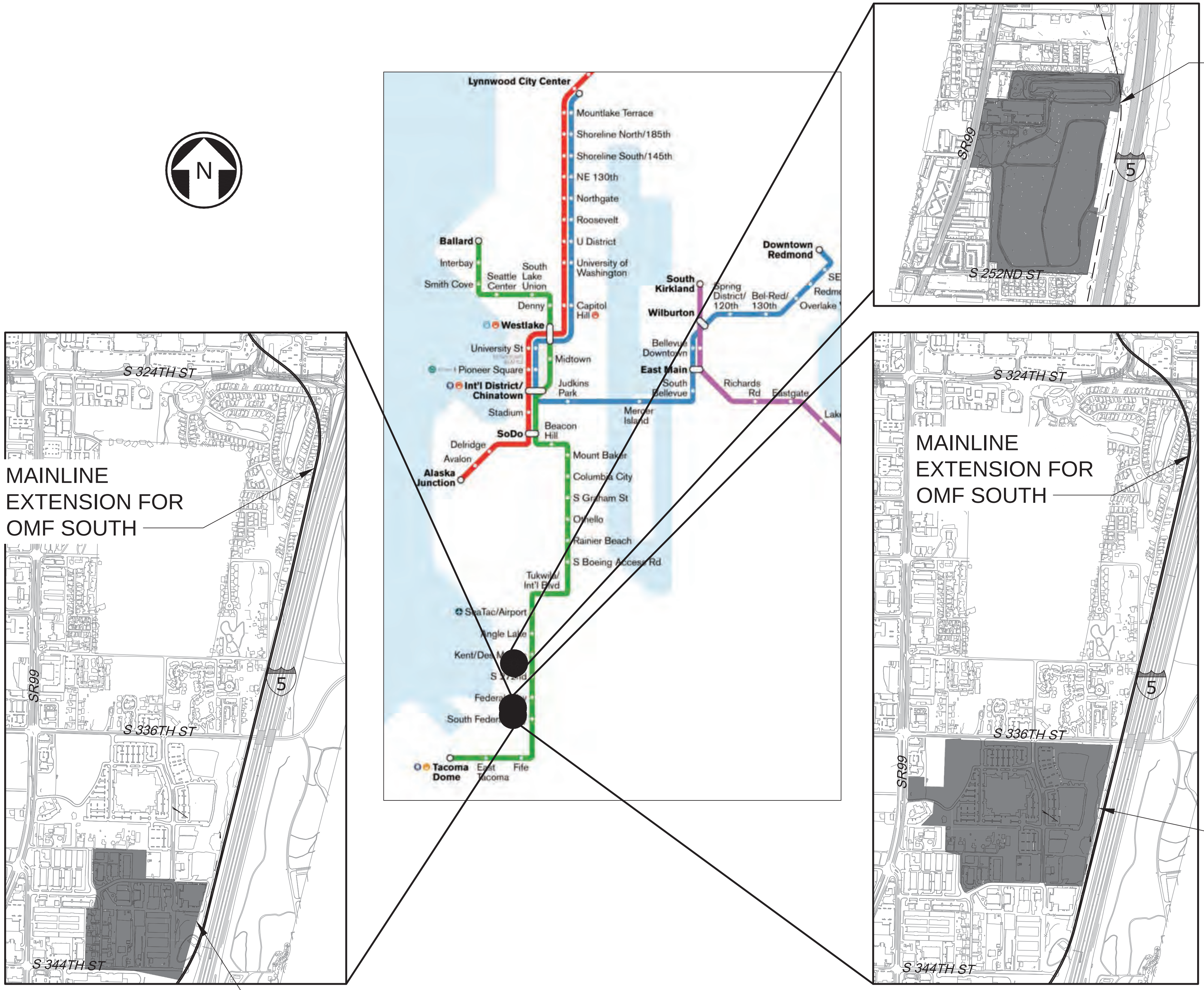
SEPTEMBER 2023

HDR

SOUNDTRANSIT

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


N
Lynnwood City Center
Mountlake Terrace
Shoreline North/185th
Shoreline South/145th
NE 130th
Northgate
Roosevelt
U District
University of Washington
Ballard
Interbay
Smith Cove
Seattle Center
South Lake Union
Denny
Capitol Hill
Westlake
University St
Midtown
Pioneer Square
Int'l District/ Chinatown
Judkins Park
Stadium
SoDo
Beacon Hill
Delridge
Avalon
Alaska Junction
Mount Baker
Columbia City
S Graham St
Othello
Rainier Beach
S Boeing Access Rd
Tukwila/ Int'l Blvd
SeaTac/Airport
Angle Lake
Kent/Des Moines
S 272nd
Federal Way
South Federal Way
Tacoma Dome
East Tacoma
Fife
Downtown Redmond
SE Redmond
Overlake
South Kirkland
Spring District/ 120th
Bel-Red/ 130th
Wilburton
Bellevue Downtown
East Main
South Bellevue
Richards Rd
Eastgate
Mercer Island
PROJECT LOCATION
MIDWAY LANDFILL
SR99
5
S 252ND ST
S 324TH ST
MAINLINE
EXTENSION FOR
OMF SOUTH
SR99
5
S 336TH ST
S 344TH ST
PROJECT LOCATION
S 344TH ST
S 324TH ST
MAINLINE
EXTENSION FOR
OMF SOUTH
5
S 336TH ST
SR99
S 344TH ST
PROJECT LOCATION
S 336TH ST

CIVIL ENGINEERING PRELIMINARY DESIGN CONSULTANT

Approved: ______________________ Date: __________

Project Manager

CENTRAL PUGET SOUND REGIONAL TRANSIT AUTHORITY

Approved: ______________________ Date: __________

Civil Engineering Manager

DRAFT EIS DRAWINGS

NOT FOR CONSTRUCTION

PROJECT LOCATION MAPS

G01-GZI001
ii

5/5/2023 4:53:35 PM
C:\PWWORKING\WEST01\D3124280\DEIS_OMFS-G01-GZI001.DWG
PLOPEZHILF

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH

INDEX OF DRAWINGS

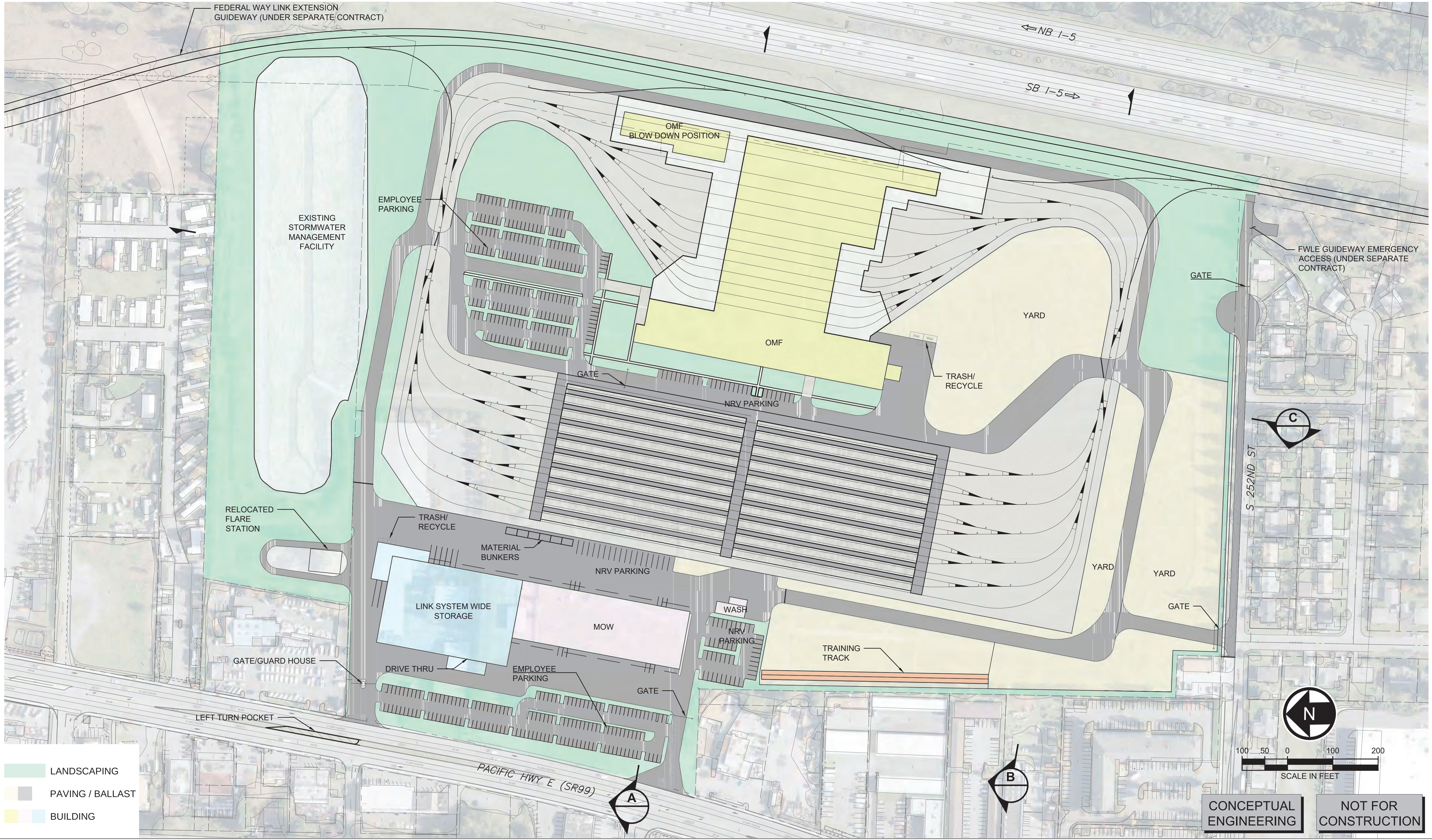
SHEET NO.	DWG. NO.	TITLE
GENERAL DRAWINGS		
i	COVER	COVER SHEET
ii	G01-GZI001	PROJECT LOCATION MAP
iii	G01-GZI005	INDEX OF DRAWINGS
MIDWAY LANDFILL		
1	M06A-ASP001	MIDWAY LANDFILL ARCHITECTURAL SITE PLAN
2	M06A-GSX101	MIDWAY LANDFILL - OPTION 1 GENERAL SITE SECTION
3	M06A-CGX101	MIDWAY LANDFILL - OPTION 1 GRADING CROSS SECTIONS
4	M06A-SFP101	MIDWAY LANDFILL - OPTION 1 STRUCTURAL PLATFORM PLAN
5	M06A-GSX201	MIDWAY LANDFILL - OPTION 2 GENERAL SITE SECTION
6	M06A-CGX201	MIDWAY LANDFILL - OPTION 2 GRADING CROSS SECTIONS
7	M06A-SFP201	MIDWAY LANDFILL - OPTION 2 STRUCTURAL SLAB PLAN
8	M06A-GSX301	MIDWAY LANDFILL - OPTION 3 GENERAL SITE SECTION
9	M06A-CGX301	MIDWAY LANDFILL - OPTION 3 GRADING CROSS SECTIONS
MAINLINE EXTENSION FOR OMFS		
10	S08B-KAP000	MAINLINE EXTENSION FOR OMFS TRACK TRACK KEY MAP
11	S08B-KAP100	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
12	S08B-KAP101	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
13	S08B-KAP102	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
14	S08B-KAP103	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
15	S08B-KAP104	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
16	B00-KAP01	TDLE MAINLINE FOR OMFS TRACK PLAN AND PROFILE ALT B (55MPH DESIGN OPTION)
17	B00-KAP02	TDLE MAINLINE FOR OMFS TRACK PLAN AND PROFILE ALT B (55MPH DESIGN OPTION)
S 336TH ST SITE ALTERNATIVE		
18	S08B-KAP001	MAINLINE EXTENSION FOR OMFS TRACK TRACK KEY MAP
19	S08B-KAP105B	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
20	S08B-KAP106B	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
21	S08B-KAP107B	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
22	S08B-KAP108B	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
23	M06B-ASP601	S 336TH ST ARCHITECTURAL SITE PLAN
24	M06B-ASP602	S 336TH ST ARCHITECTURAL SITE PLAN
25	M06B-CGX601	S 336TH ST GRADING CROSS SECTIONS
26	M06B-CGX602	S 336TH ST GRADING CROSS SECTIONS
27	M06B-CDP651	S 336TH ST CREEK DRAINAGE PLAN
S 344th ST SITE ALTERNATIVE		
28	S08C-KAP002	MAINLINE EXTENSION FOR OMFS TRACK TRACK KEY MAP
29	S08C-KAP105C	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
30	S08C-KAP106C	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
31	S08C-KAP107C	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
32	S08C-KAP108C	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
33	S08C-KAP109	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
34	S08C-KAP110	MAINLINE EXTENSION FOR OMFS TRACK PLAN AND PROFILE
35	S08C-KAP201	TDLE MAINLINE FOR OMFS TRACK PLAN AND PROFILE I-5 OPTION
36	S08C-KAP202	TDLE MAINLINE FOR OMFS TRACK PLAN AND PROFILE I-5 OPTION
37	M06C-ASP701	S 344TH ST ARCHITECTURAL SITE PLAN
38	M06C-CGX701	S 344TH ST GRADING CROSS SECTIONS
39	M06C-CDP751	S 344TH ST CREEK DRAINAGE PLAN

5/5/2023 5:21:37 PM
C:\PWWORKING\WEST01\D3124286\DEIS_OMFS-G01-GZI005-006.DWG
HSLIU

SOUNDTRANSIT

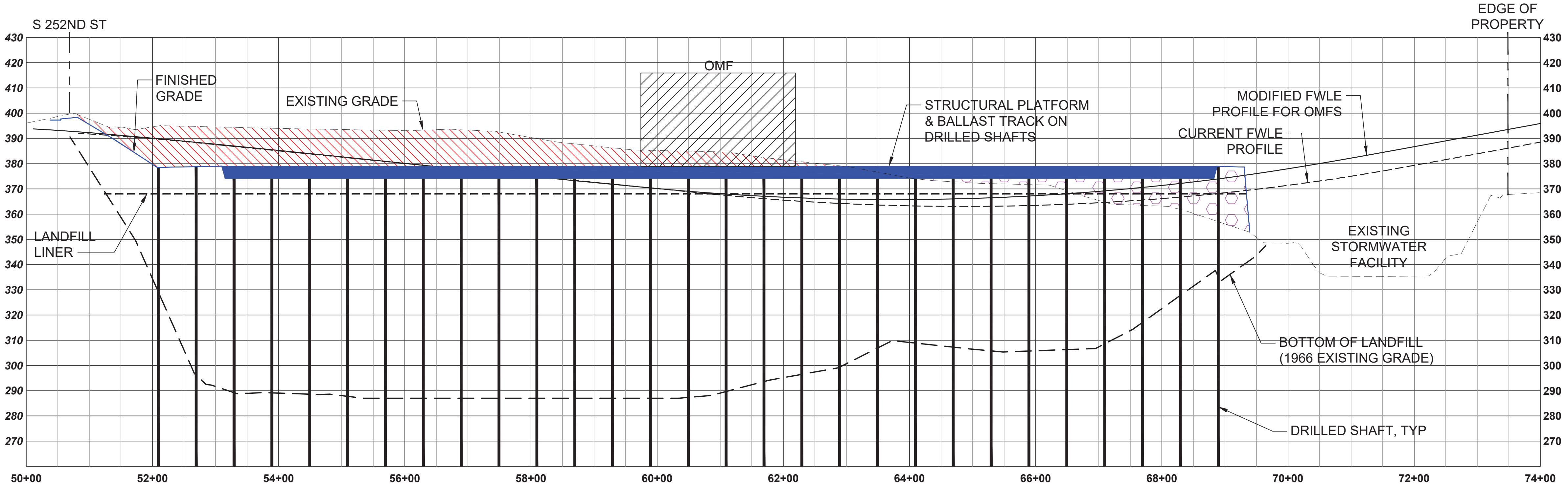
INDEX OF DRAWINGS

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


FEDERAL WAY LINK EXTENSION
GUIDEWAY (UNDER SEPARATE CONTRACT)
NB I-5
SB I-5
OMF
BLOW DOWN POSITION
EXISTING
STORMWATER
MANAGEMENT
FACILITY
EMPLOYEE
PARKING
FWLE GUIDEWAY EMERGENCY
ACCESS (UNDER SEPARATE
CONTRACT)
GATE
YARD
OMF
TRASH/
RECYCLE
GATE
NRV PARKING
C
S 252ND ST
RELOCATED
FLARE
STATION
TRASH/
RECYCLE
MATERIAL
BUNKERS
NRV PARKING
YARD
YARD
GATE
LINK SYSTEM WIDE
STORAGE
MOW
WASH
NRV
PARKING
TRAINING
TRACK
GATE/GUARD HOUSE
DRIVE THRU
EMPLOYEE
PARKING
GATE
LEFT TURN POCKET
N
100 50 0 100 200
SCALE IN FEET
LANDSCAPING
PAVING / BALLAST
BUILDING
PACIFIC HWY E (SR99)
A
B
CONCEPTUAL
ENGINEERING
NOT FOR
CONSTRUCTION

M06A - MIDWAY LANDFILL
ARCHITECTURAL SITE PLAN

M06A-ASP001
1


S 252ND ST
EDGE OF PROPERTY
OMF
FINISHED GRADE
EXISTING GRADE
STRUCTURAL PLATFORM & BALLAST TRACK ON DRILLED SHAFTS
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
LANDFILL LINER
EXISTING STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
DRILLED SHAFT, TYP
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

▨ EXCAVATE

⬡ BACKFILL WITH REUSED MATERIAL / IMPORTED MATERIAL

MIDWAY LANDFILL - OPTION 1 , LOW STRUCTURAL PLATFORM

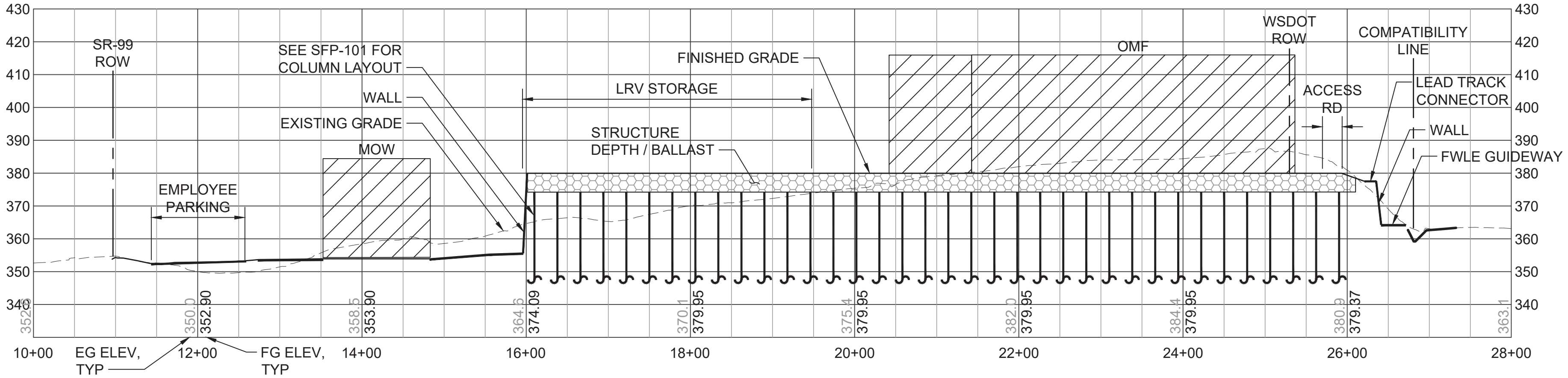
SCALE: 1" = 100'

CONCEPTUAL ENGINEERING

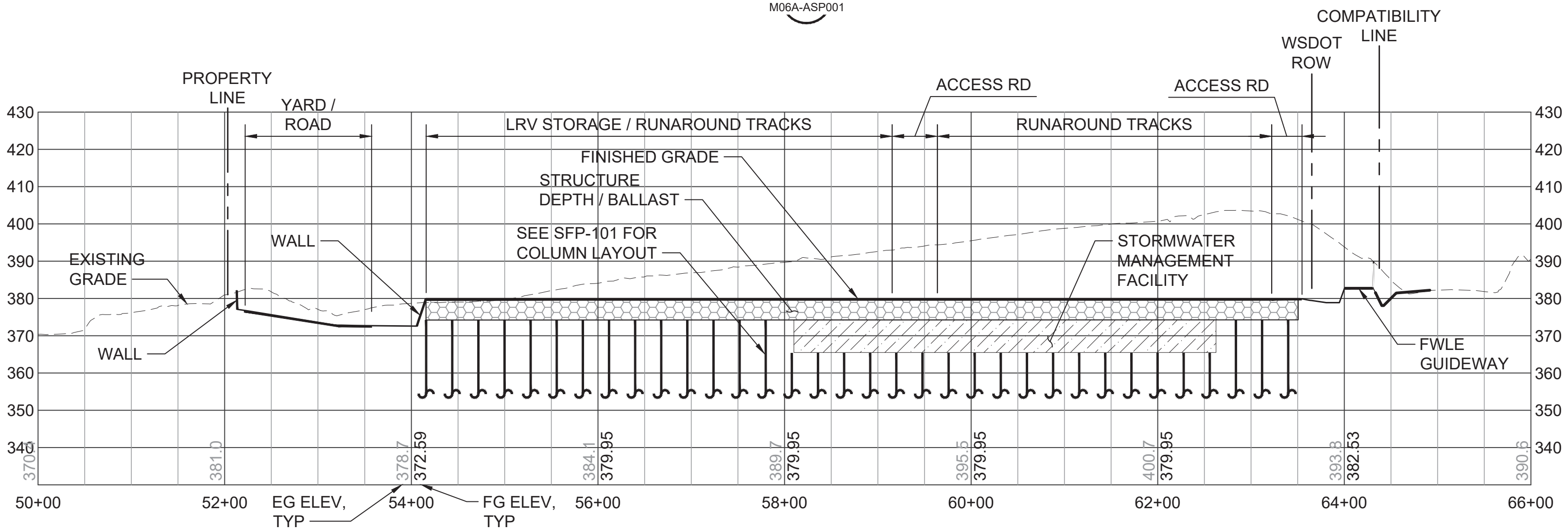
NOT FOR CONSTRUCTION

M06A - MIDWAY LANDFILL
OPTION 1 GENERAL SITE SECTION

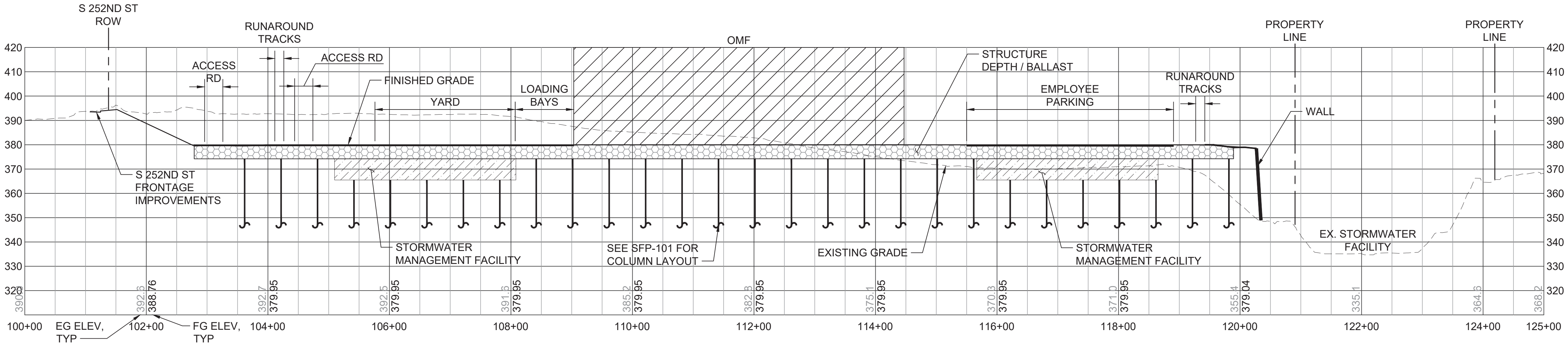
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SR-99 ROW
SEE SFP-101 FOR COLUMN LAYOUT
WALL
EXISTING GRADE
MOW
EMPLOYEE PARKING
FINISHED GRADE
LRV STORAGE
STRUCTURE DEPTH / BALLAST
OMF
WSDOT ROW
ACCESS RD
COMPATIBILITY LINE
LEAD TRACK CONNECTOR
WALL
FWLE GUIDEWAY
430
420
410
400
390
380
370
360
350
340
352
350.0
352.90
358.5
353.90
364.3
374.09
370.1
379.95
375.4
379.95
382.0
379.95
384.4
379.95
380.3
379.37
363.1
10+00
EG ELEV, TYP
12+00
FG ELEV, TYP
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00

SECTION A (A) M06A-ASP001


PROPERTY LINE
YARD / ROAD
LRV STORAGE / RUNAROUND TRACKS
ACCESS RD
RUNAROUND TRACKS
ACCESS RD
WSDOT ROW
COMPATIBILITY LINE
FINISHED GRADE
STRUCTURE DEPTH / BALLAST
SEE SFP-101 FOR COLUMN LAYOUT
WALL
EXISTING GRADE
STORMWATER MANAGEMENT FACILITY
WALL
FWLE GUIDEWAY
430
420
410
400
390
380
370
360
350
340
370
381.0
378.7
372.59
384.1
379.95
389.7
379.95
395.5
379.95
400.7
379.95
393.3
382.53
390.6
50+00
52+00
EG ELEV, TYP
54+00
FG ELEV, TYP
56+00
58+00
60+00
62+00
64+00
66+00

SECTION B (B) M06A-ASP001


S 252ND ST ROW
RUNAROUND TRACKS
ACCESS RD
ACCESS RD
FINISHED GRADE
YARD
LOADING BAYS
OMF
STRUCTURE DEPTH / BALLAST
EMPLOYEE PARKING
RUNAROUND TRACKS
PROPERTY LINE
WALL
PROPERTY LINE
S 252ND ST FRONTAGE IMPROVEMENTS
STORMWATER MANAGEMENT FACILITY
SEE SFP-101 FOR COLUMN LAYOUT
EXISTING GRADE
STORMWATER MANAGEMENT FACILITY
EX. STORMWATER FACILITY
420
410
400
390
380
370
360
350
340
330
320
390
392.3
388.76
392.7
379.95
392.5
379.95
391.6
379.95
385.2
379.95
382.3
379.95
375.1
379.95
370.3
379.95
371.0
379.95
355.4
379.04
335.1
364.5
368.2
100+00
EG ELEV, TYP
102+00
FG ELEV, TYP
104+00
106+00
108+00
110+00
112+00
114+00
116+00
118+00
120+00
122+00
124+00
125+00

SECTION C (C) M06A-ASP001

100
50
0
100
200

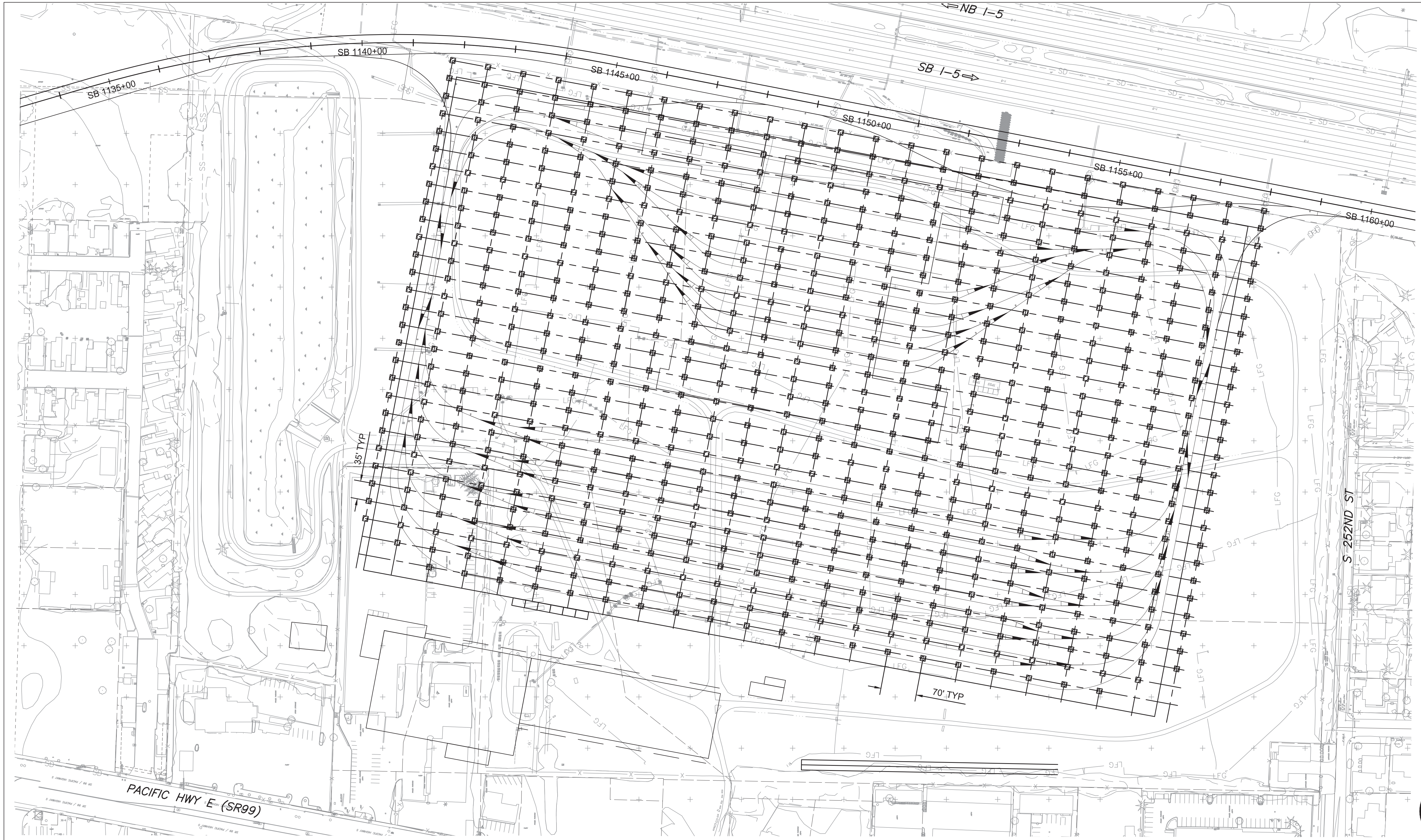
SCALE IN FEET

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

M06A - MIDWAY LANDFILL
OPTION 1 GRADING CROSS SECTIONS

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


NB I–5
SB I–5
SB 1135+00
SB 1140+00
SB 1145+00
SB 1150+00
SB 1155+00
SB 1160+00
35' TYP
70' TYP
S 252ND ST
PACIFIC HWY E (SR99)
LFG
N

100 50 0 100 200
SCALE IN FEET

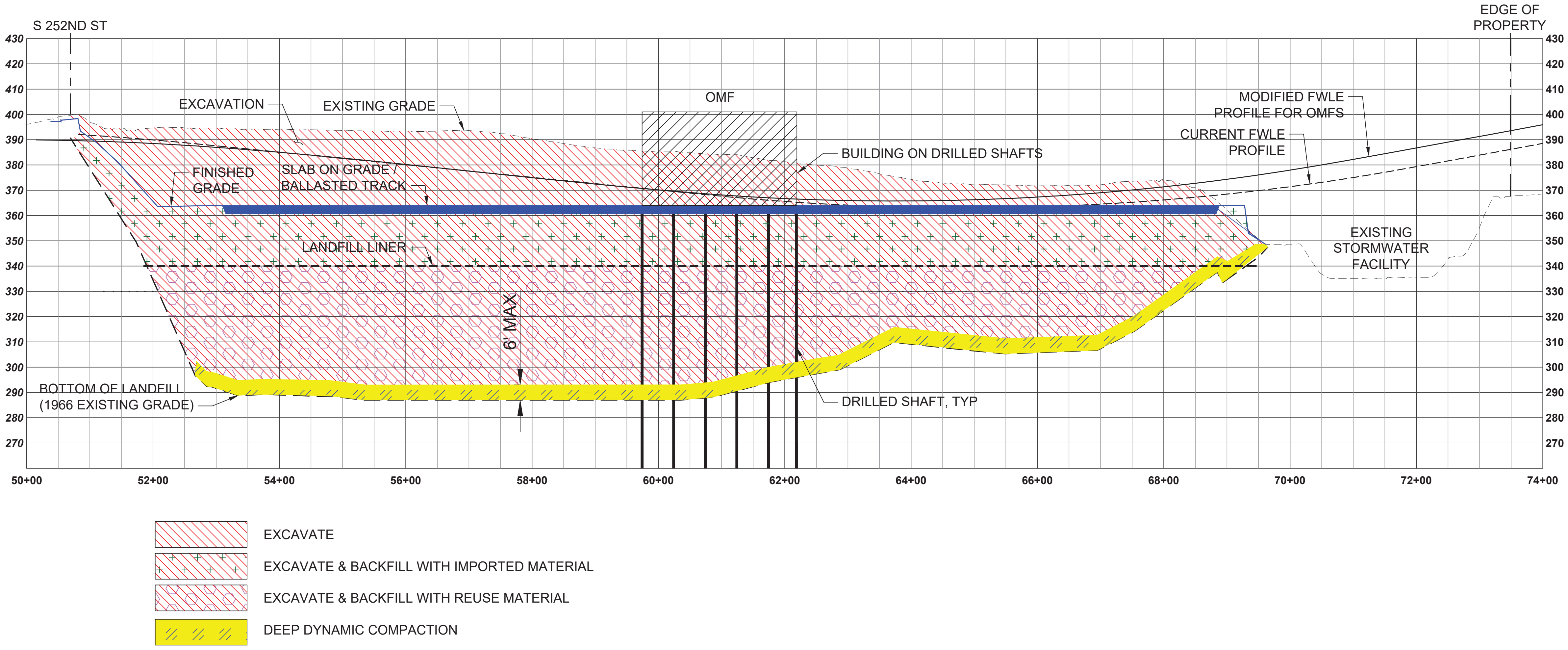
⌖ DRILLED SHAFT

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

SOUNDTRANSIT HDR

M06A - MIDWAY LANDFILL
OPTION 1 STRUCTURAL PLATFORM PLAN


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
OMF
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
SLAB ON GRADE / BALLASTED TRACK
LANDFILL LINER
EXISTING STORMWATER FACILITY
6' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
DRILLED SHAFT, TYP
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATE
EXCAVATE & BACKFILL WITH IMPORTED MATERIAL
EXCAVATE & BACKFILL WITH REUSE MATERIAL
DEEP DYNAMIC COMPACTION

MIDWAY LANDFILL - OPTION 2, HYBRID PLATFORM

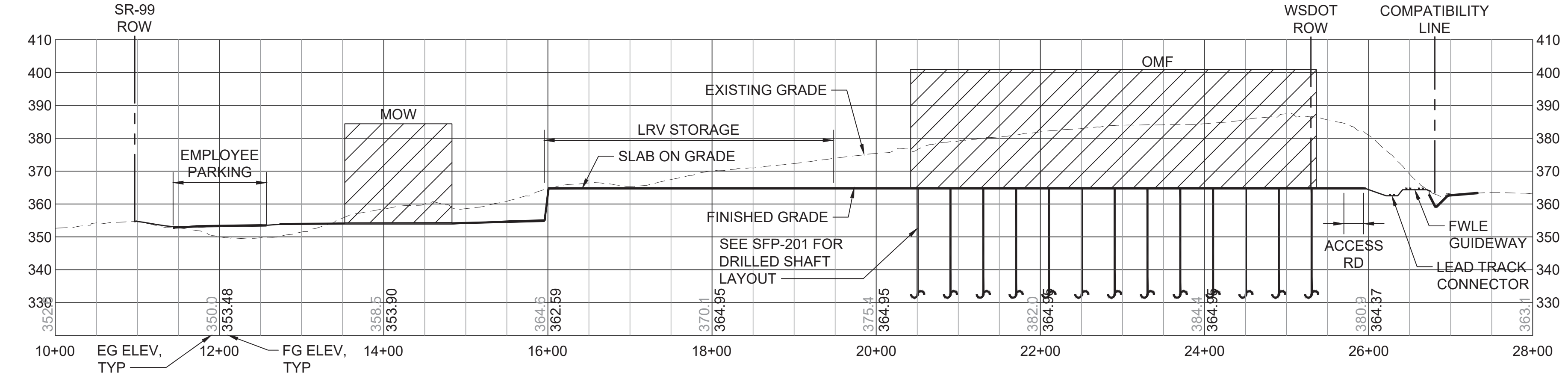
SCALE: 1" = 100'

CONCEPTUAL ENGINEERING

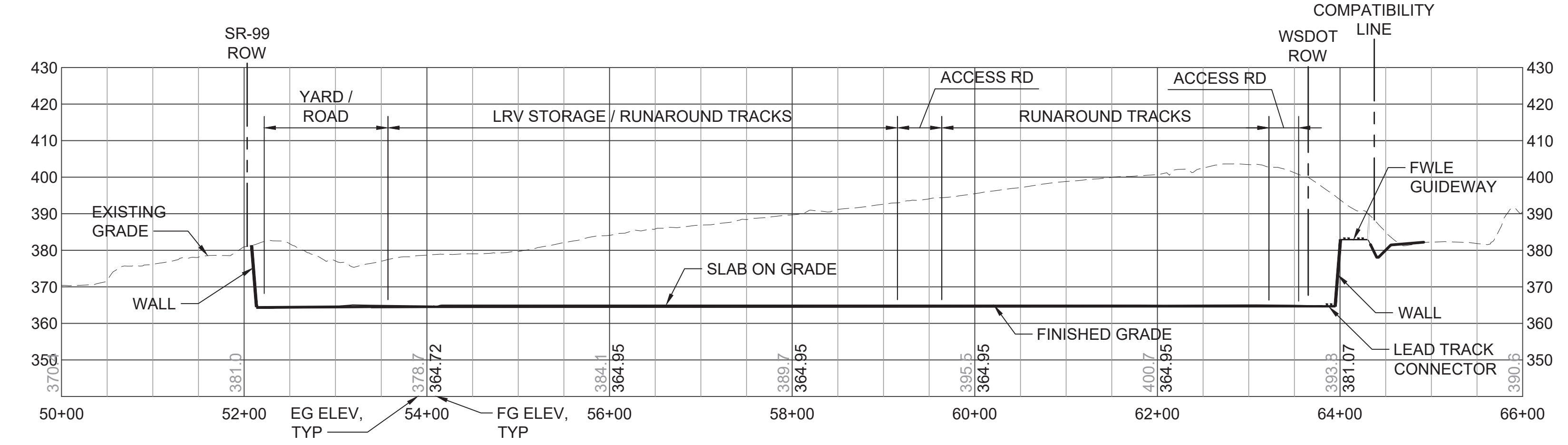
NOT FOR CONSTRUCTION

M06A - MIDWAY LANDFILL
OPTION 2 GENERAL SITE SECTION

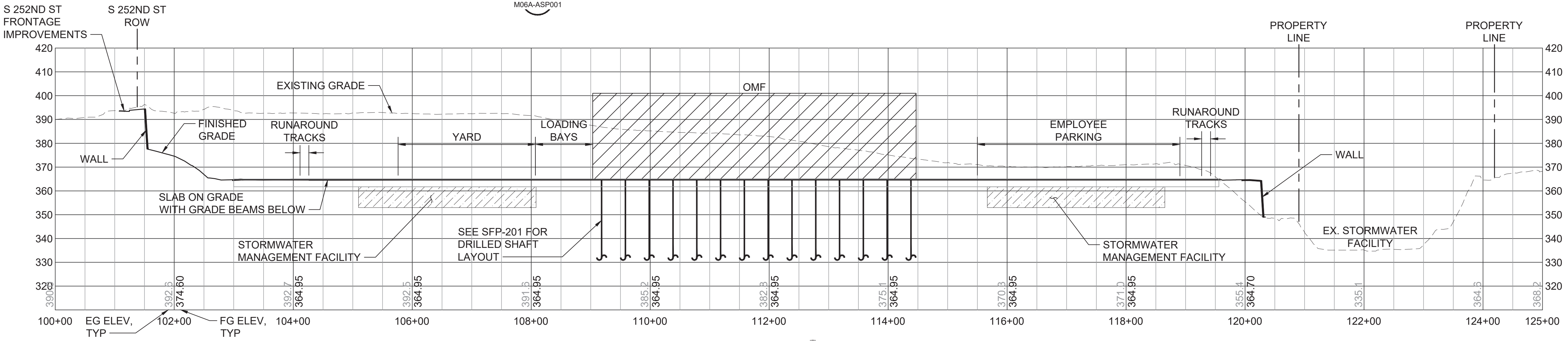
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SR-99 ROW
WSDOT ROW
COMPATIBILITY LINE
OMF
EXISTING GRADE
MOW
LRV STORAGE
SLAB ON GRADE
EMPLOYEE PARKING
FINISHED GRADE
SEE SFP-201 FOR DRILLED SHAFT LAYOUT
ACCESS RD
FWLE GUIDEWAY
LEAD TRACK CONNECTOR
410
400
390
380
370
360
350
340
330
353.48
353.90
362.59
364.95
364.95
364.95
364.95
364.37
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00
EG ELEV, TYP
FG ELEV, TYP

SECTION A (A) M06A-ASP001


COMPATIBILITY LINE
SR-99 ROW
WSDOT ROW
ACCESS RD
ACCESS RD
YARD / ROAD
LRV STORAGE / RUNAROUND TRACKS
RUNAROUND TRACKS
FWLE GUIDEWAY
EXISTING GRADE
SLAB ON GRADE
WALL
WALL
FINISHED GRADE
LEAD TRACK CONNECTOR
430
420
410
400
390
380
370
360
350
364.72
364.95
364.95
364.95
364.95
381.07
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
EG ELEV, TYP
FG ELEV, TYP

SECTION B (B) M06A-ASP001


S 252ND ST FRONTAGE IMPROVEMENTS
S 252ND ST ROW
PROPERTY LINE
PROPERTY LINE
EXISTING GRADE
OMF
FINISHED GRADE
RUNAROUND TRACKS
YARD
LOADING BAYS
EMPLOYEE PARKING
RUNAROUND TRACKS
WALL
WALL
SLAB ON GRADE WITH GRADE BEAMS BELOW
STORMWATER MANAGEMENT FACILITY
SEE SFP-201 FOR DRILLED SHAFT LAYOUT
EX. STORMWATER FACILITY
STORMWATER MANAGEMENT FACILITY
420
410
400
390
380
370
360
350
340
330
320
374.60
364.95
364.95
364.95
364.95
364.95
364.95
364.95
364.95
364.70
100+00
102+00
104+00
106+00
108+00
110+00
112+00
114+00
116+00
118+00
120+00
122+00
124+00
125+00
EG ELEV, TYP
FG ELEV, TYP

SECTION C (C) M06A-ASP001

100
50
0
100
200

SCALE IN FEET

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

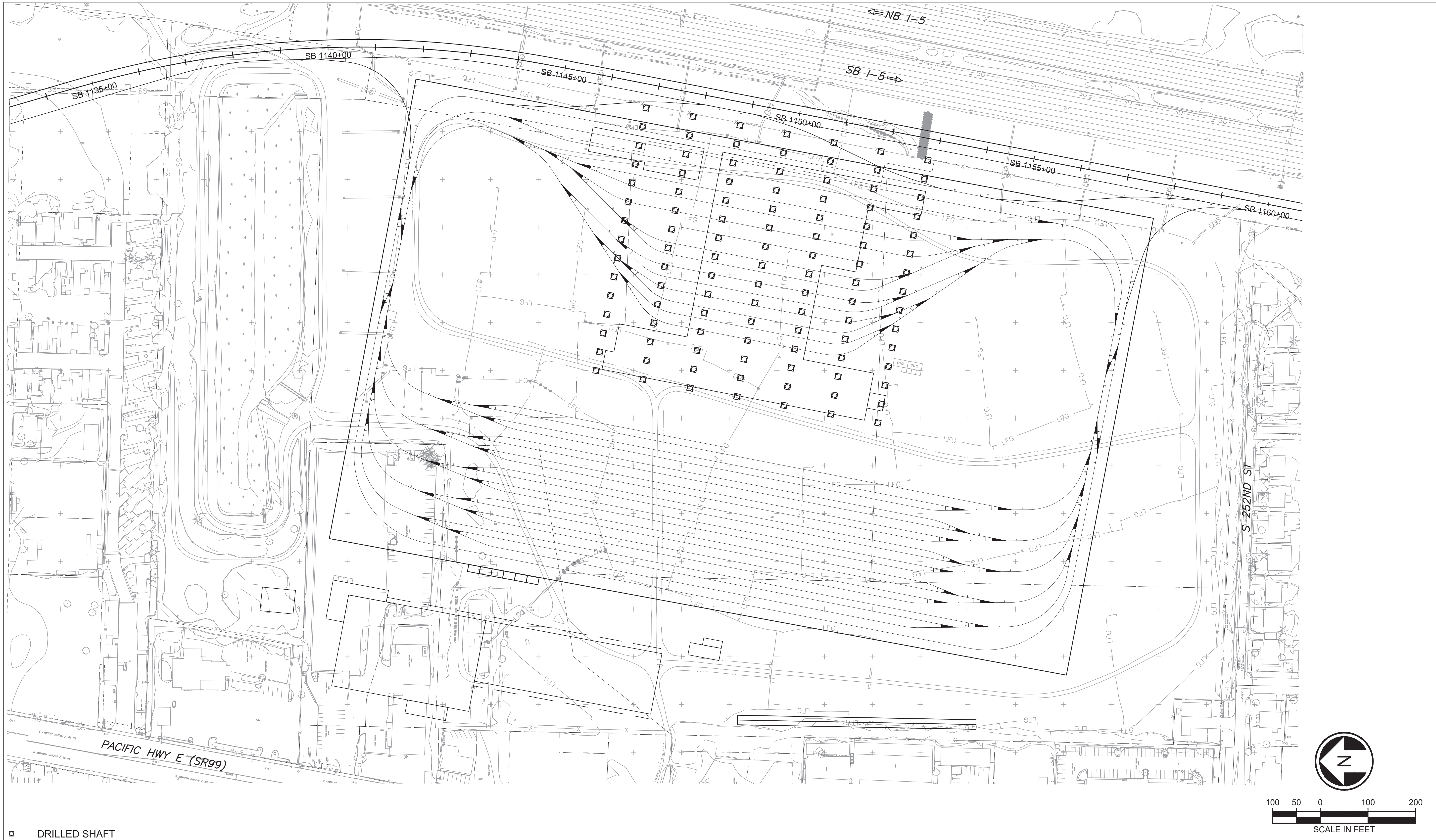
SOUNDTRANSIT

HDR

M06A - MIDWAY LANDFILL
OPTION 2 GRADING CROSS SECTIONS

M06A-CGX201
6

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH



⇐NB I–5
SB 1135+00
SB 1140+00
SB 1145+00
SB 1150+00
SB 1155+00
SB 1160+00
SB I–5⇒
LFG
S 252ND ST
PACIFIC HWY E (SR99)
N
100 50 0 100 200
SCALE IN FEET

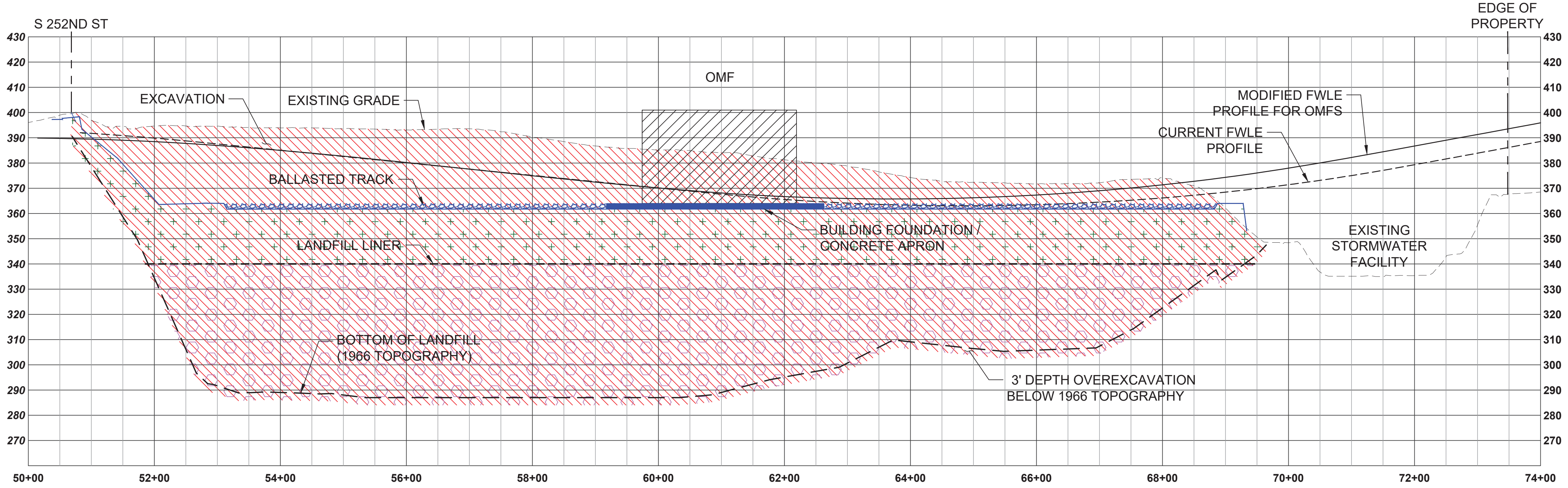
◘ DRILLED SHAFT

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

M06A - MIDWAY LANDFILL
OPTION 2 STRUCTURAL SLAB PLAN

M06A-SFP201
7


S 252ND ST
EDGE OF PROPERTY
OMF
EXCAVATION
EXISTING GRADE
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
BALLASTED TRACK
BUILDING FOUNDATION / CONCRETE APRON
LANDFILL LINER
EXISTING STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 TOPOGRAPHY)
3' DEPTH OVEREXCAVATION BELOW 1966 TOPOGRAPHY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

▨ EXCAVATE

▨ EXCAVATE & BACKFILL WITH IMPORTED MATERIAL

▨ EXCAVATE & BACKFILL WITH REUSED MATERIAL

MIDWAY LANDFILL - OPTION 3 , FULL EXCAVATION

SCALE: 1" = 100'

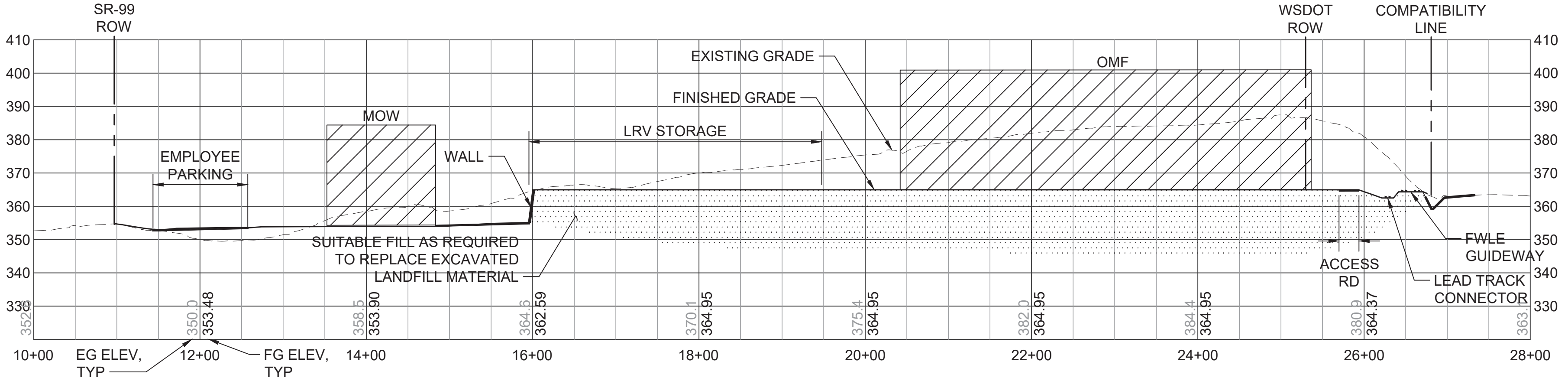
CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

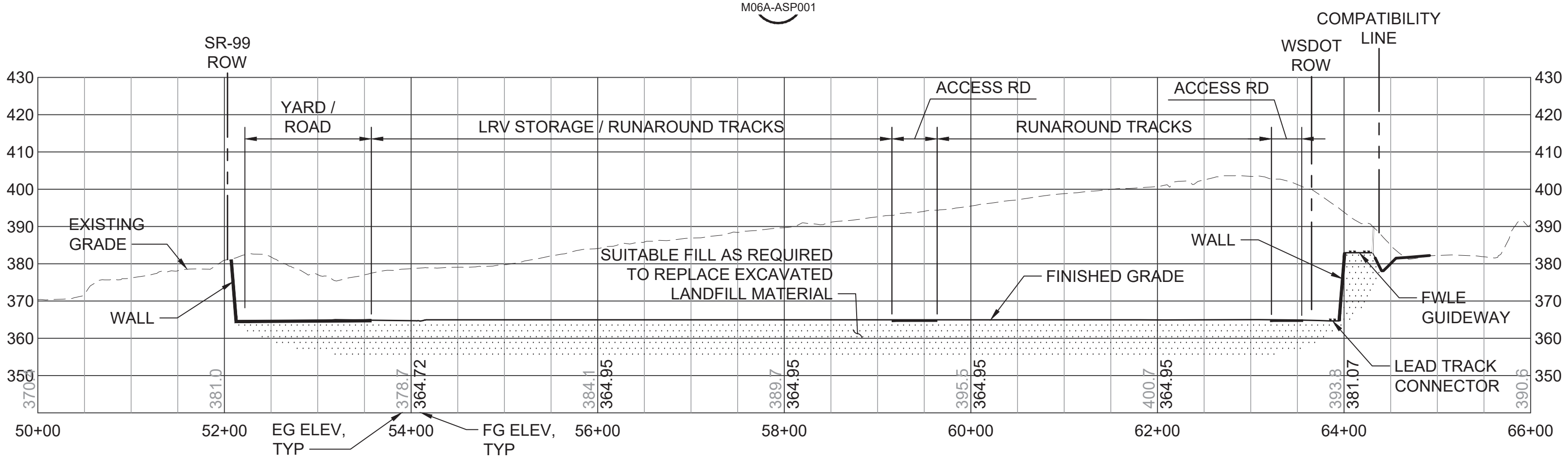
SOUNDTRANSIT

M06A - MIDWAY LANDFILL
OPTION 3 GENERAL SITE SECTION

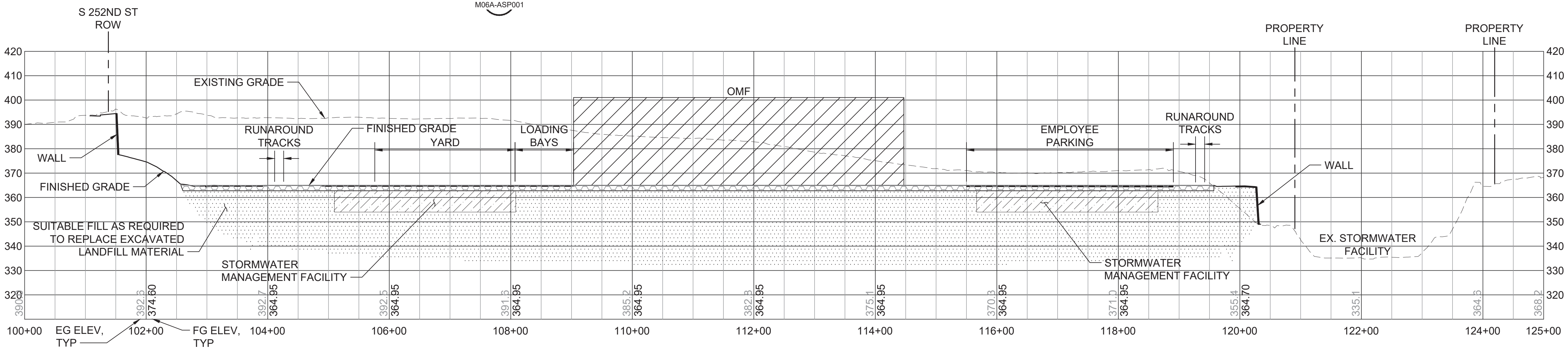
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SR-99 ROW
WSDOT ROW
COMPATIBILITY LINE
EXISTING GRADE
OMF
FINISHED GRADE
MOW
LRV STORAGE
WALL
EMPLOYEE PARKING
SUITABLE FILL AS REQUIRED TO REPLACE EXCAVATED LANDFILL MATERIAL
ACCESS RD
FWLE GUIDEWAY
LEAD TRACK CONNECTOR
353.48
353.90
362.59
364.95
364.95
364.95
364.95
364.37
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00
EG ELEV, TYP
FG ELEV, TYP
410
400
390
380
370
360
350
340
330

SECTION A (A) M06A-ASP001


SR-99 ROW
COMPATIBILITY LINE
WSDOT ROW
ACCESS RD
ACCESS RD
YARD / ROAD
LRV STORAGE / RUNAROUND TRACKS
RUNAROUND TRACKS
EXISTING GRADE
WALL
SUITABLE FILL AS REQUIRED TO REPLACE EXCAVATED LANDFILL MATERIAL
FINISHED GRADE
WALL
FWLE GUIDEWAY
LEAD TRACK CONNECTOR
364.72
364.95
364.95
364.95
364.95
381.07
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
EG ELEV, TYP
FG ELEV, TYP
430
420
410
400
390
380
370
360
350

SECTION B (B) M06A-ASP001


S 252ND ST ROW
PROPERTY LINE
PROPERTY LINE
EXISTING GRADE
OMF
RUNAROUND TRACKS
FINISHED GRADE
YARD
LOADING BAYS
EMPLOYEE PARKING
RUNAROUND TRACKS
WALL
WALL
FINISHED GRADE
SUITABLE FILL AS REQUIRED TO REPLACE EXCAVATED LANDFILL MATERIAL
STORMWATER MANAGEMENT FACILITY
STORMWATER MANAGEMENT FACILITY
EX. STORMWATER FACILITY
374.60
364.95
364.95
364.95
364.95
364.95
364.95
364.95
364.95
364.70
100+00
102+00
104+00
106+00
108+00
110+00
112+00
114+00
116+00
118+00
120+00
122+00
124+00
125+00
EG ELEV, TYP
FG ELEV, TYP
420
410
400
390
380
370
360
350
340
330
320

SECTION C (C) M06A-ASP001

100 50 0 100 200

SCALE IN FEET

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

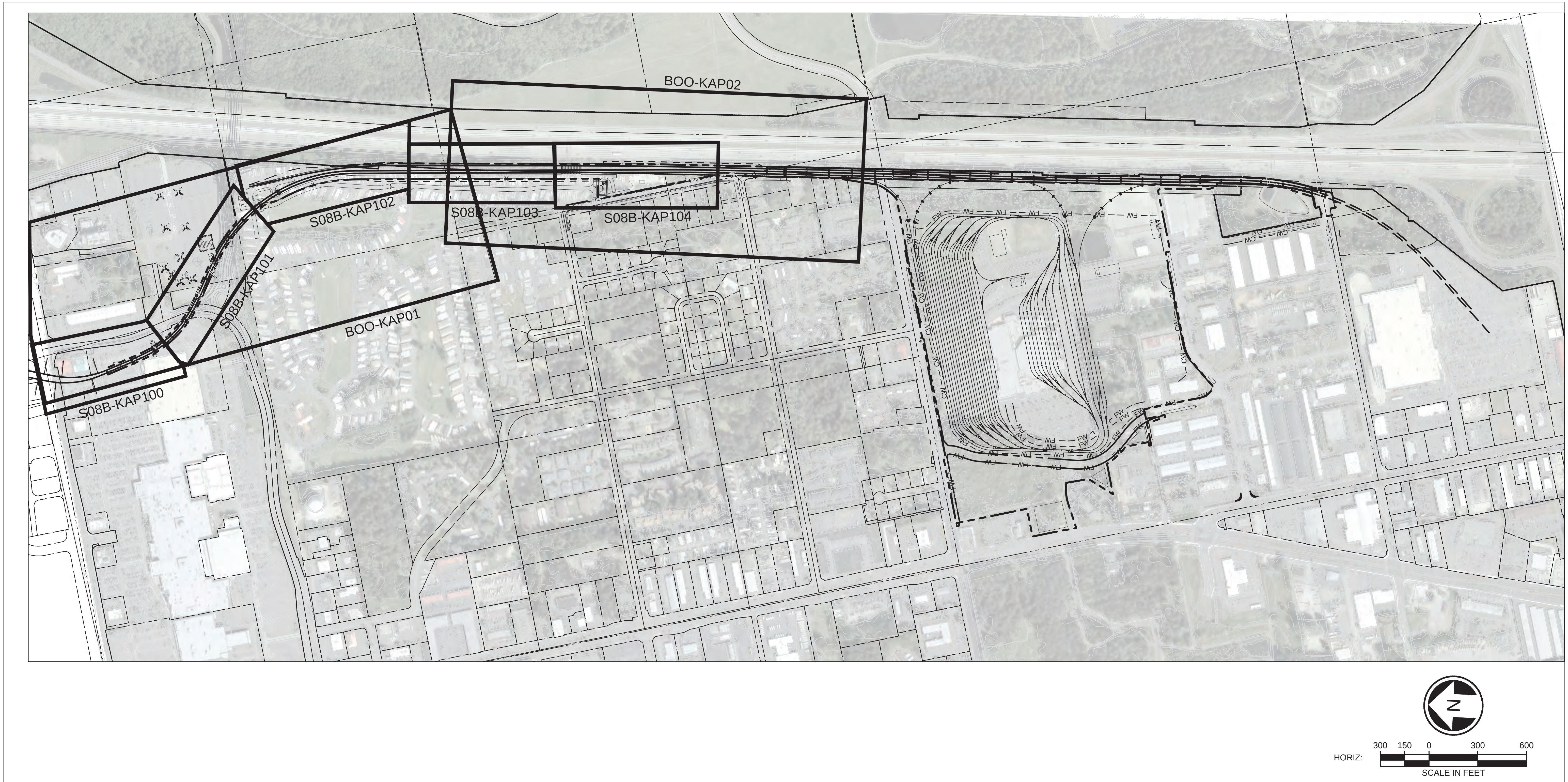
SOUNDTRANSIT

HDR

M06A - MIDWAY LANDFILL
OPTION 3 GRADING CROSS SECTIONS

M06A-CGX301

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


BOO-KAP02
BOO-KAP01
S08B-KAP100
S08B-KAP101
S08B-KAP102
S08B-KAP103
S08B-KAP104
CW
FW
N
300 150 0 300 600
HORIZ:
SCALE IN FEET

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — — —	TRANSIT WAY LIMITS
— — · — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

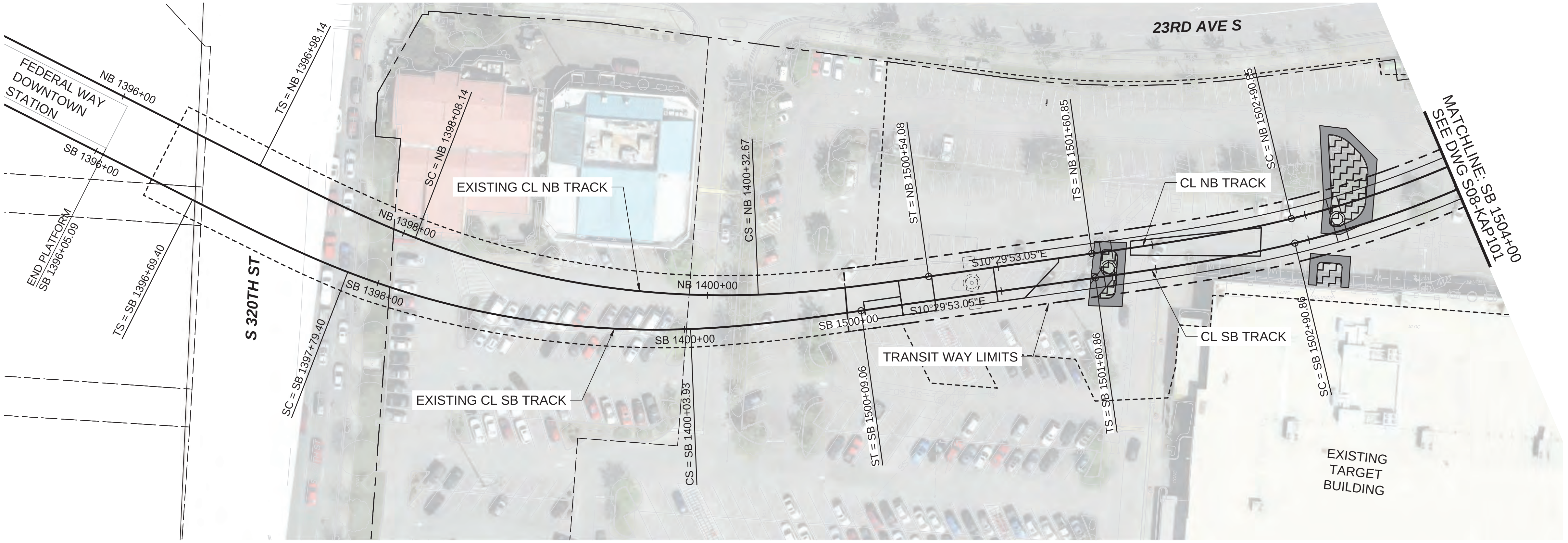
HDR

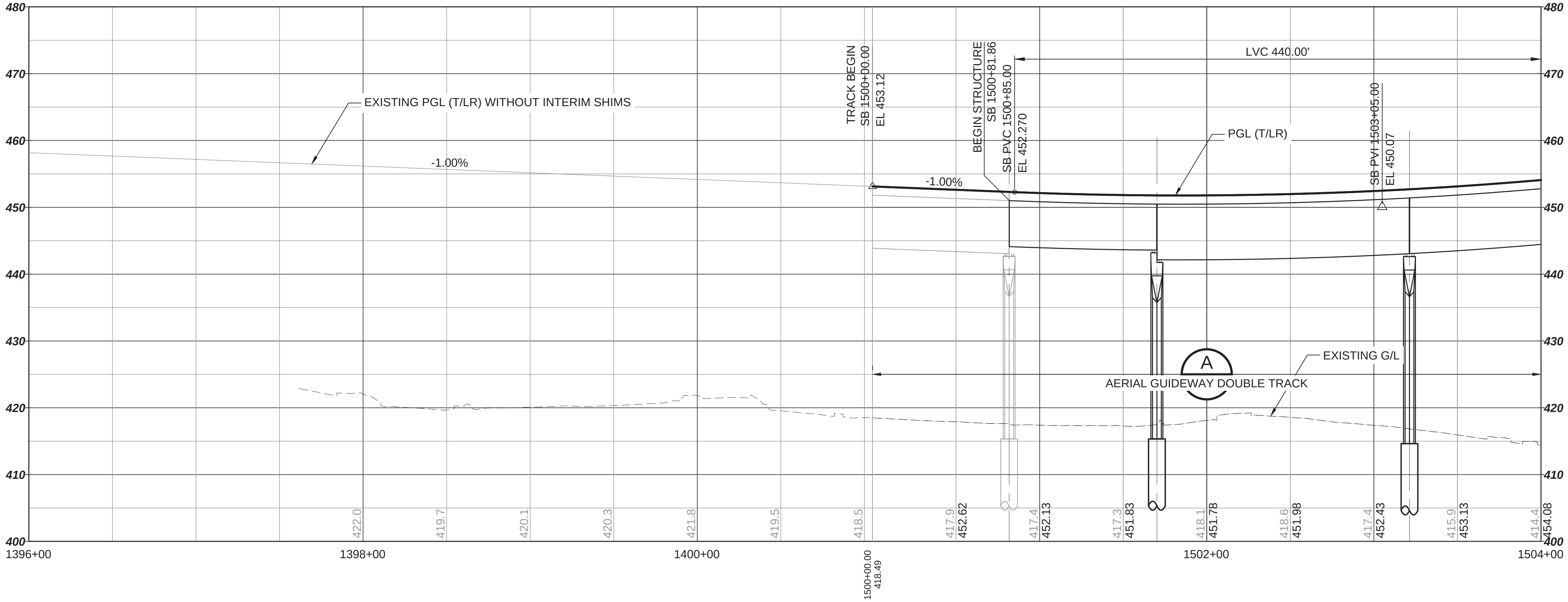
S08B MAINLINE
KEYMAP

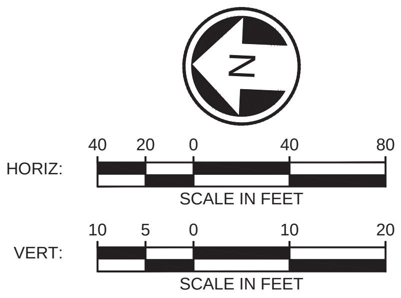
S08B-KAP000
10

ASCHEPPE
5/5/2023 6:22:08 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08-KAP000.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


23RD AVE S
FEDERAL WAY DOWNTOWN STATION
NB 1396+00
SB 1396+00
TS = NB 1396+98.14
END PLATFORM SB 1396+05.09
TS = SB 1396+69.40
S 320TH ST
SC = NB 1398+08.14
NB 1398+00
SB 1398+00
SC = SB 1397+79.40
EXISTING CL NB TRACK
EXISTING CL SB TRACK
CS = NB 1400+32.67
NB 1400+00
SB 1400+00
CS = SB 1400+03.93
ST = NB 1500+54.08
SB 1500+00
ST = SB 1500+09.06
S10°29'53.05"E
S10°29'53.05"E
TRANSIT WAY LIMITS
TS = NB 1501+60.85
TS = SB 1501+60.86
CL NB TRACK
CL SB TRACK
SC = NB 1502+90.85
SC = SB 1502+90.86
MATCHLINE: SB 1504+00
SEE DWG S08-KAP101
EXISTING TARGET BUILDING


480
470
460
450
440
430
420
410
400
EXISTING PGL (T/LR) WITHOUT INTERIM SHIMS
-1.00%
TRACK BEGIN
SB 1500+00.00
EL 453.12
-1.00%
BEGIN STRUCTURE
SB 1500+81.86
SB PVC 1500+85.00
EL 452.270
LVC 440.00'
PGL (T/LR)
SB PVI 1503+05.00
EL 450.07
EXISTING G/L
A
AERIAL GUIDEWAY DOUBLE TRACK
422.0
419.7
420.1
420.3
421.8
419.5
418.5
417.9
452.62
417.4
452.13
417.3
451.83
418.1
451.78
418.6
451.98
417.4
452.43
415.9
453.13
414.4
454.08
1396+00
1398+00
1400+00
1500+00.00
418.49
1502+00
1504+00


N
HORIZ:
40
20
0
40
80
SCALE IN FEET
VERT:
10
5
0
10
20
SCALE IN FEET

LEGEND:

○ ○═○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

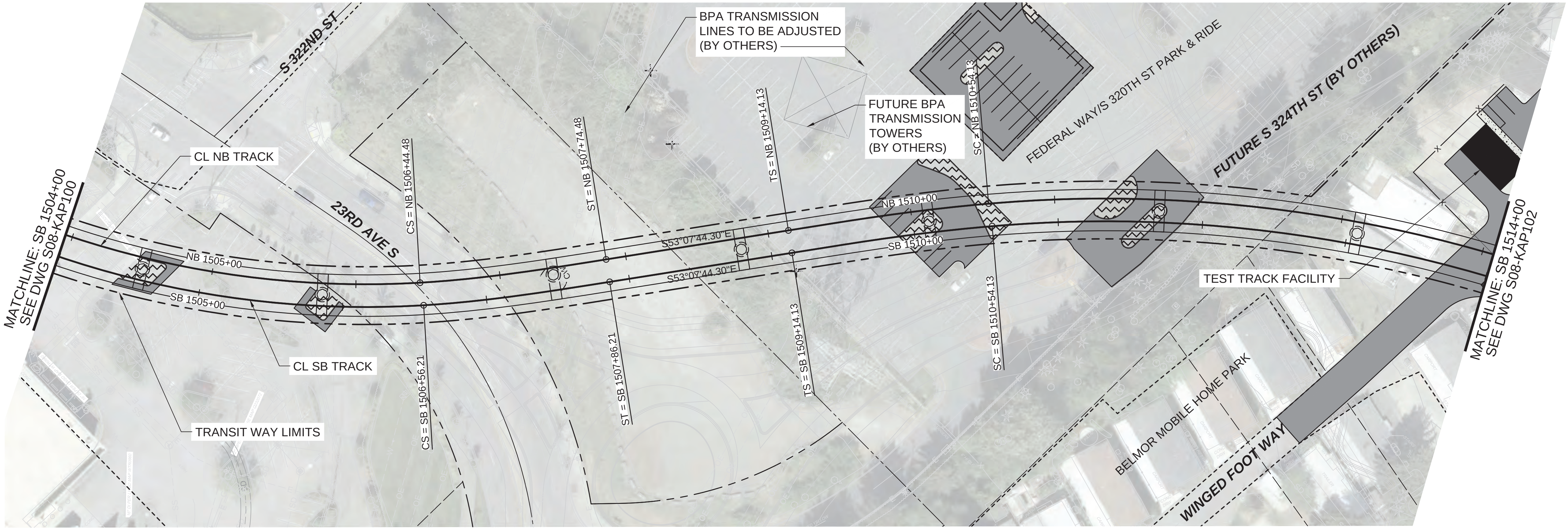
HDR

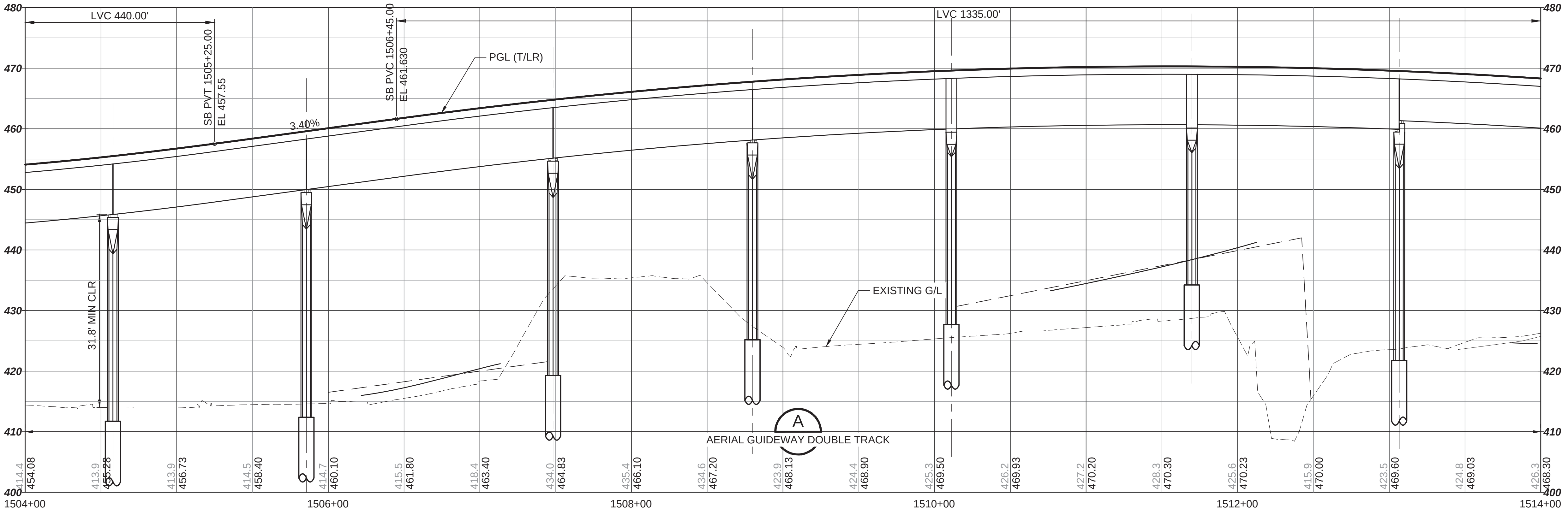
S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE - 40MPH ALIGNMENT
SB STA 1500+00 TO SB STA 1504+00

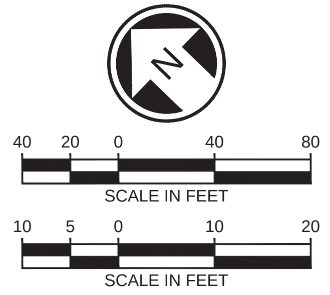
S08B-KAP100
11

KMCDONALD
8/3/2023 5:46:03 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


S 322ND ST
BPA TRANSMISSION LINES TO BE ADJUSTED (BY OTHERS)
FUTURE BPA TRANSMISSION TOWERS (BY OTHERS)
FEDERAL WAY/S 320TH ST PARK & RIDE
FUTURE S 324TH ST (BY OTHERS)
CL NB TRACK
23RD AVE S
CS = NB 1506+44.48
ST = NB 1507+74.48
TS = NB 1509+14.13
SC = NB 1510+54.13
NB 1510+00
SB 1510+00
S53°07'44.30"E
S53°07'44.30"E
NB 1505+00
SB 1505+00
MATCHLINE: SB 1504+00 SEE DWG S08-KAP100
MATCHLINE: SB 1514+00 SEE DWG S08-KAP102
TEST TRACK FACILITY
CL SB TRACK
TRANSIT WAY LIMITS
CS = SB 1506+56.21
ST = SB 1507+86.21
TS = SB 1509+14.13
SC = SB 1510+54.13
BELMOR MOBILE HOME PARK
WINGED FOOT WAY


480
470
460
450
440
430
420
410
400
LVC 440.00'
LVC 1335.00'
SB PVT 1505+25.00
EL 457.55
SB PVC 1506+45.00
EL 461.630
PGL (T/LR)
3.40%
31.8' MIN CLR
EXISTING G/L
A
AERIAL GUIDEWAY DOUBLE TRACK
414.4
454.08
413.9
455.28
413.9
456.73
414.5
458.40
414.7
460.10
415.5
461.80
418.4
463.40
434.0
464.83
435.4
466.10
434.6
467.20
423.9
468.13
424.4
468.90
425.3
469.50
426.2
469.93
427.2
470.20
428.3
470.30
425.6
470.23
415.9
470.00
423.5
469.60
424.8
469.03
426.3
468.30
1504+00
1506+00
1508+00
1510+00
1512+00
1514+00


N
HORIZ:
40
20
0
40
80
SCALE IN FEET
VERT:
10
5
0
10
20
SCALE IN FEET

KMCDONALD

8/3/2023 6:16:39 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · — · —	STREAM / WETLAND
- - - - - - - -	CONSTRUCTION LIMITS
— — — — — —	TRANSIT WAY LIMITS
— — — — —	WSDOT COMPATIBILITY LINE

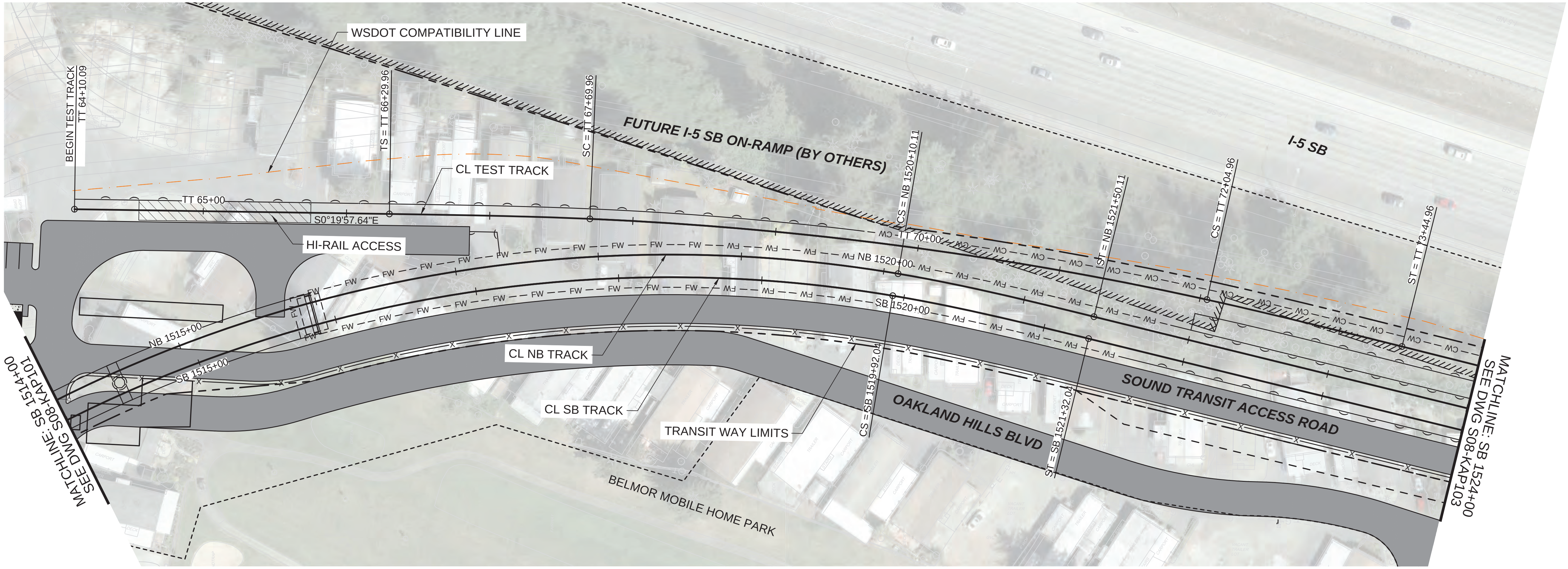
SOUNDTRANSIT

HDR

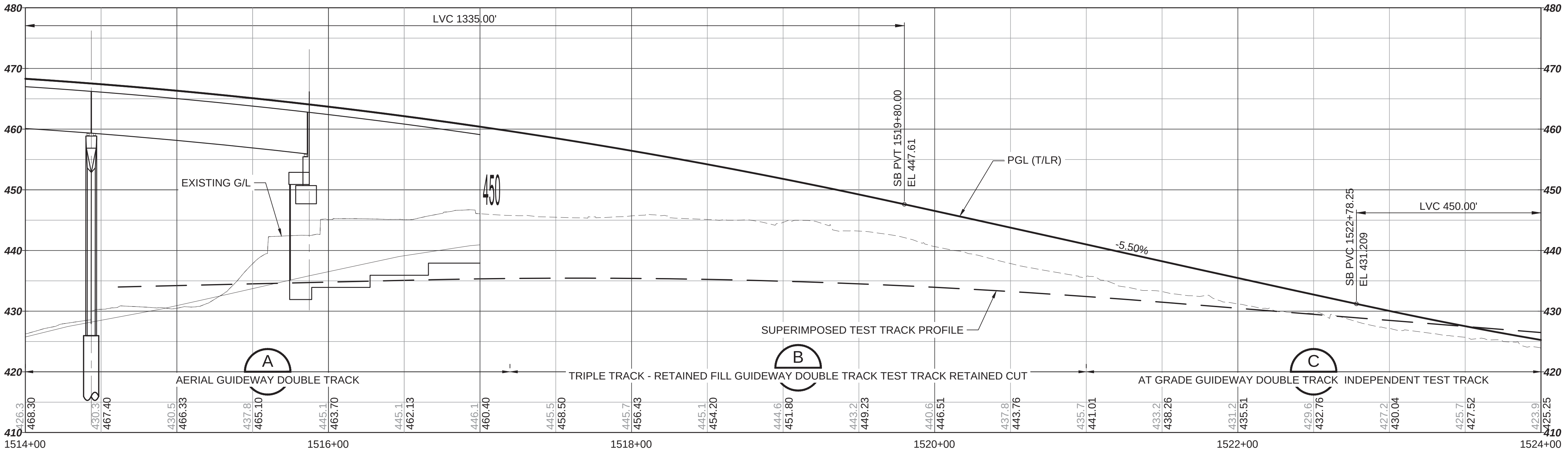
S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE - 40 MPH ALIGNMENT
SB STA 1504+00 TO SB STA 1514+00

S08B-KAP101
12

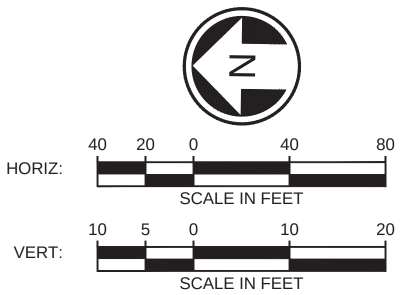
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH



WSDOT COMPATIBILITY LINE
BEGIN TEST TRACK
TT 64+10.09
TS = TT 66+29.96
SC = TT 67+69.96
FUTURE I-5 SB ON-RAMP (BY OTHERS)
I-5 SB
CL TEST TRACK
TT 65+00
S0°19'57.64"E
HI-RAIL ACCESS
CS = NB 1520+10.11
ST = NB 1521+50.11
CS = TT 72+04.96
ST = TT 73+44.96
TT 70+00
NB 1520+00
SB 1520+00
NB 1515+00
SB 1515+00
CL NB TRACK
CL SB TRACK
TRANSIT WAY LIMITS
CS = SB 1519+92.04
ST = SB 1521+32.04
OAKLAND HILLS BLVD
SOUND TRANSIT ACCESS ROAD
BELMOR MOBILE HOME PARK
MATCHLINE: SB 1514+00
SEE DWG S08-KAP101
MATCHLINE: SB 1524+00
SEE DWG S08-KAP103
FW
CW



480
470
460
450
440
430
420
410
LVC 1335.00'
EXISTING G/L
450
SB PVT 1519+80.00
EL 447.61
PGL (T/LR)
-5.50%
SB PVC 1522+78.25
EL 431.209
LVC 450.00'
SUPERIMPOSED TEST TRACK PROFILE
A
AERIAL GUIDEWAY DOUBLE TRACK
B
TRIPLE TRACK - RETAINED FILL GUIDEWAY DOUBLE TRACK TEST TRACK RETAINED CUT
C
AT GRADE GUIDEWAY DOUBLE TRACK INDEPENDENT TEST TRACK
426.3
468.30
430.3
467.40
430.5
466.33
437.8
465.10
445.1
463.70
445.1
462.13
446.1
460.40
445.5
458.50
445.7
456.43
445.1
454.20
444.6
451.80
443.2
449.23
440.6
446.51
437.8
443.76
435.7
441.01
433.2
438.26
431.2
435.51
429.6
432.76
427.2
430.04
425.7
427.52
423.9
425.25
1514+00
1516+00
1518+00
1520+00
1522+00
1524+00



N
HORIZ:
40
20
0
40
80
SCALE IN FEET
VERT:
10
5
0
10
20
SCALE IN FEET

KMCDONALD
8/3/2023 5:47:43 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

SOUNDTRANSIT

HDR

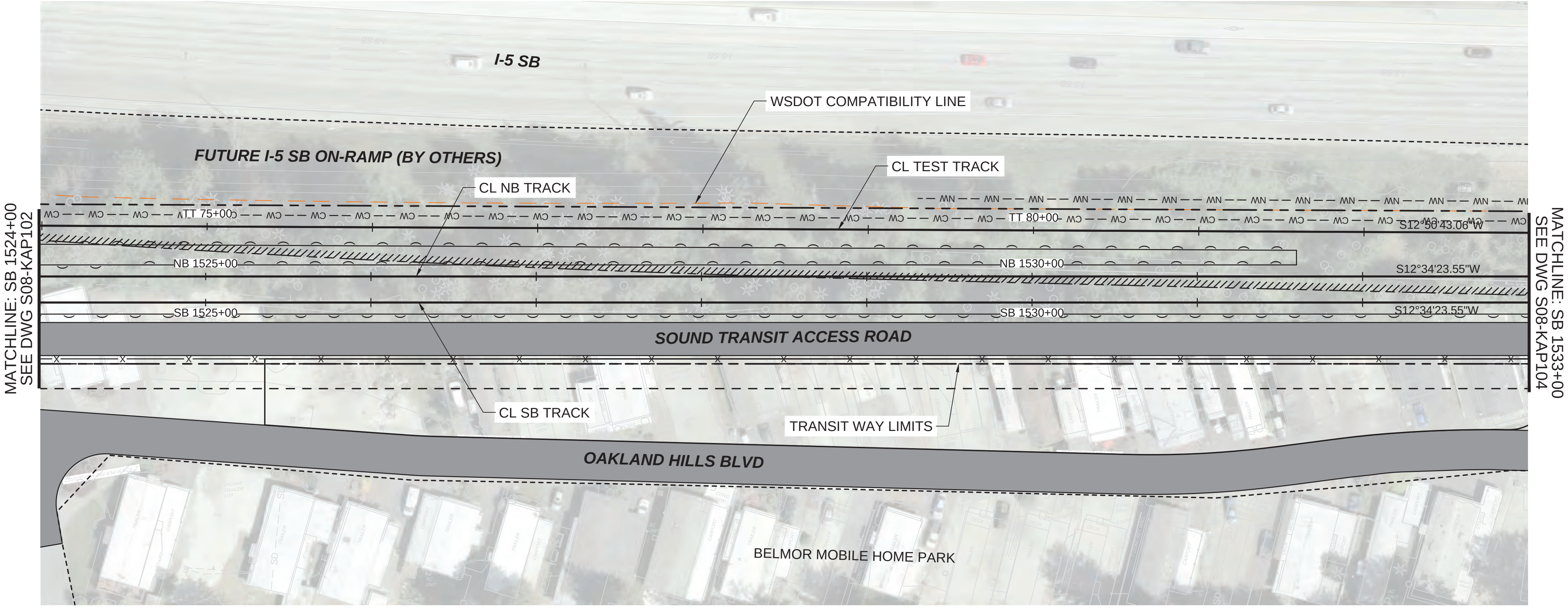
LEGEND:

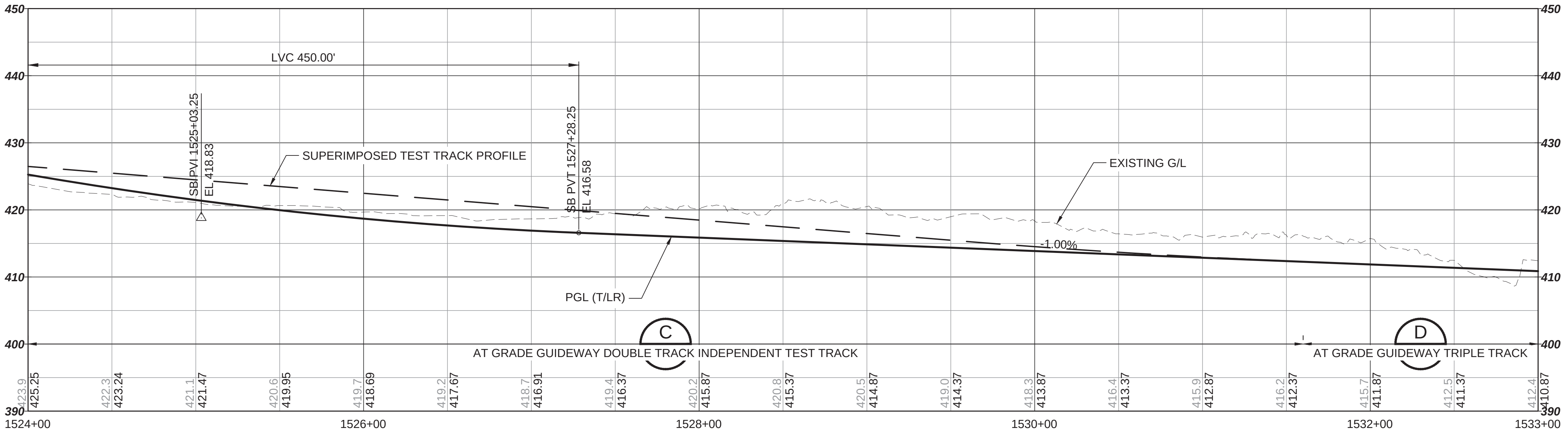
- COLUMNS / STRADDLE BENTS
- STREAM / WETLAND
- CONSTRUCTION LIMITS
- TRANSIT WAY LIMITS
- WSDOT COMPATIBILITY LINE

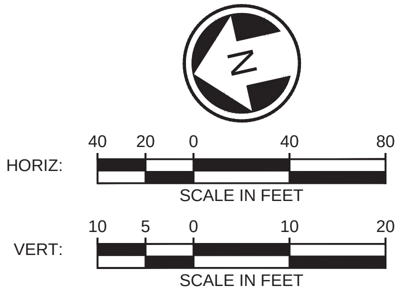
S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE - 40 MPH ALIGNMENT
SB STA 1514+00 TO SB STA 1524+00

S08B-KAP102
13

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


MATCHLINE: SB 1524+00
SEE DWG S08-KAP102
I-5 SB
WSDOT COMPATIBILITY LINE
FUTURE I-5 SB ON-RAMP (BY OTHERS)
CL TEST TRACK
CL NB TRACK
TT 75+00
TT 80+00
S12°50'43.06"W
NB 1525+00
NB 1530+00
S12°34'23.55"W
SB 1525+00
SB 1530+00
S12°34'23.55"W
SOUND TRANSIT ACCESS ROAD
CL SB TRACK
TRANSIT WAY LIMITS
OAKLAND HILLS BLVD
BELMOR MOBILE HOME PARK
MATCHLINE: SB 1533+00
SEE DWG S08-KAP104




N
HORIZ:
40
20
0
40
80
SCALE IN FEET
VERT:
10
5
0
10
20
SCALE IN FEET

8/3/2023 5:48:32 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG
KMCDONALD

SOUNDTRANSIT

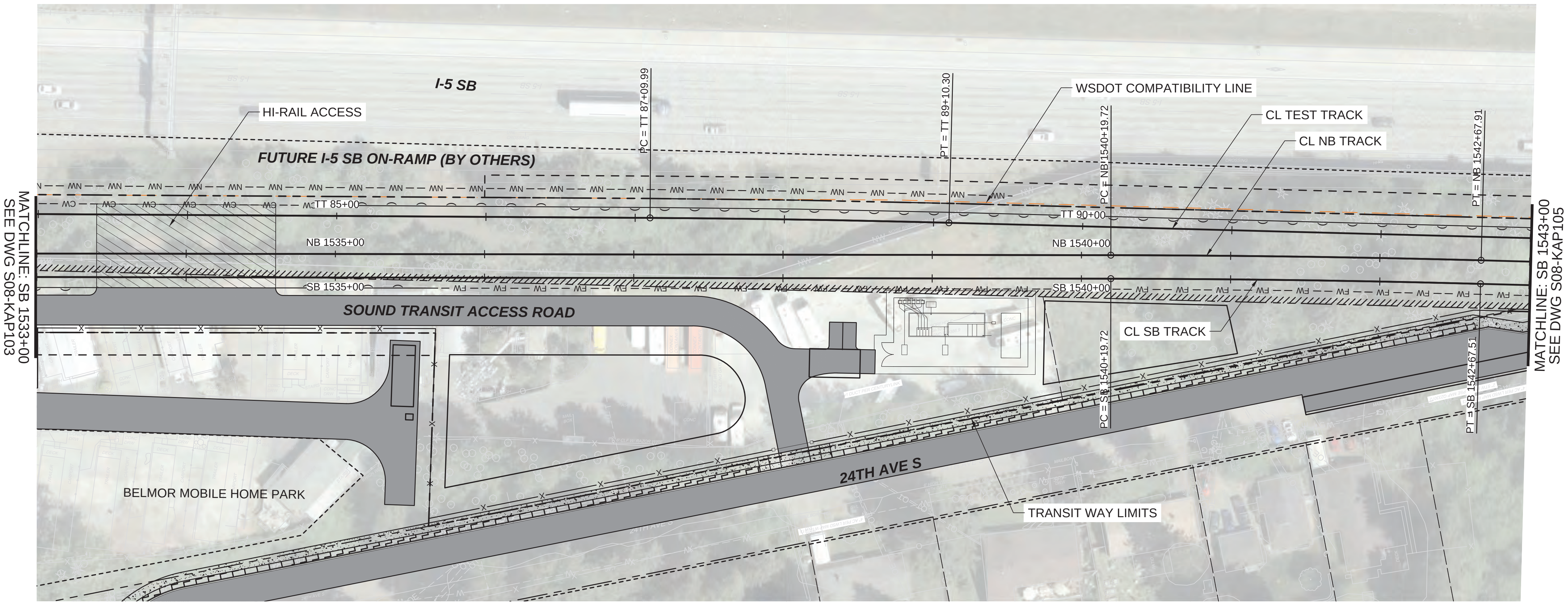
HDR

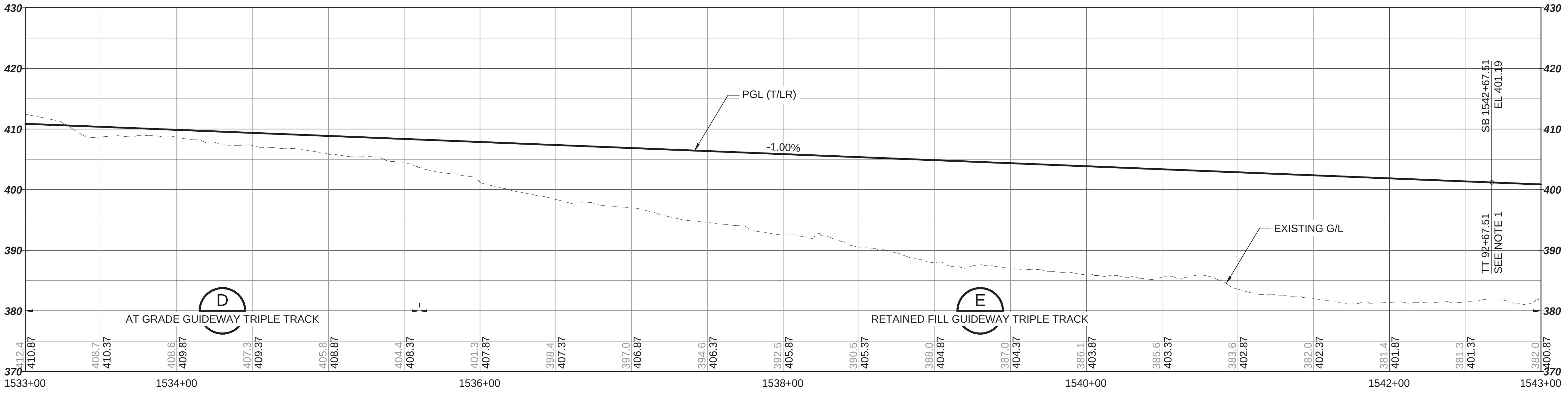
LEGEND:
COLUMNS / STRADDLE BENTS
STREAM / WETLAND
CONSTRUCTION LIMITS
TRANSIT WAY LIMITS
WSDOT COMPATIBILITY LINE

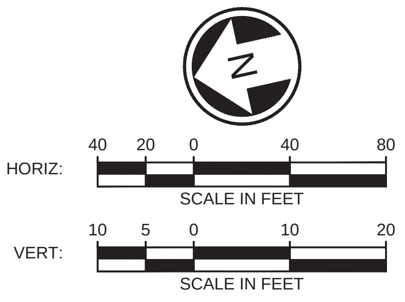
S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE - 40 MPH ALIGNMENT
SB STA 1524+00 TO SB STA 1533+00

S08-KAP103
14

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


I-5 SB
HI-RAIL ACCESS
FUTURE I-5 SB ON-RAMP (BY OTHERS)
PC = TT 87+09.99
PT = TT 89+10.30
WSDOT COMPATIBILITY LINE
PC = NB 1540+19.72
CL TEST TRACK
CL NB TRACK
PT = NB 1542+67.91
TT 85+00
TT 90+00
NB 1535+00
NB 1540+00
SB 1535+00
SB 1540+00
MATCHLINE: SB 1533+00
SEE DWG S08-KAP103
MATCHLINE: SB 1543+00
SEE DWG S08-KAP105
SOUND TRANSIT ACCESS ROAD
CL SB TRACK
PC = SB 1540+19.72
PT = SB 1542+67.51
24TH AVE S
TRANSIT WAY LIMITS
BELMOR MOBILE HOME PARK




N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
10 5 0 10 20
SCALE IN FEET

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

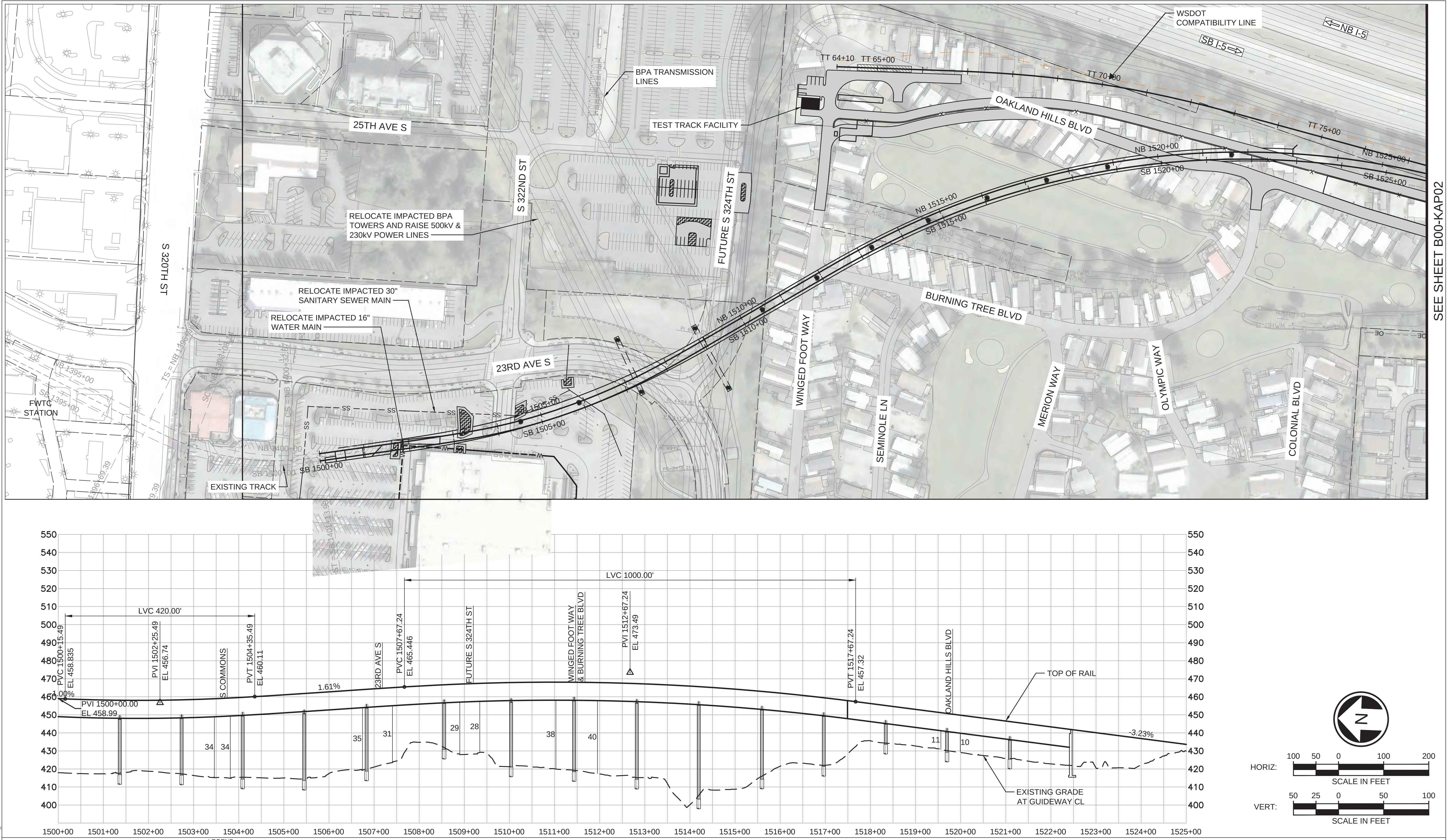
HDR

S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE - 40 MPH ALIGNMENT
SB STA 1533+00 TO SB STA 1543+00

S08B-KAP104
15

KMCDONALD
8/3/2023 5:49:22 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


WSDOT COMPATIBILITY LINE
NB I-5
SB I-5
TT 64+10
TT 65+00
TT 70+00
TT 75+00
BPA TRANSMISSION LINES
TEST TRACK FACILITY
OAKLAND HILLS BLVD
25TH AVE S
S 322ND ST
FUTURE S 324TH ST
NB 1520+00
SB 1520+00
NB 1525+00
SB 1525+00
NB 1515+00
SB 1515+00
NB 1510+00
SB 1510+00
NB 1505+00
SB 1505+00
NB 1400+00
SB 1400+00
SB 1500+00
NB 1395+00
SB 1395+00
RELOCATE IMPACTED BPA TOWERS AND RAISE 500kV & 230kV POWER LINES
RELOCATE IMPACTED 30" SANITARY SEWER MAIN
RELOCATE IMPACTED 16" WATER MAIN
S 320TH ST
23RD AVE S
BURNING TREE BLVD
WINGED FOOT WAY
SEMINOLE LN
MERION WAY
OLYMPIC WAY
COLONIAL BLVD
FWTC STATION
EXISTING TRACK
SS
SEE SHEET B00-KAP02
LVC 420.00'
LVC 1000.00'
PVC 1500+15.49 EL 458.835
PVI 1500+00.00 EL 458.99
PVI 1502+25.49 EL 456.74
S COMMONS
PVT 1504+35.49 EL 460.11
23RD AVE S
PVC 1507+67.24 EL 465.446
FUTURE S 324TH ST
WINGED FOOT WAY & BURNING TREE BLVD
PVI 1512+67.24 EL 473.49
PVT 1517+67.24 EL 457.32
OAKLAND HILLS BLVD
-1.00%
1.61%
-3.23%
TOP OF RAIL
EXISTING GRADE AT GUIDEWAY CL
34
34
35
31
29
28
38
40
11
10
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
1500+00
1501+00
1502+00
1503+00
1504+00
1505+00
1506+00
1507+00
1508+00
1509+00
1510+00
1511+00
1512+00
1513+00
1514+00
1515+00
1516+00
1517+00
1518+00
1519+00
1520+00
1521+00
1522+00
1523+00
1524+00
1525+00
N
HORIZ:
100 50 0 100 200
SCALE IN FEET
VERT:
50 25 0 50 100
SCALE IN FEET

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

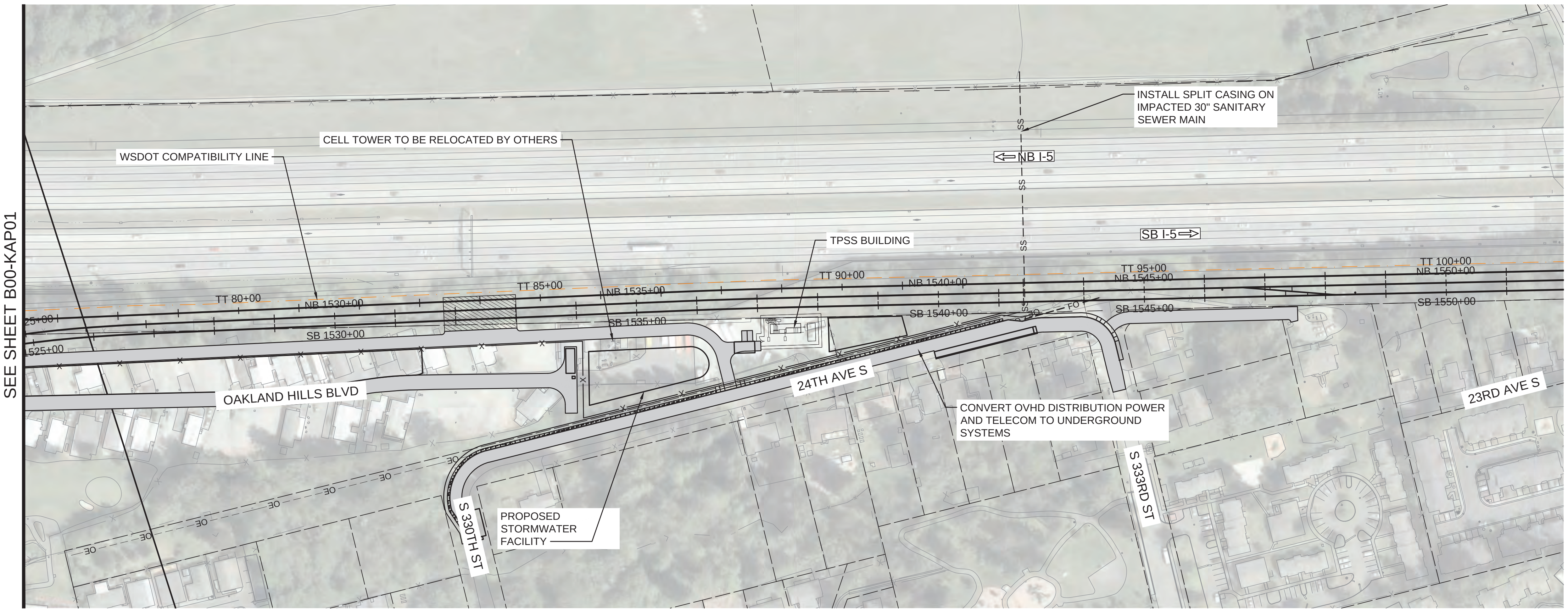
HDR

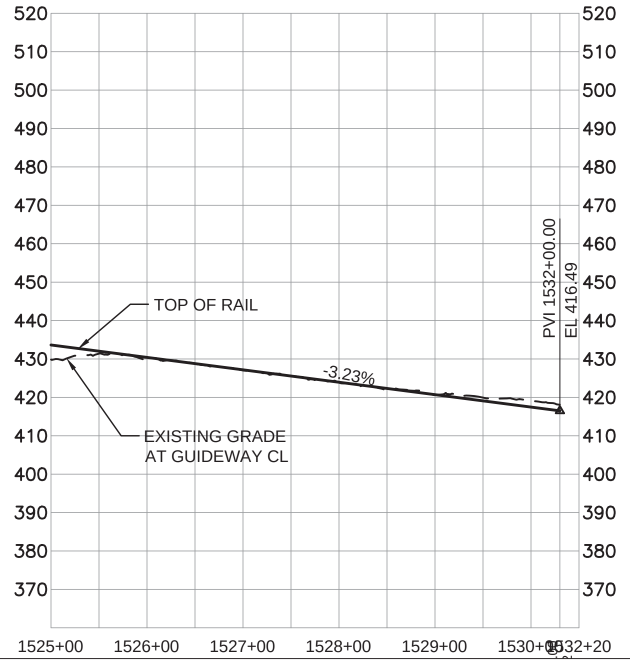
B00 - 55MPH DESIGN OPTION
TRACK PLAN AND PROFILE
SB STA 1500+00 TO SB STA 1525+00

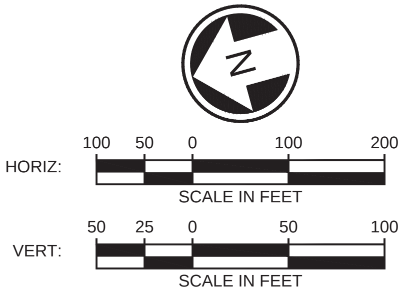
B00-KAP01
16

KMCDONALD
8/3/2023 9:27:18 AM
C:\PWWORKING\WEST01\D3124286\DEIS_B00-KAP01.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE SHEET B00-KAP01
INSTALL SPLIT CASING ON IMPACTED 30" SANITARY SEWER MAIN
CELL TOWER TO BE RELOCATED BY OTHERS
WSDOT COMPATIBILITY LINE
NB I-5
SB I-5
TPSS BUILDING
TT 80+00
TT 85+00
TT 90+00
TT 95+00
TT 100+00
NB 1530+00
NB 1535+00
NB 1540+00
NB 1545+00
NB 1550+00
SB 1525+00
SB 1530+00
SB 1535+00
SB 1540+00
SB 1545+00
SB 1550+00
OAKLAND HILLS BLVD
24TH AVE S
23RD AVE S
S 330TH ST
S 333RD ST
CONVERT OVHD DISTRIBUTION POWER AND TELECOM TO UNDERGROUND SYSTEMS
PROPOSED STORMWATER FACILITY
SS
OE
FO




N
HORIZ:
100
50
0
100
200
SCALE IN FEET
VERT:
50
25
0
50
100
SCALE IN FEET

KMCDONALD
8/3/2023 9:27:44 AM
C:\PWWORKING\WEST01\D3124286\DEIS_B00-KAP01.DWG

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

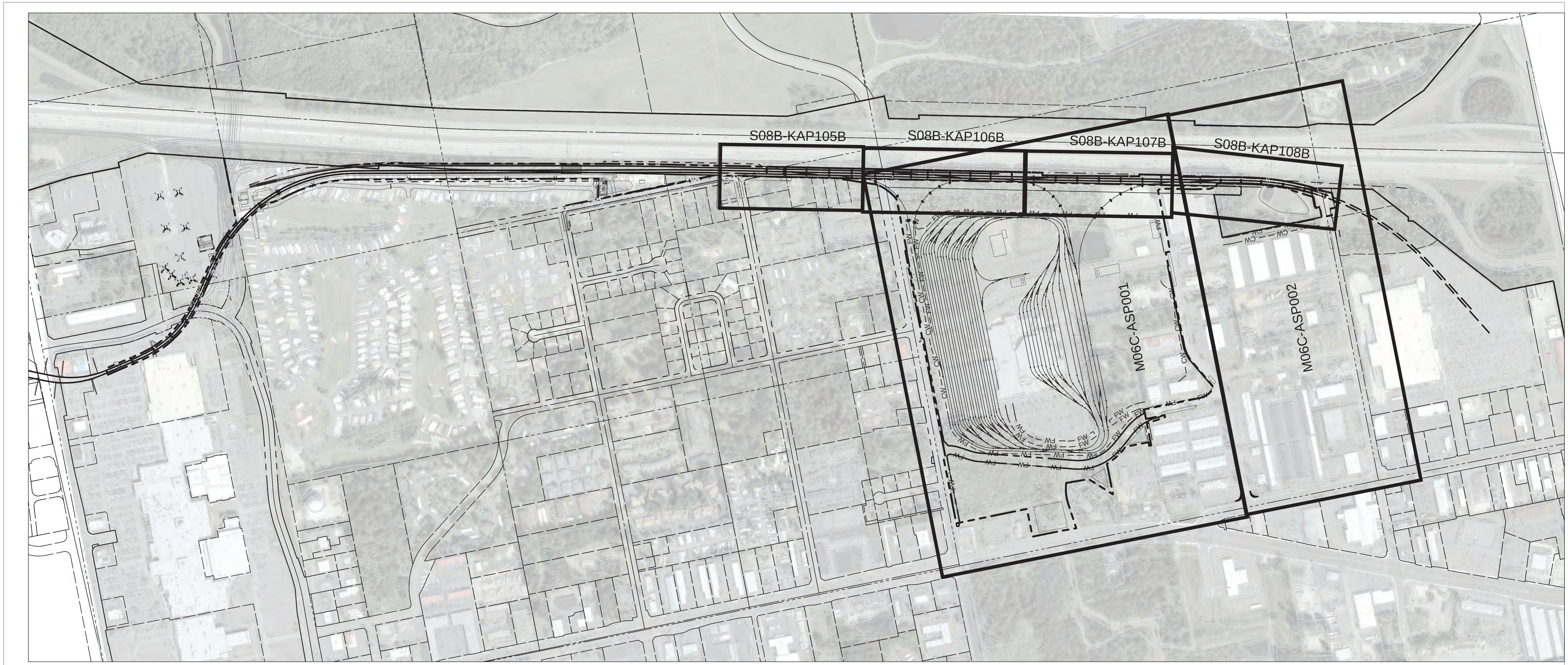
SOUNDTRANSIT

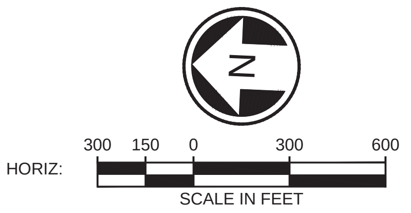
HDR

B00 - 55MPH DESIGN OPTION
TRACK PLAN AND PROFILE
SB STA 1525+00 TO SB STA 1532+20

B00-KAP02
17

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


S08B-KAP105B
S08B-KAP106B
S08B-KAP107B
S08B-KAP108B
M06C-ASP001
M06C-ASP002
CW
FW


N
300
150
0
300
600
HORIZ:
SCALE IN FEET

LEGEND:

- COLUMNS / STRADDLE BENTS
- STREAM / WETLAND
- CONSTRUCTION LIMITS
- TRANSIT WAY LIMITS
- WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

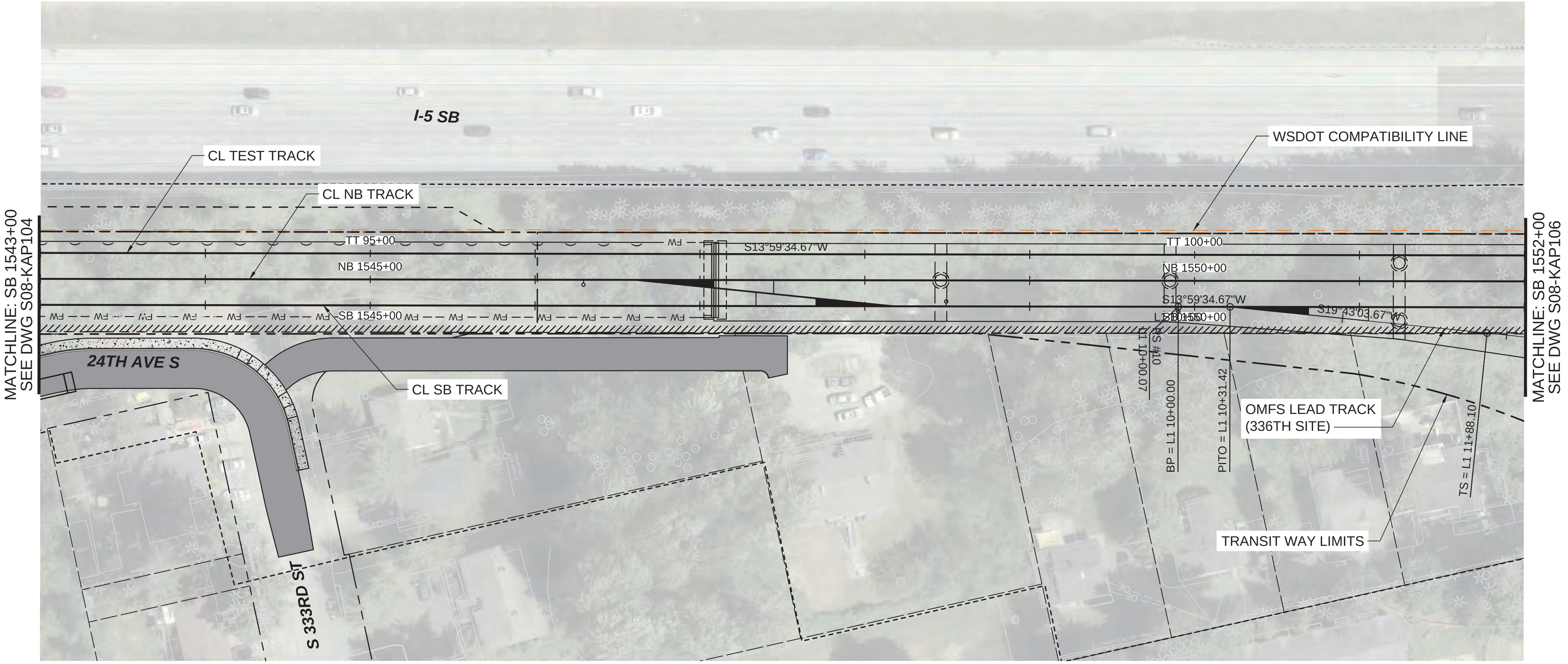
HDR

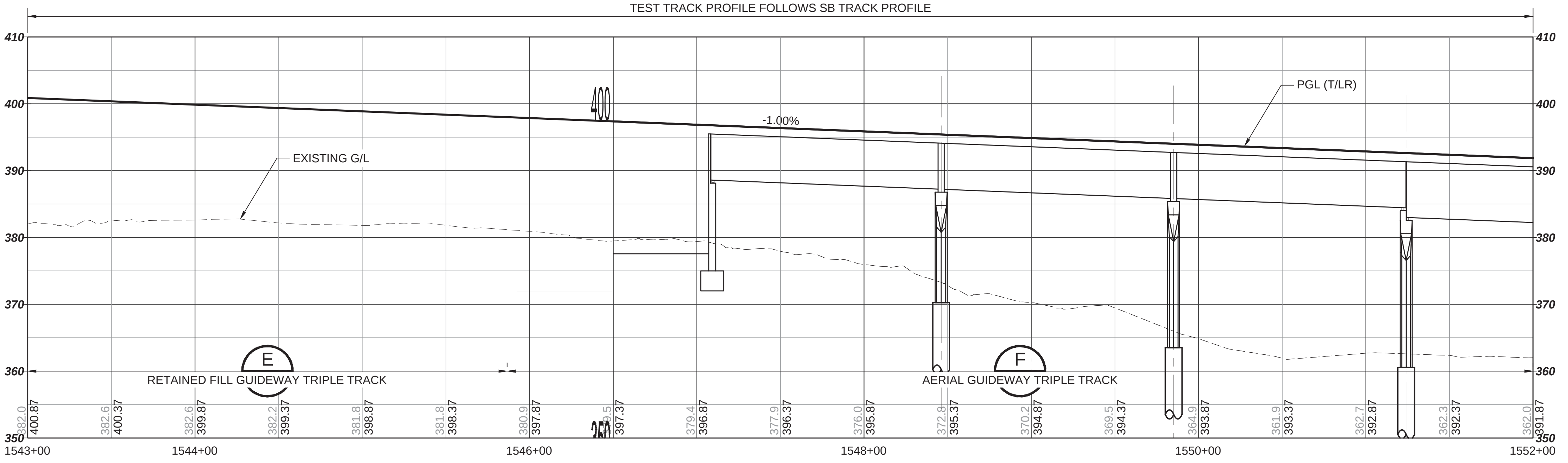
S08B- S 336TH ST SITE
KEYMAP

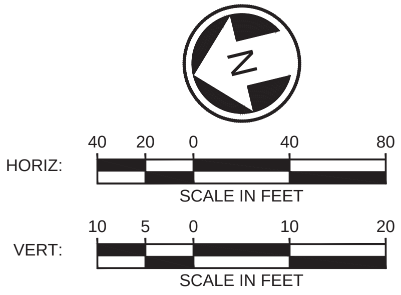
S08B-KAP001
18

5/5/2023 6:22:49 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08-KAP000.DWG
ASCHEPPE

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


I-5 SB
CL TEST TRACK
CL NB TRACK
WSDOT COMPATIBILITY LINE
MATCHLINE: SB 1543+00
SEE DWG S08-KAP104
TT 95+00
NB 1545+00
SB 1545+00
S13°59'34.67"W
24TH AVE S
CL SB TRACK
S 333RD ST
TT 100+00
NB 1550+00
S13°59'34.67"W
S19°43'03.67"W
SB 1550+00
L1 10+00
RS #10
L1 10+00.07
BP = L1 10+00.00
PITO = L1 10+31.42
TS = L1 11+88.10
OMFS LEAD TRACK
(336TH SITE)
TRANSIT WAY LIMITS
MATCHLINE: SB 1552+00
SEE DWG S08-KAP106


TEST TRACK PROFILE FOLLOWS SB TRACK PROFILE
410
400
390
380
370
360
350
PGL (T/LR)
-1.00%
EXISTING G/L
E
RETAINED FILL GUIDEWAY TRIPLE TRACK
F
AERIAL GUIDEWAY TRIPLE TRACK
382.0 400.87
382.6 400.37
382.6 399.87
382.2 399.37
381.8 398.87
381.8 398.37
380.9 397.87
379.5 397.37
379.4 396.87
377.9 396.37
376.0 395.87
372.8 395.37
370.2 394.87
369.5 394.37
364.9 393.87
361.9 393.37
362.7 392.87
362.3 392.37
362.0 391.87
1543+00
1544+00
1546+00
1548+00
1550+00
1552+00


N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
10 5 0 10 20
SCALE IN FEET

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

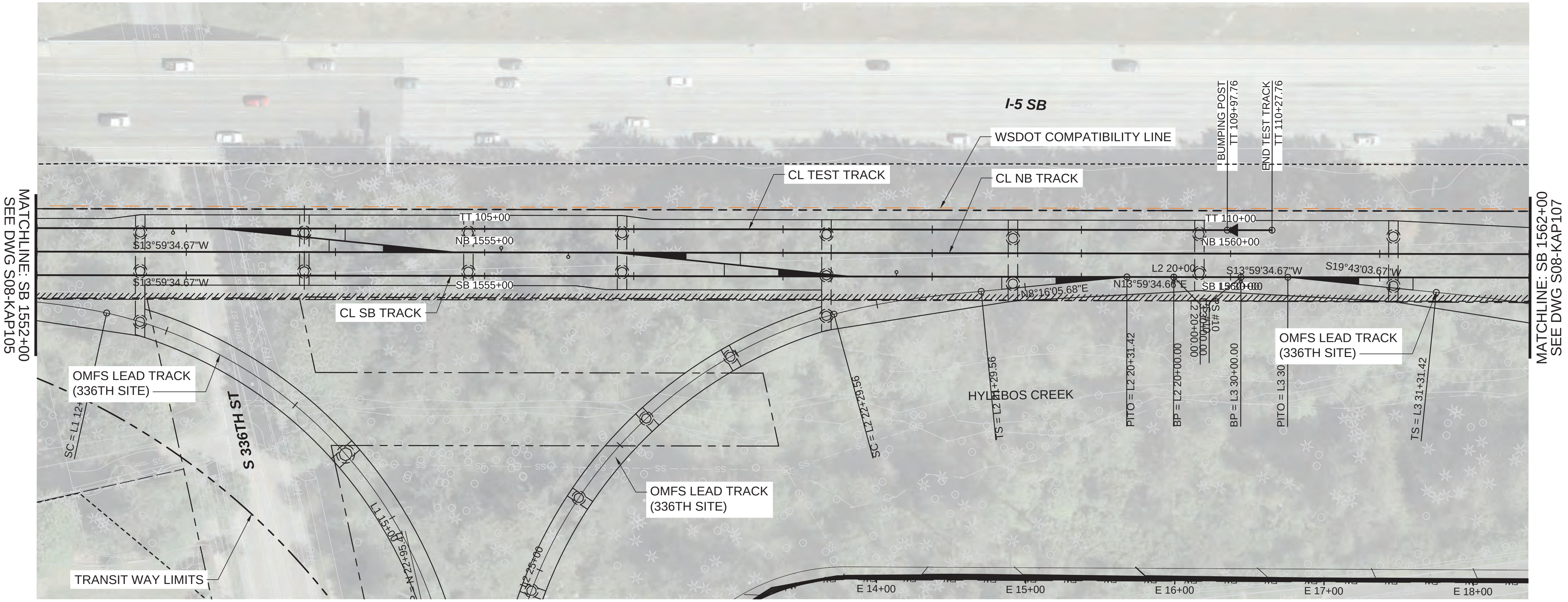
HDR

S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1543+00 TO SB STA 1552+00

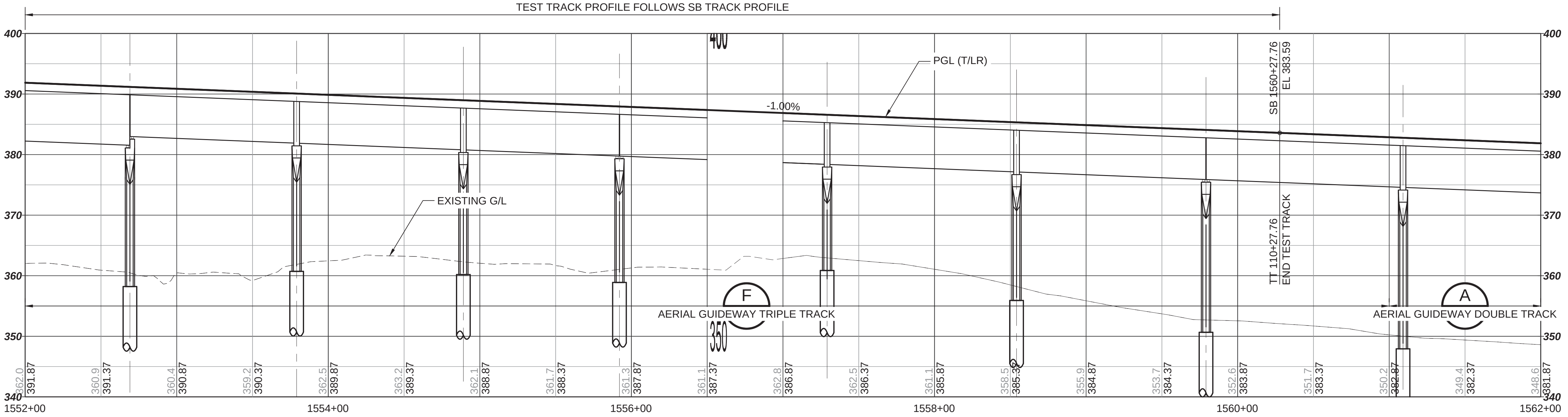
S08B-KAP105
19

KMCDONALD
8/3/2023 6:02:04 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

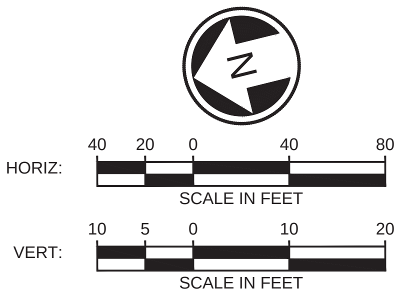
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH



MATCHLINE: SB 1552+00
SEE DWG S08-KAP105
I-5 SB
WSDOT COMPATIBILITY LINE
BUMPING POST
TT 109+97.76
END TEST TRACK
TT 110+27.76
CL TEST TRACK
CL NB TRACK
TT 105+00
TT 110+00
NB 1555+00
NB 1560+00
S13°59'34.67"W
S13°59'34.67"W
SB 1555+00
SB 1560+00
L2 20+00
N8°16'05.68"E
N13°59'34.66"E
S19°43'03.67"W
CL SB TRACK
OMFS LEAD TRACK
(336TH SITE)
OMFS LEAD TRACK
(336TH SITE)
OMFS LEAD TRACK
(336TH SITE)
S 336TH ST
HYLEBOS CREEK
SC = L1 12+
SC = L2 22+29.56
TS = L2 21+29.56
PITO = L2 20+31.42
BP = L2 20+00.00
BP = L3 30+00.00
PITO = L3 30
TS = L3 31+31.42
L1 15+00
L2 25+00
TRANSIT WAY LIMITS
MATCHLINE: SB 1562+00
SEE DWG S08-KAP107
E 14+00
E 15+00
E 16+00
E 17+00
E 18+00



TEST TRACK PROFILE FOLLOWS SB TRACK PROFILE
400
390
380
370
360
350
340
PGL (T/LR)
-1.00%
SB 1560+27.76
EL 383.59
EXISTING G/L
TT 110+27.76
END TEST TRACK
F
AERIAL GUIDEWAY TRIPLE TRACK
A
AERIAL GUIDEWAY DOUBLE TRACK
362.0 391.87
360.9 391.37
360.4 390.87
359.2 390.37
362.5 389.87
363.2 389.37
362.1 388.87
361.7 388.37
361.3 387.87
361.1 387.37
362.8 386.87
362.5 386.37
361.1 385.87
358.5 385.37
355.9 384.87
353.7 384.37
352.6 383.87
351.7 383.37
350.2 382.87
349.4 382.37
348.6 381.87
1552+00
1554+00
1556+00
1558+00
1560+00
1562+00



N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
10 5 0 10 20
SCALE IN FEET

SOUNDTRANSIT

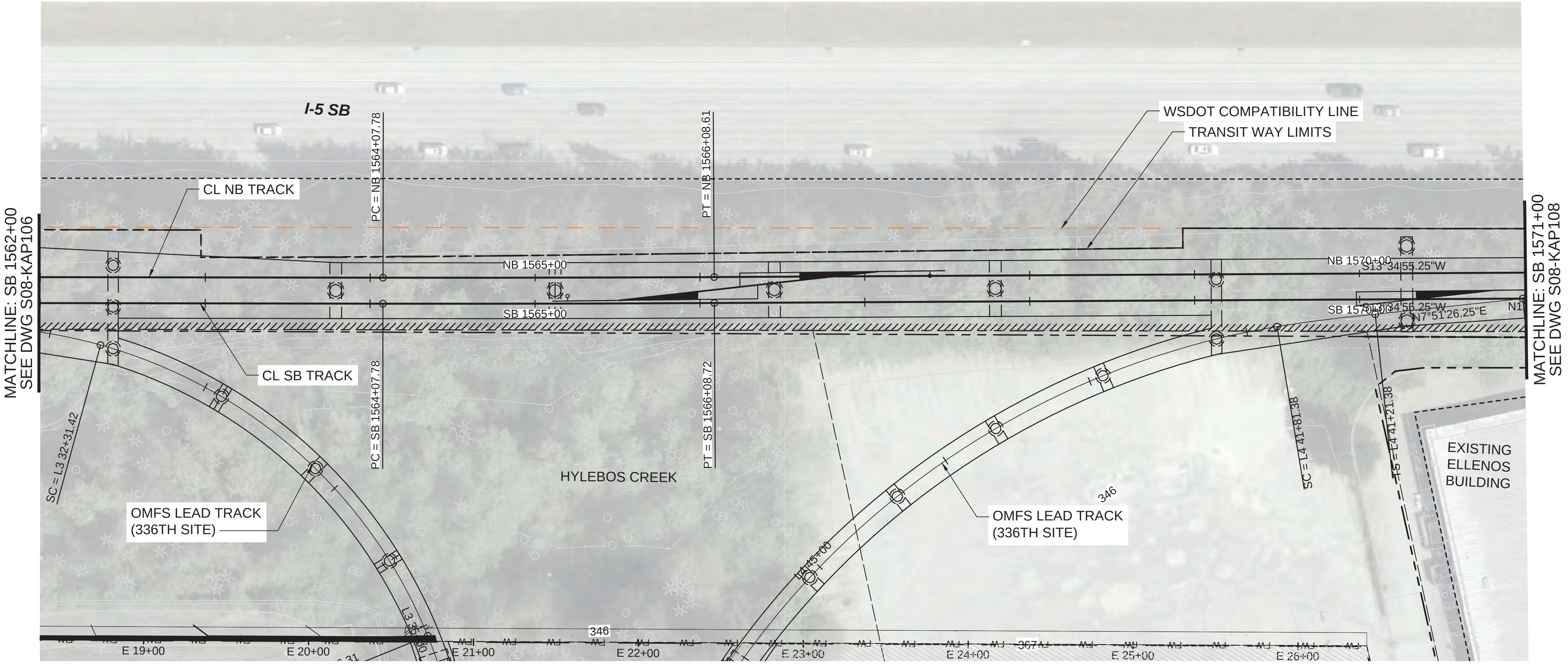
HDR

LEGEND:

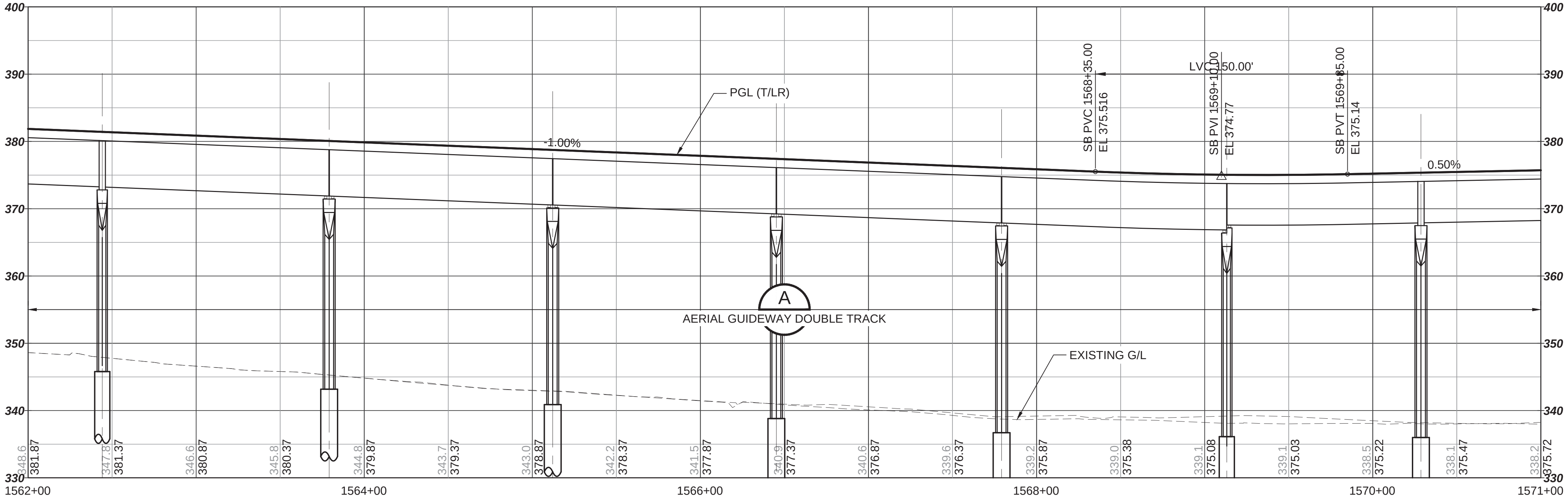
- ○ ○═══○ COLUMNS / STRADDLE BENTS
- — · — · — STREAM / WETLAND
- - - - - - CONSTRUCTION LIMITS
- — — — — TRANSIT WAY LIMITS
- — — — — WSDOT COMPATIBILITY LINE

S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1552+00 TO SB STA 1562+00

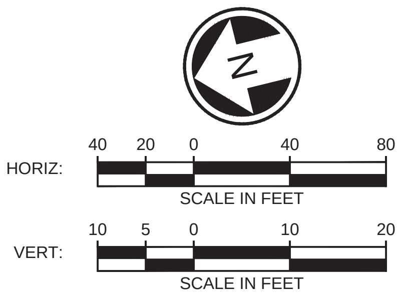
SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH



I-5 SB
MATCHLINE: SB 1562+00
SEE DWG S08-KAP106
CL NB TRACK
PC = NB 1564+07.78
PT = NB 1566+08.61
WSDOT COMPATIBILITY LINE
TRANSIT WAY LIMITS
NB 1565+00
SB 1565+00
NB 1570+00
S13°34'55.25"W
SB 1570+00
N7°51'26.25"E
MATCHLINE: SB 1571+00
SEE DWG S08-KAP108
CL SB TRACK
PC = SB 1564+07.78
PT = SB 1566+08.72
SC = L3 32+31.42
SC = L4 41+81.38
TS = L4 41+21.38
HYLEBOS CREEK
EXISTING ELLENOS BUILDING
OMFS LEAD TRACK (336TH SITE)
OMFS LEAD TRACK (336TH SITE)
346
346
367
E 19+00
E 20+00
E 21+00
E 22+00
E 23+00
E 24+00
E 25+00
E 26+00



400
390
380
370
360
350
340
330
PGL (T/LR)
-1.00%
0.50%
SB PVC 1568+35.00
EL 375.516
LVC 350.00'
SB PVI 1569+10.00
EL 374.77
SB PVT 1569+85.00
EL 375.14
A
AERIAL GUIDEWAY DOUBLE TRACK
EXISTING G/L
348.6 381.87
347.8 381.37
346.6 380.87
345.8 380.37
344.8 379.87
343.7 379.37
343.0 378.87
342.2 378.37
341.5 377.87
340.9 377.37
340.6 376.87
339.6 376.37
339.2 375.87
339.0 375.38
339.1 375.08
339.1 375.03
338.5 375.22
338.1 375.47
338.2 375.72
1562+00
1564+00
1566+00
1568+00
1570+00
1571+00



N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
10 5 0 10 20
SCALE IN FEET

8/3/2023 5:52:01 PM
KMCDONALD
C:\PWWORKING\WEST01\D3124298\OMFS-S08B-KAP100-108.DWG

SOUNDTRANSIT
HDR

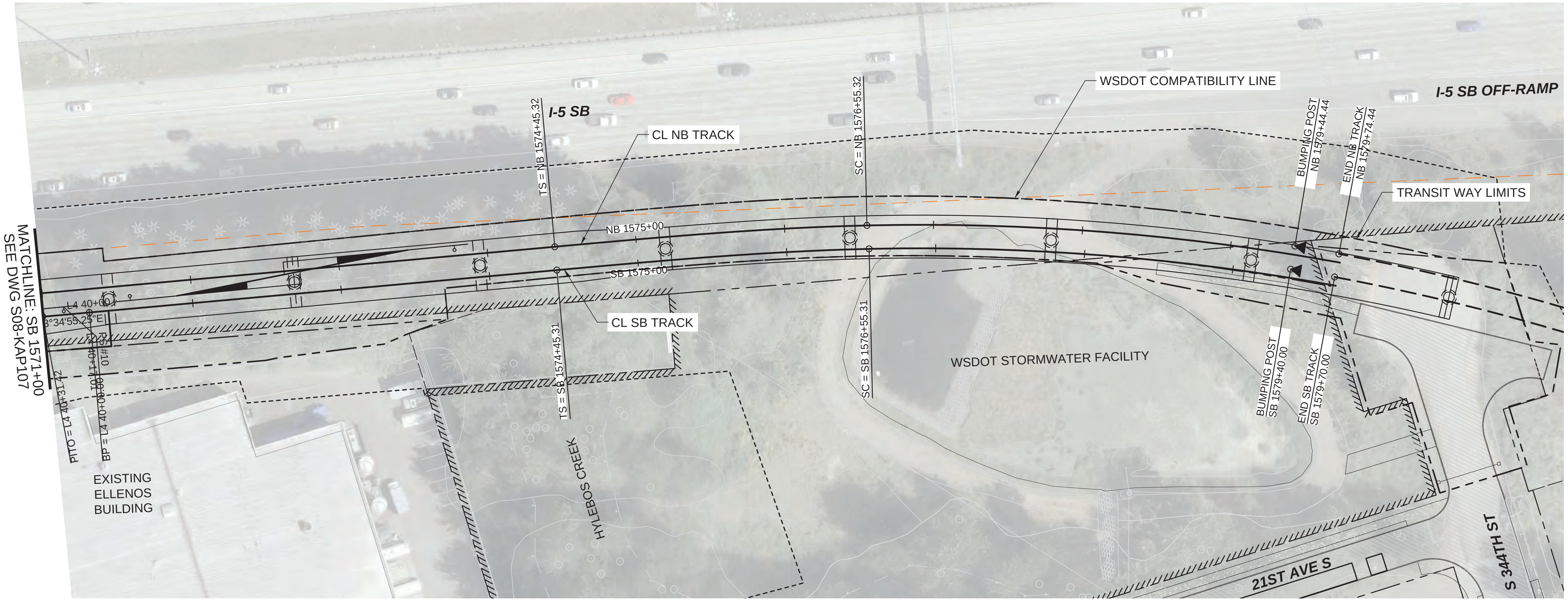
LEGEND:

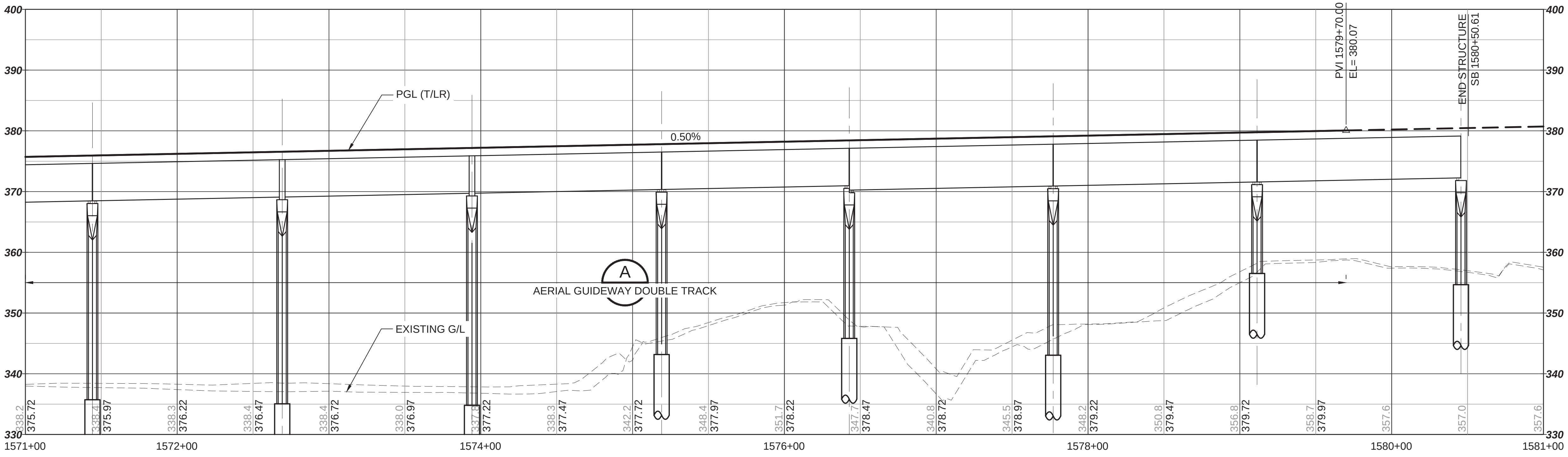
◎ ○═○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— · — · —	WSDOT COMPATIBILITY LINE

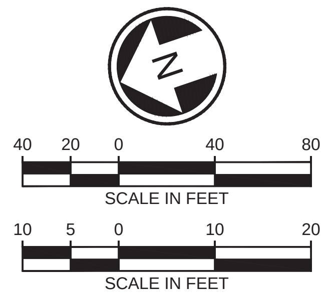
S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1562+00 TO SB STA 1571+00

S08B-KAP107
21

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


MATCHLINE: SB 1571+00
SEE DWG S08-KAP107
I-5 SB
I-5 SB OFF-RAMP
WSDOT COMPATIBILITY LINE
CL NB TRACK
CL SB TRACK
TRANSIT WAY LIMITS
TS = NB 1574+45.32
SC = NB 1576+55.32
BUMPING POST NB 1579+44.44
END NB TRACK NB 1579+74.44
NB 1575+00
SB 1575+00
L4 40+00
8°34'55.25"E
PITO = L4 40+31.42
BP = L4 40+00.00
L4 40+17.01
PS #10
TS = SB 1574+45.31
SC = SB 1576+55.31
BUMPING POST SB 1579+40.00
END SB TRACK SB 1579+70.00
WSDOT STORMWATER FACILITY
EXISTING ELLENOS BUILDING
HYLEBOS CREEK
21ST AVE S
S 344TH ST


400
390
380
370
360
350
340
330
PVI 1579+70.00
EL= 380.07
END STRUCTURE
SB 1580+50.61
PGL (T/LR)
0.50%
A
AERIAL GUIDEWAY DOUBLE TRACK
EXISTING G/L
338.2 375.72
338.4 375.97
338.3 376.22
338.4 376.47
338.4 376.72
338.0 376.97
337.8 377.22
338.3 377.47
342.2 377.72
348.4 377.97
351.7 378.22
347.7 378.47
340.8 378.72
345.5 378.97
348.2 379.22
350.8 379.47
356.8 379.72
358.7 379.97
357.6
357.0
357.6
1571+00
1572+00
1574+00
1576+00
1578+00
1580+00
1581+00


N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
10 5 0 10 20
SCALE IN FEET

KMCDONALD
8/3/2023 5:52:55 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08B-KAP100-108.DWG

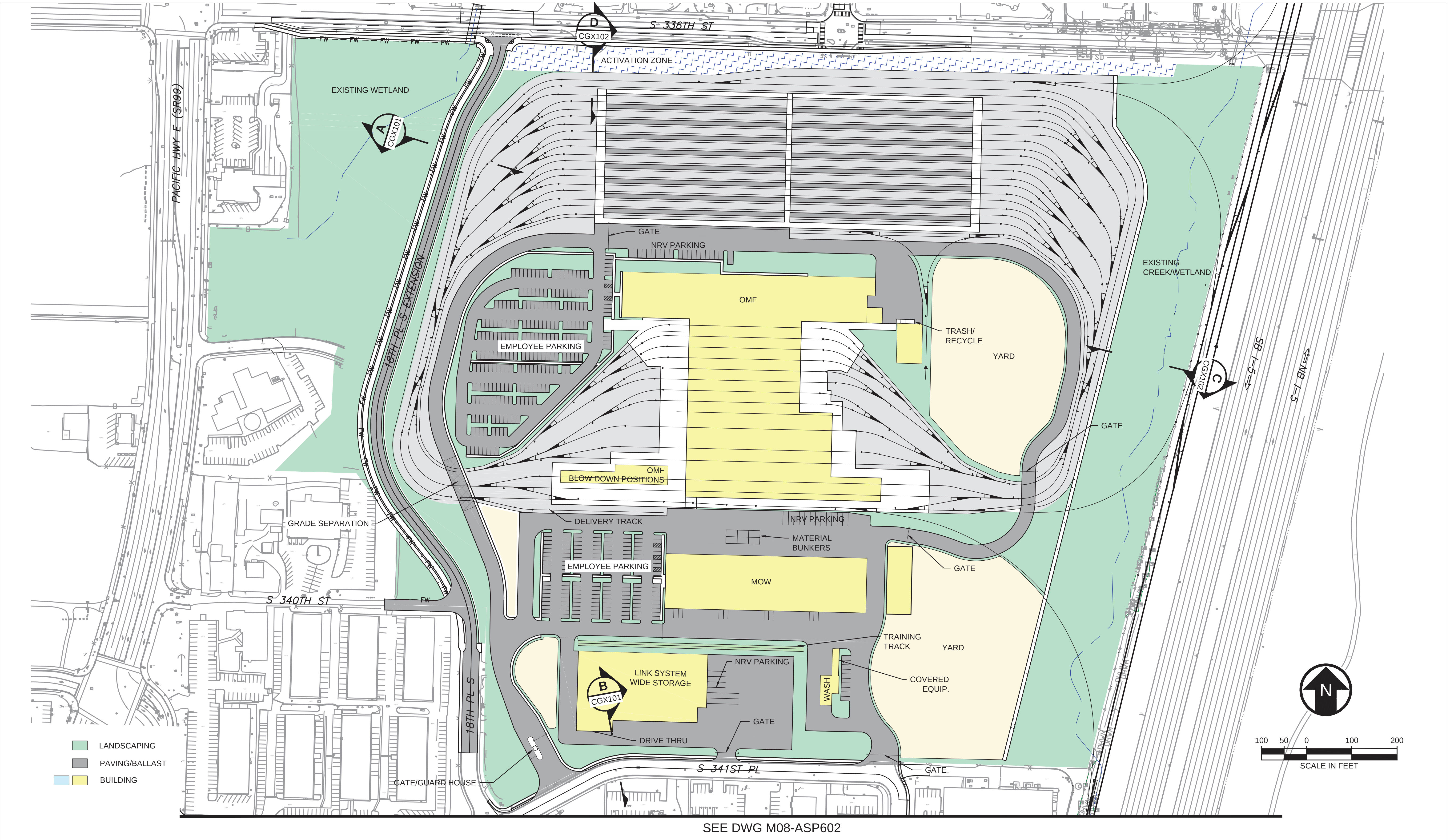
LEGEND:

○ ○═○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

S08B - S 336TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1571+00 TO SB STA 1579+70

S08B-KAP108
22

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


S 336TH ST
D
CGX102
ACTIVATION ZONE
EXISTING WETLAND
A
CGX101
PACIFIC HWY E (SR99)
18TH PL S EXTENSION
GATE
NRV PARKING
OMF
TRASH/ RECYCLE
YARD
EMPLOYEE PARKING
EXISTING CREEK/WETLAND
SB I-5
NB I-5
C
CGX102
GATE
OMF BLOW DOWN POSITIONS
GRADE SEPARATION
DELIVERY TRACK
NRV PARKING
MATERIAL BUNKERS
EMPLOYEE PARKING
MOW
GATE
S 340TH ST
TRAINING TRACK
YARD
NRV PARKING
LINK SYSTEM WIDE STORAGE
B
CGX101
WASH
COVERED EQUIP.
18TH PL S
GATE
DRIVE THRU
S 341ST PL
GATE
GATE/GUARD HOUSE
LANDSCAPING
PAVING/BALLAST
BUILDING
N
100 50 0 100 200
SCALE IN FEET
SEE DWG M08-ASP602

5/5/2023 5:35:44 PM JLUM
C:\PWWORKING\WEST01\D3124286\OMFS-M08-ASP601.DWG

SOUNDTRANSIT

HDR

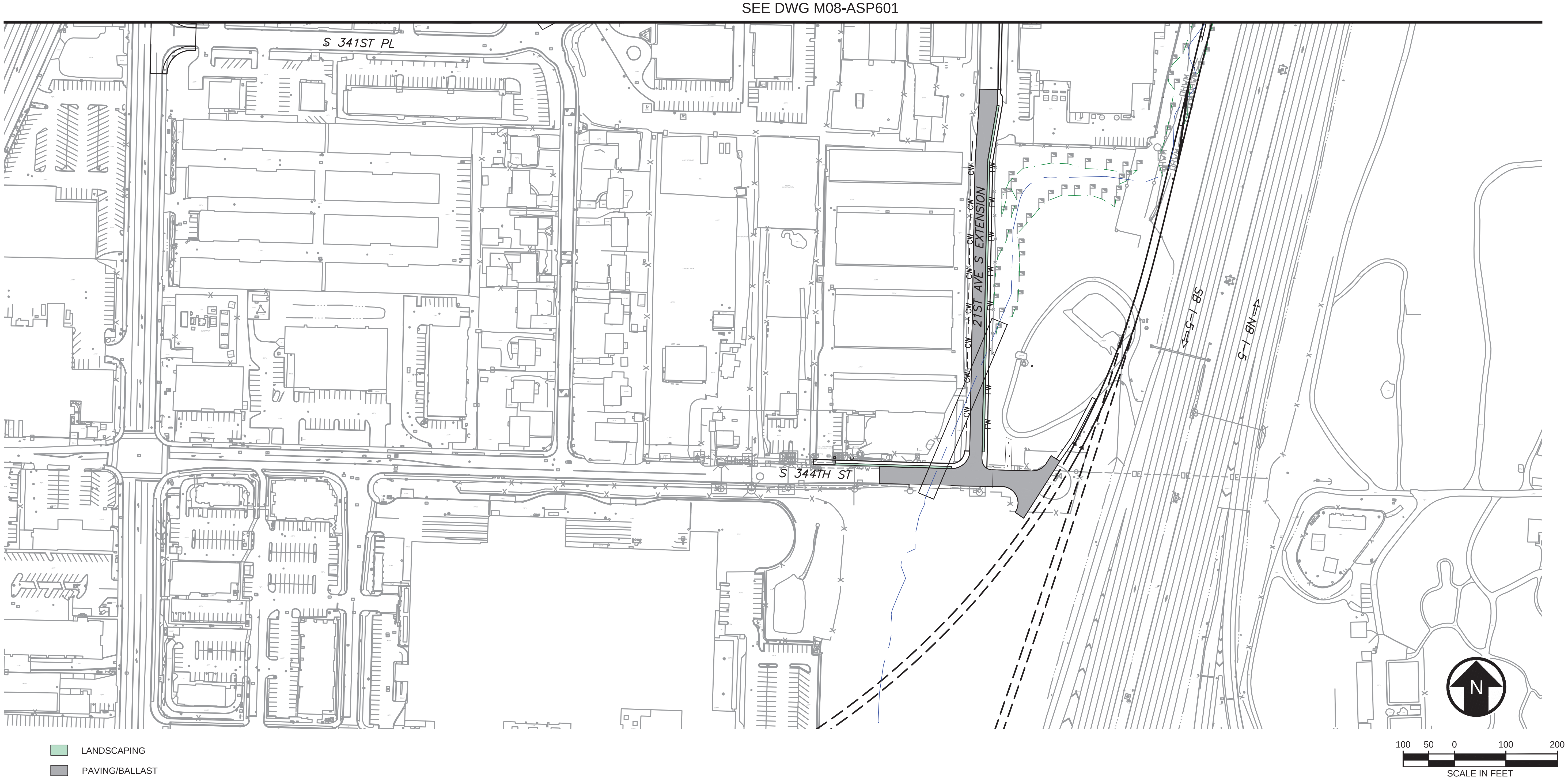
LEGEND:

COLUMNS / STRADDLE BENTS
STREAM / WETLAND
CONSTRUCTION LIMITS
TRANSIT WAY LIMITS
WSDOT COMPATIBILITY LINE

M08 - S 336TH ST
ARCHITECTURAL SITE PLAN

M08-ASP601
23

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG M08-ASP601
S 341ST PL
S 344TH ST
21ST AVE S EXTENSION
CW
FW
SB I-5
NB I-5
N
100
50
0
100
200
SCALE IN FEET

🟩 LANDSCAPING

▨ PAVING/BALLAST

🟦 🟨 BUILDING

5/5/2023 5:37:50 PM
C:\PWWORKING\WEST01\D31242286\OMFS-M08-ASP601.DWG
JLUM

SOUNDTRANSIT

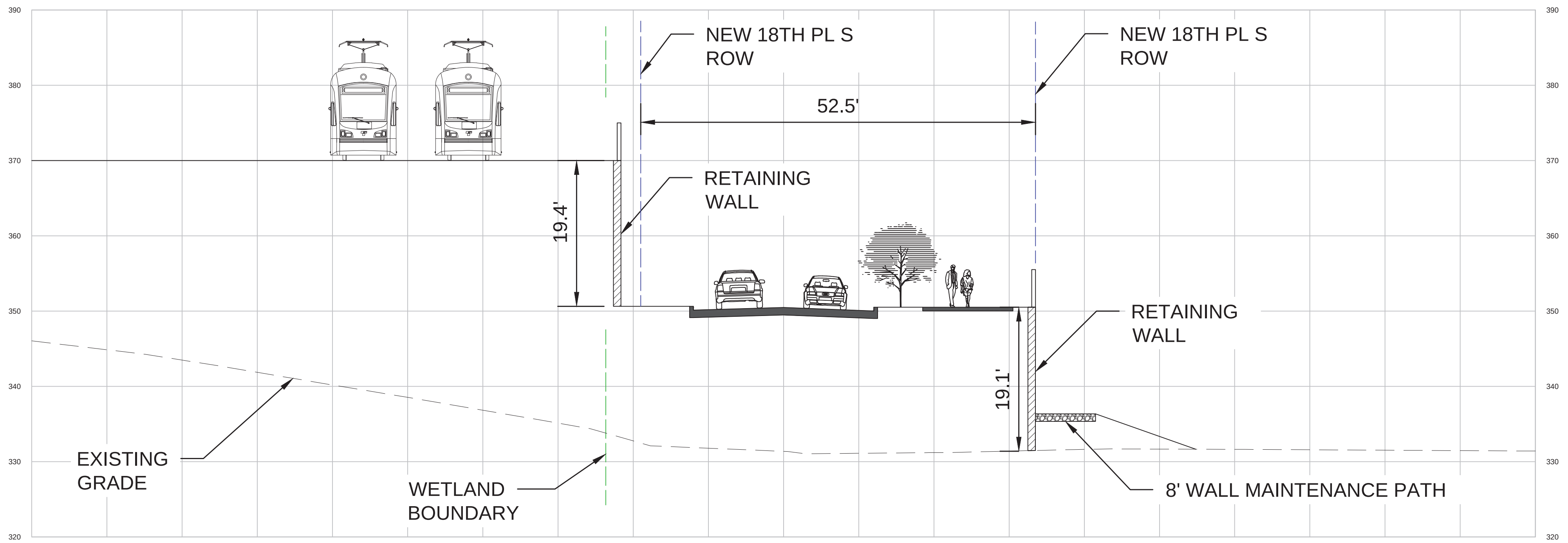
HDR

LEGEND:

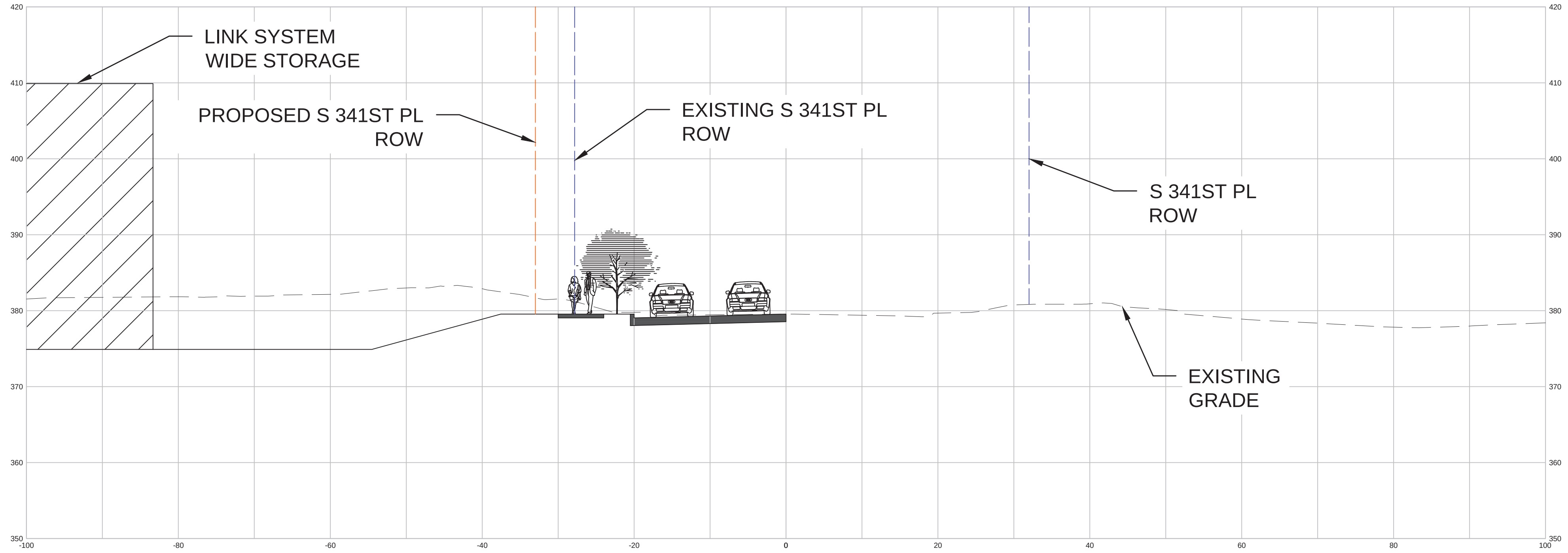
○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— · — · —	WSDOT COMPATIBILITY LINE

M08 - S 336TH ST
ARCHITECTURAL SITE PLAN

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


NEW 18TH PL S ROW
NEW 18TH PL S ROW
52.5'
RETAINING WALL
19.4'
RETAINING WALL
19.1'
EXISTING GRADE
WETLAND BOUNDARY
8' WALL MAINTENANCE PATH
390
380
370
360
350
340
330
320

18TH PL S EXTENSION A


LINK SYSTEM WIDE STORAGE
PROPOSED S 341ST PL ROW
EXISTING S 341ST PL ROW
S 341ST PL ROW
EXISTING GRADE
420
410
400
390
380
370
360
350
-100
-80
-60
-40
-20
0
20
40
60
80
100

S 341ST PL B

HSLIU
5/5/2023 4:48:23 PM
C:\PWWORKING\WEST01\D3124286\OMFS-M08-CGX101-102.DWG

SOUNDTRANSIT

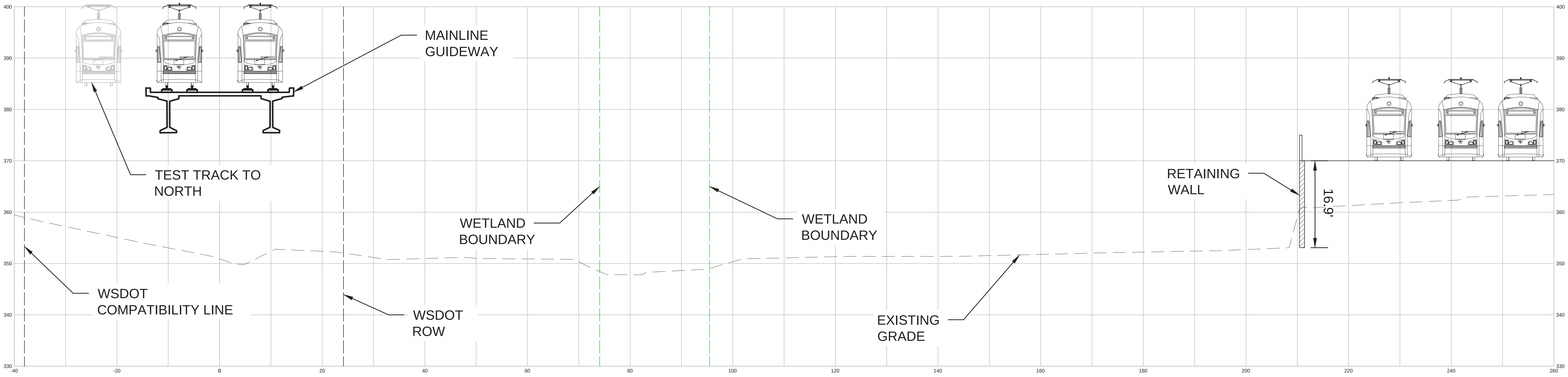
HDR

LEGEND:

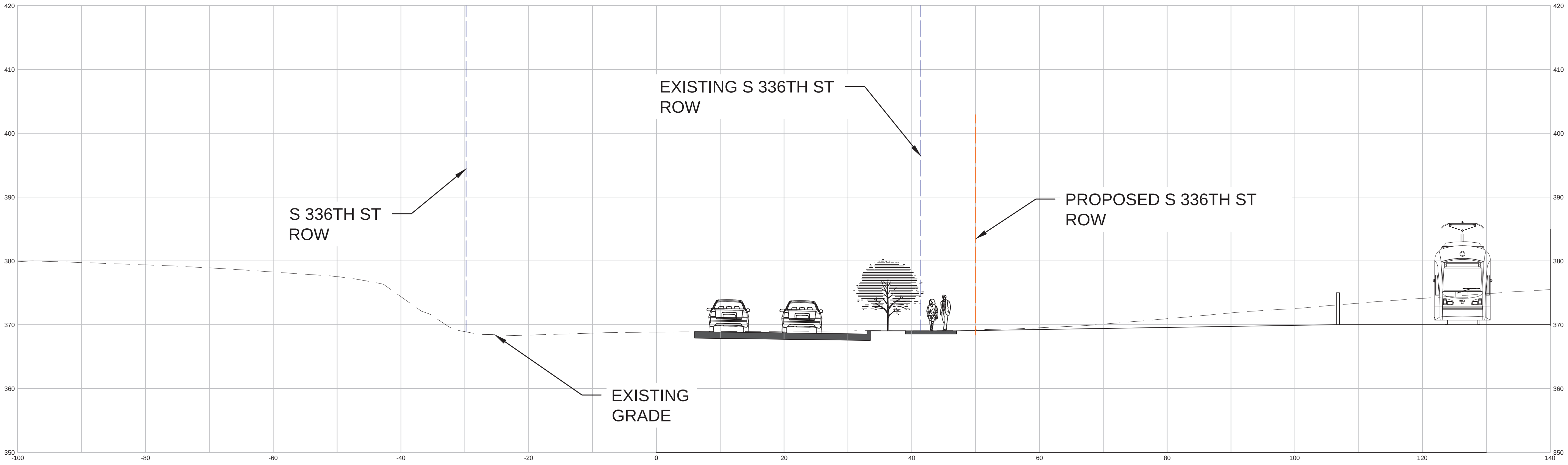
o o═══o	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - - - -	CONSTRUCTION LIMITS
— — — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

M06B - S 336TH ST SITE
S 336TH ST GRADING CROSS SECTIONS

M06B-CGX601
25


MAINLINE
GUIDEWAY
TEST TRACK TO
NORTH
WETLAND
BOUNDARY
WETLAND
BOUNDARY
RETAINING
WALL
16.9'
WSDOT
COMPATIBILITY LINE
WSDOT
ROW
EXISTING
GRADE
400
390
380
370
360
350
340
330
-40
-20
0
20
40
60
80
100
120
140
160
180
200
220
240
260

MAINLINE & SITE C


EXISTING S 336TH ST
ROW
S 336TH ST
ROW
PROPOSED S 336TH ST
ROW
EXISTING
GRADE
420
410
400
390
380
370
360
350
-100
-80
-60
-40
-20
0
20
40
60
80
100
120
140

S 336TH ST D

SOUNDTRANSIT

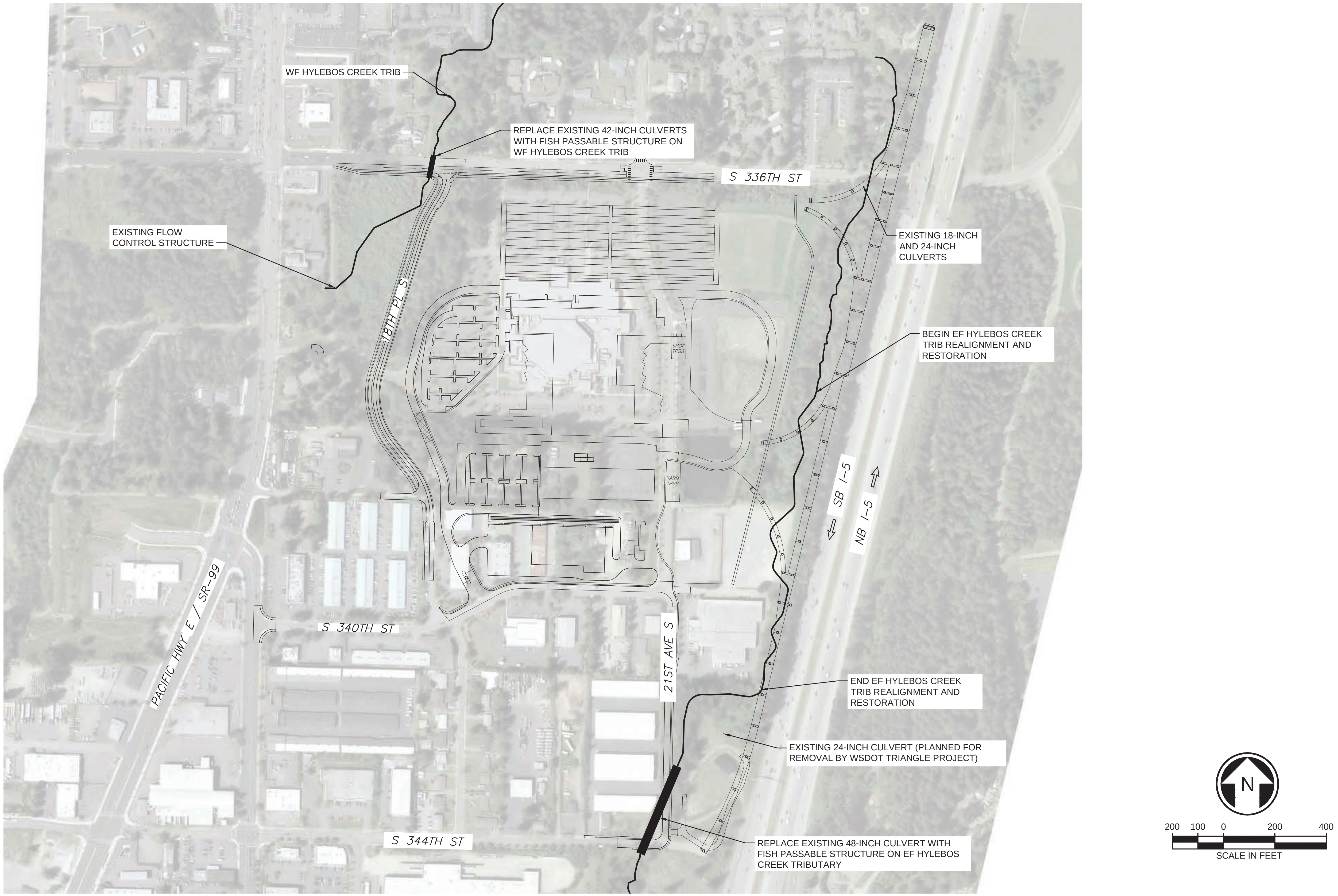
HDR

LEGEND:

- COLUMNS / STRADDLE BENTS
- STREAM / WETLAND
- CONSTRUCTION LIMITS
- TRANSIT WAY LIMITS
- WSDOT COMPATIBILITY LINE

M06B - S 336TH ST SITE
S 336TH ST GRADING CROSS SECTIONS

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


WF HYLEBOS CREEK TRIB
REPLACE EXISTING 42-INCH CULVERTS WITH FISH PASSABLE STRUCTURE ON WF HYLEBOS CREEK TRIB
S 336TH ST
EXISTING FLOW CONTROL STRUCTURE
18TH PL S
EXISTING 18-INCH AND 24-INCH CULVERTS
BEGIN EF HYLEBOS CREEK TRIB REALIGNMENT AND RESTORATION
SHOP TPSS
YARD TPSS
SB I-5
NB I-5
PACIFIC HWY E / SR-99
S 340TH ST
21ST AVE S
END EF HYLEBOS CREEK TRIB REALIGNMENT AND RESTORATION
EXISTING 24-INCH CULVERT (PLANNED FOR REMOVAL BY WSDOT TRIANGLE PROJECT)
S 344TH ST
REPLACE EXISTING 48-INCH CULVERT WITH FISH PASSABLE STRUCTURE ON EF HYLEBOS CREEK TRIBUTARY
N
200 100 0 200 400
SCALE IN FEET

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

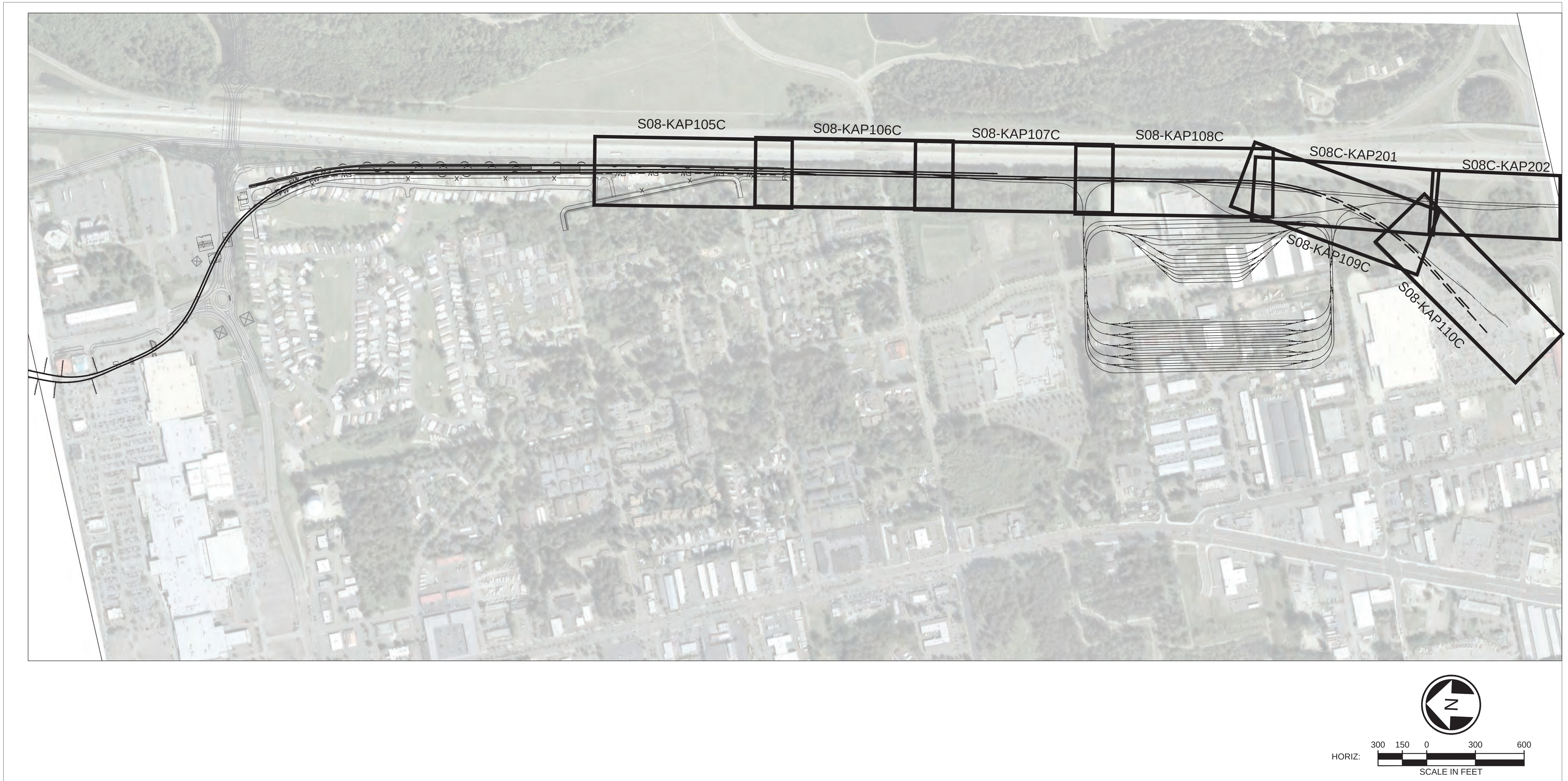
HDR

M06B - S336TH ST SITE
CREEK DRAINAGE PLAN

CDP 651
27

PLOPEZHILF
5/5/2023 4:41:31 PM
C:\PWWORKING\WEST01\D3124286\OMFS-M08-SRP100.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


S08-KAP105C
S08-KAP106C
S08-KAP107C
S08-KAP108C
S08C-KAP201
S08C-KAP202
S08-KAP109C
S08-KAP110C
N
300 150 0 300 600
HORIZ:
SCALE IN FEET

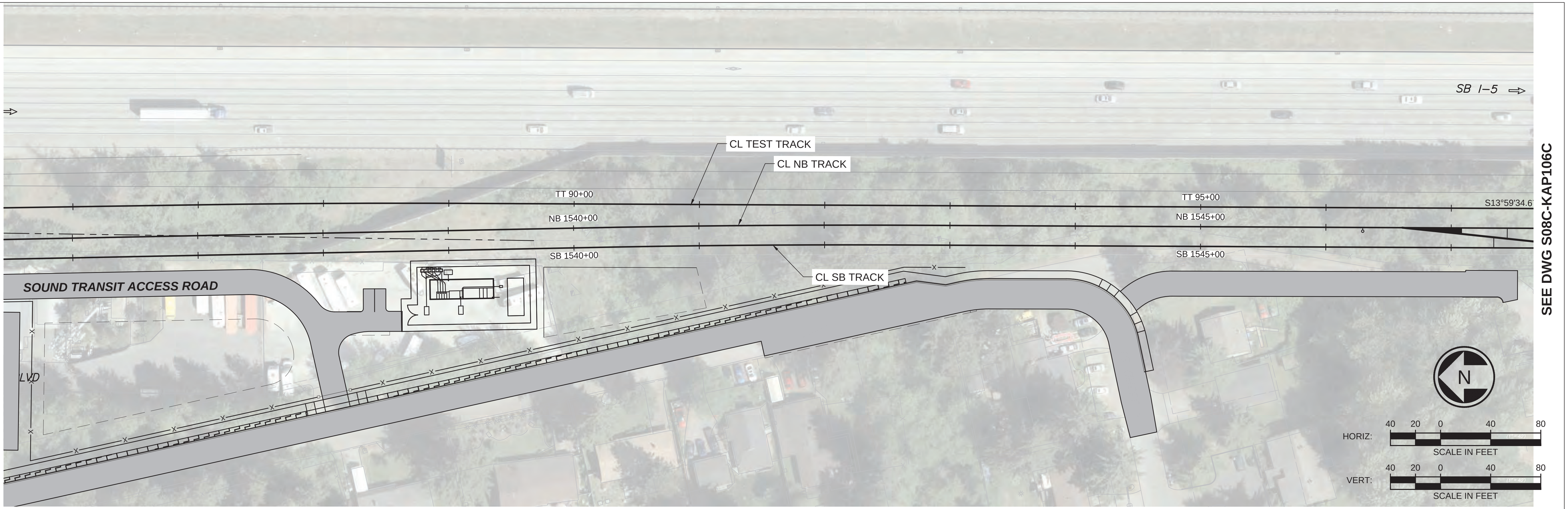
LEGEND:

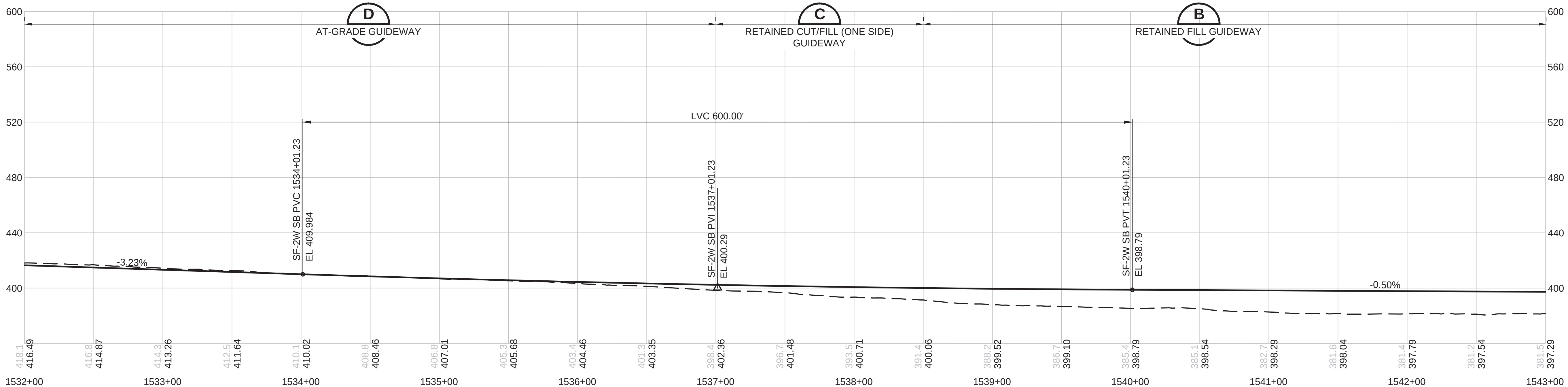
- COLUMNS / STRADDLE BENTS
- STREAM / WETLAND
- CONSTRUCTION LIMITS
- TRANSIT WAY LIMITS
- WSDOT COMPATIBILITY LINE

S08C - S 344TH ST
TRACK KEY MAP
SB STA 1500+00 TO SB STA 1504+00

JLUM
5/5/2023 7:00:13 PM
C:\PWWORKING\WEST01\D3124286\OMFS-S08C-KAP002.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SB I–5
CL TEST TRACK
CL NB TRACK
TT 90+00
TT 95+00
S13°59'34.6'
NB 1540+00
NB 1545+00
SB 1540+00
SB 1545+00
CL SB TRACK
SOUND TRANSIT ACCESS ROAD
LVD
SEE DWG S08C-KAP106C
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET



PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

ASCHEPPE
5/5/2023 4:42:52 PM
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUNDTRANSIT

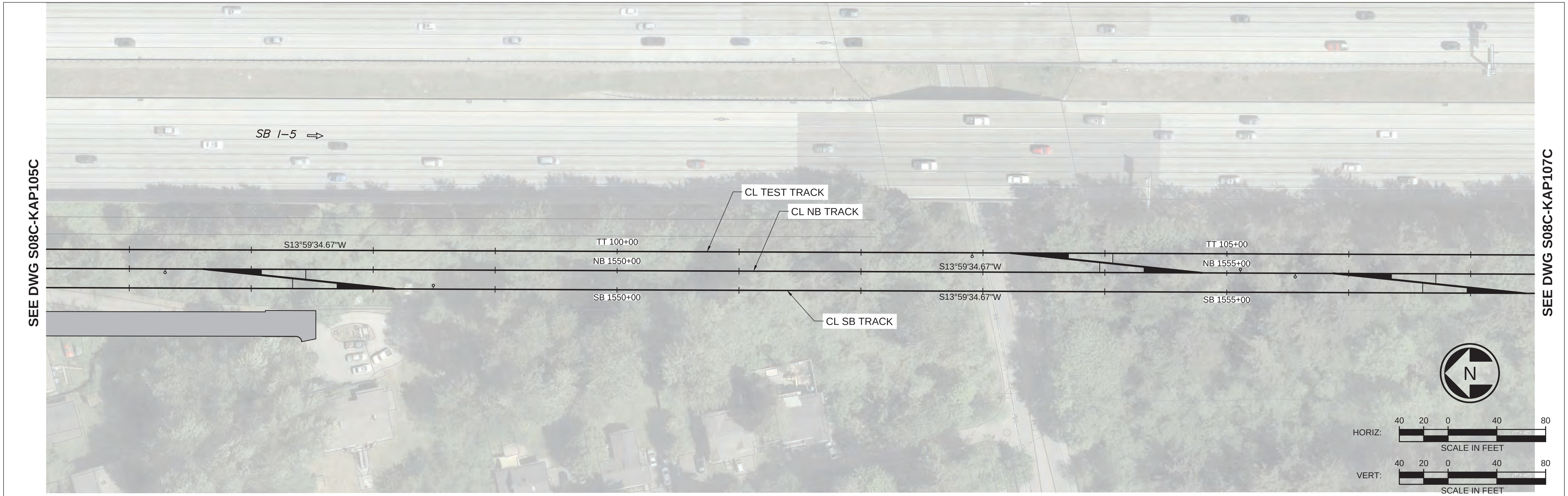
HDR

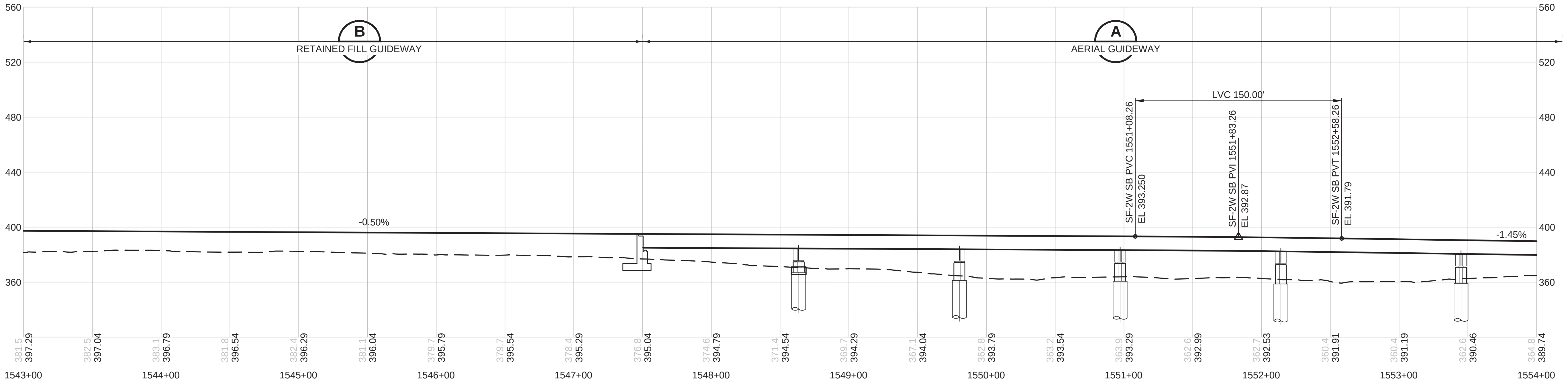
LEGEND:
- ○ ○═══○ COLUMNS / STRADDLE BENTS
- — · — · — STREAM / WETLAND
- - - - - - - CONSTRUCTION LIMITS
- — — — — TRANSIT WAY LIMITS
- — — — — WSDOT COMPATIBILITY LINE

S08C - 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1532+00 TO SB STA 1543+00

S08C-KAP105C
29

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG S08C-KAP105C
SEE DWG S08C-KAP107C
SB I–5 ⇨
CL TEST TRACK
CL NB TRACK
CL SB TRACK
S13°59'34.67"W
TT 100+00
NB 1550+00
SB 1550+00
S13°59'34.67"W
S13°59'34.67"W
TT 105+00
NB 1555+00
SB 1555+00
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET


560
520
480
440
400
360
B
RETAINED FILL GUIDEWAY
A
AERIAL GUIDEWAY
LVC 150.00'
SF-2W SB PVC 1551+08.26
EL 393.250
SF-2W SB PVI 1551+83.26
EL 392.87
SF-2W SB PVT 1552+58.26
EL 391.79
-0.50%
-1.45%
381.5 397.29
382.5 397.04
383.1 396.79
381.8 396.54
382.4 396.29
381.1 396.04
379.7 395.79
379.7 395.54
378.4 395.29
376.8 395.04
374.6 394.79
371.4 394.54
369.7 394.29
367.1 394.04
362.8 393.79
363.2 393.54
363.9 393.29
362.6 392.99
362.7 392.53
360.4 391.91
360.4 391.19
362.6 390.46
364.8 389.74
1543+00
1544+00
1545+00
1546+00
1547+00
1548+00
1549+00
1550+00
1551+00
1552+00
1553+00
1554+00

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

ASCHEPPE
5/5/2023 4:43:37 PM
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUNDTRANSIT

HDR

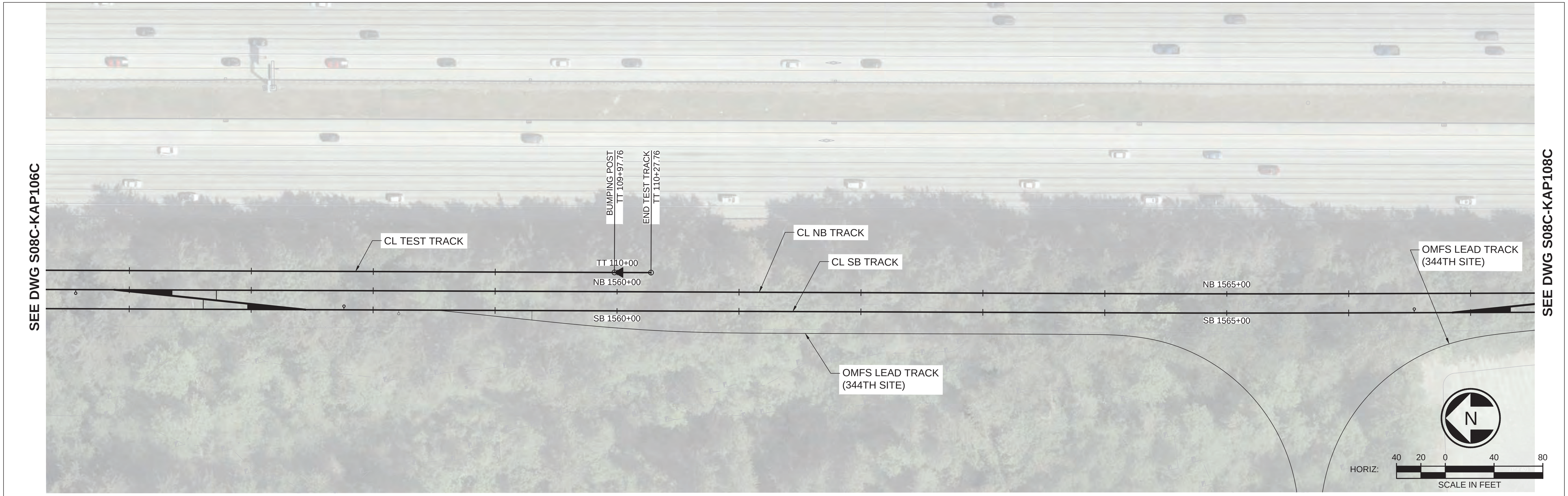
LEGEND:

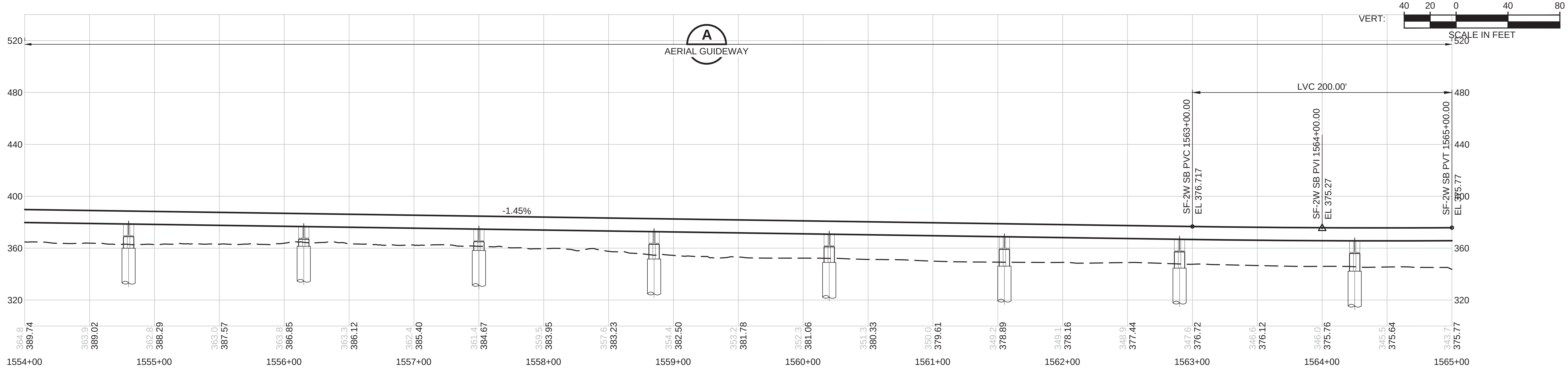
- ○ ○═○ COLUMNS / STRADDLE BENTS
- — · — · — STREAM / WETLAND
- - - - - - - CONSTRUCTION LIMITS
- — — — — TRANSIT WAY LIMITS
- — — — — WSDOT COMPATIBILITY LINE

S08C - S 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1543+00 TO SB STA 1554+00

S08C-KAP106C

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG S08C-KAP106C
BUMPING POST
TT 109+97.76
END TEST TRACK
TT 110+27.76
CL TEST TRACK
TT 110+00
NB 1560+00
CL NB TRACK
CL SB TRACK
SB 1560+00
NB 1565+00
SB 1565+00
OMFS LEAD TRACK
(344TH SITE)
OMFS LEAD TRACK
(344TH SITE)
SEE DWG S08C-KAP108C
N
40
20
0
40
80
HORIZ:
SCALE IN FEET


40
20
0
40
80
VERT:
SCALE IN FEET
A
AERIAL GUIDEWAY
520
480
440
400
360
320
-1.45%
LVC 200.00'
SF-2W SB PVC 1563+00.00
EL 376.717
SF-2W SB PVI 1564+00.00
EL 375.27
SF-2W SB PVT 1565+00.00
EL 375.77
364.8 389.74
363.9 389.02
362.8 388.29
363.0 387.57
363.8 386.85
363.3 386.12
362.4 385.40
361.4 384.67
359.5 383.95
357.6 383.23
354.4 382.50
353.2 381.78
352.3 381.06
351.3 380.33
350.0 379.61
349.2 378.89
349.1 378.16
348.9 377.44
347.6 376.72
346.6 376.12
346.0 375.76
345.5 375.64
343.7 375.77
1554+00
1555+00
1556+00
1557+00
1558+00
1559+00
1560+00
1561+00
1562+00
1563+00
1564+00
1565+00

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

SOUNDTRANSIT

HDR

LEGEND:

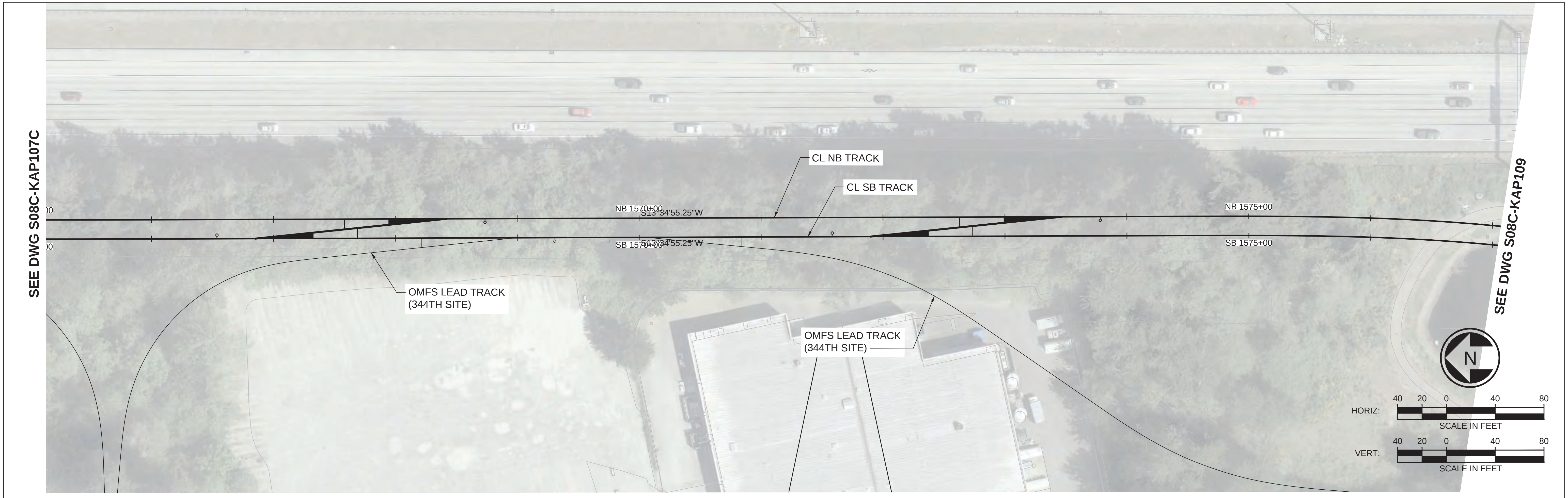
o o═══o COLUMNS / STRADDLE BENTS
— · — · — STREAM / WETLAND
- - - - - - CONSTRUCTION LIMITS
— — — — TRANSIT WAY LIMITS
— — — — WSDOT COMPATIBILITY LINE

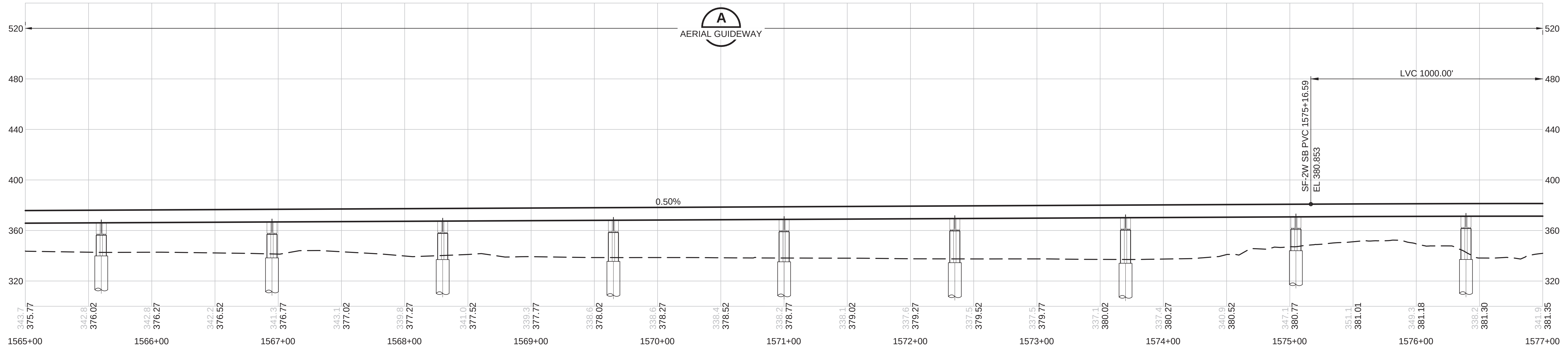
S08C - S 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1554+00 TO SB STA 1565+00

S08C-KAP107C
31

ASCHEPPE
5/5/2023 4:44:02 PM
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG S08C-KAP107C
CL NB TRACK
CL SB TRACK
NB 1570+00
S13°34'55.25"W
SB 1570+00
S13°34'55.25"W
NB 1575+00
SB 1575+00
OMFS LEAD TRACK (344TH SITE)
OMFS LEAD TRACK (344TH SITE)
SEE DWG S08C-KAP109
N
HORIZ: 40 20 0 40 80
SCALE IN FEET
VERT: 40 20 0 40 80
SCALE IN FEET


A
AERIAL GUIDEWAY
520
480
440
400
360
320
LVC 1000.00'
SF-2W SB PVC 1575+16.59
EL 380.853
0.50%
343.7 375.77
342.8 376.02
342.8 376.27
342.2 376.52
341.3 376.77
343.1 377.02
339.8 377.27
341.0 377.52
339.3 377.77
338.6 378.02
338.6 378.27
338.4 378.52
338.2 378.77
338.1 379.02
337.6 379.27
337.5 379.52
337.5 379.77
337.1 380.02
337.4 380.27
340.9 380.52
347.1 380.77
351.1 381.01
349.3 381.18
338.2 381.30
341.9 381.35
1565+00
1566+00
1567+00
1568+00
1569+00
1570+00
1571+00
1572+00
1573+00
1574+00
1575+00
1576+00
1577+00

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

ASCHEPPE

5/5/2023 4:44:27 PM
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUNDTRANSIT

HDR

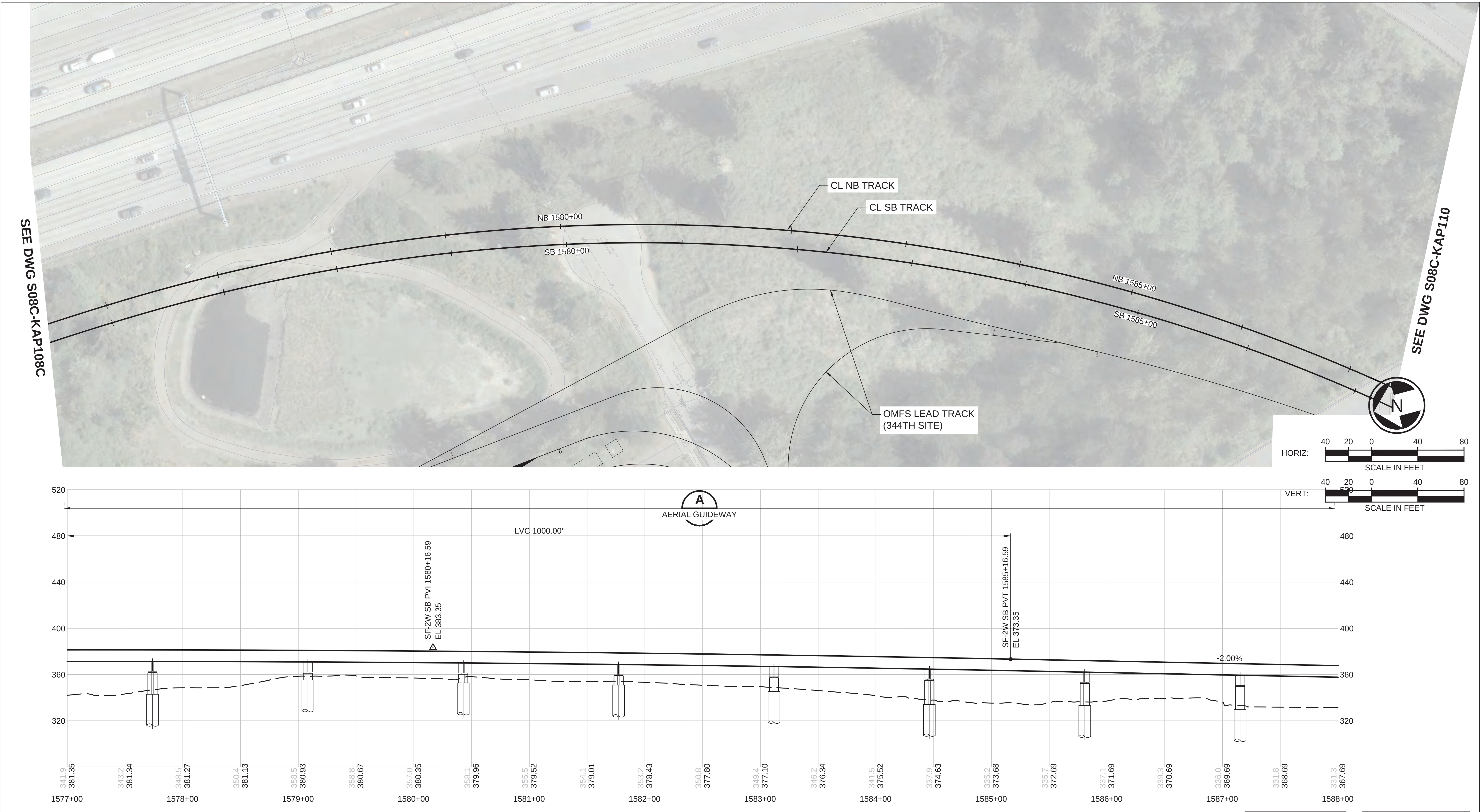
LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
------------	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

S08C - S 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1565+00 TO SB STA 1577+00

S08C-KAP108C
32

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG S08C-KAP108C
SEE DWG S08C-KAP110
CL NB TRACK
CL SB TRACK
NB 1580+00
SB 1580+00
NB 1585+00
SB 1585+00
OMFS LEAD TRACK
(344TH SITE)
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET
520
480
440
400
360
320
A
AERIAL GUIDEWAY
LVC 1000.00'
SF-2W SB PVI 1580+16.59
EL 383.35
SF-2W SB PVT 1585+16.59
EL 373.35
-2.00%
341.9 381.35
343.2 381.34
348.5 381.27
350.4 381.13
358.5 380.93
358.8 380.67
357.0 380.35
358.1 379.96
355.5 379.52
354.1 379.01
353.2 378.43
350.8 377.80
349.4 377.10
346.2 376.34
341.5 375.52
337.9 374.63
335.2 373.68
335.7 372.69
337.1 371.69
339.3 370.69
336.0 369.69
331.8 368.69
331.3 367.69
1577+00
1578+00
1579+00
1580+00
1581+00
1582+00
1583+00
1584+00
1585+00
1586+00
1587+00
1588+00

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
—·—·—·—	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

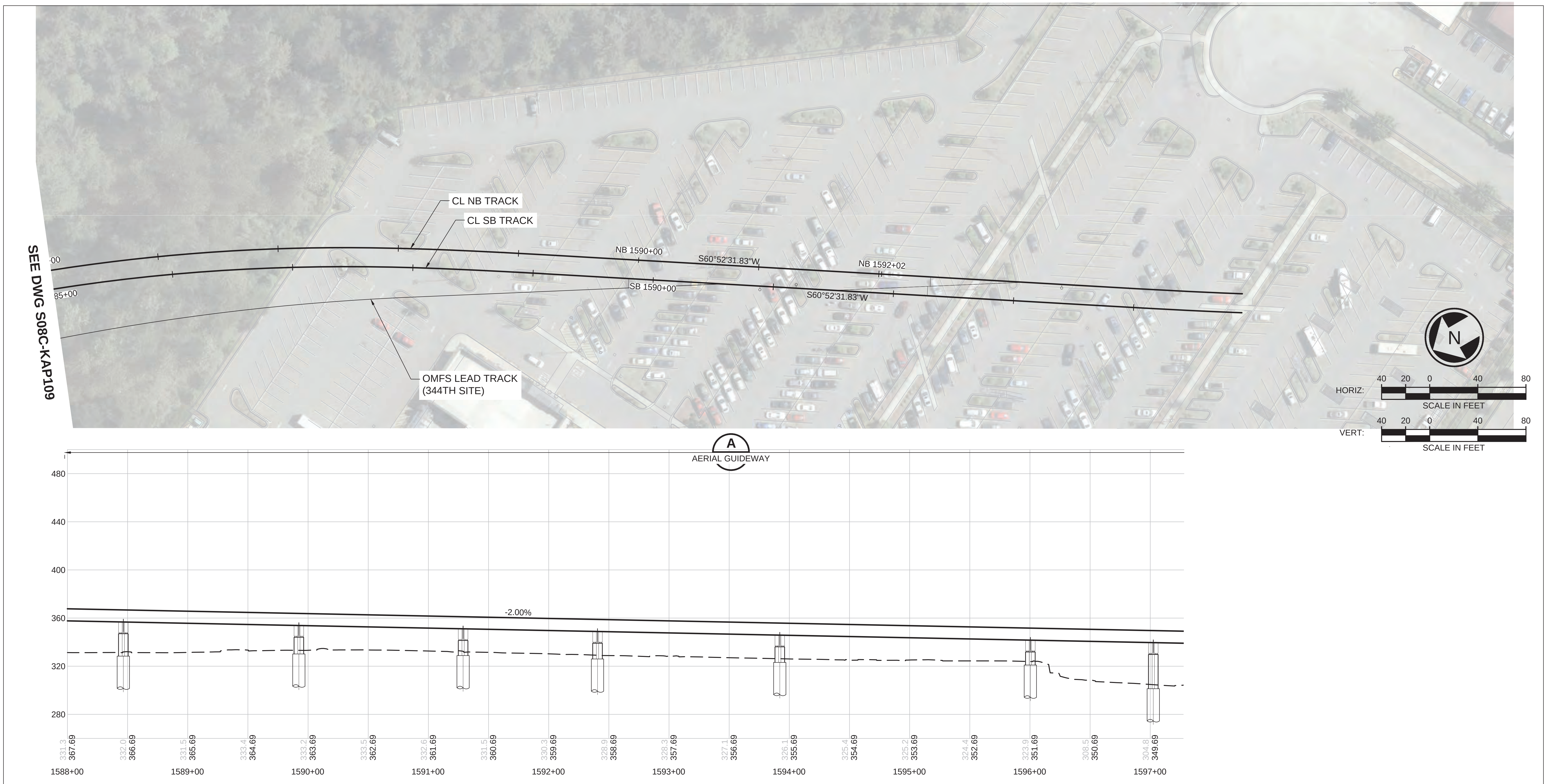
HDR

S08C - S 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1577+00 TO SB STA 1588+00

S08C-KAP109
33

5/5/2023 4:44:59 PM
ASCHEPPE
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SEE DWG S08C-KAP109
CL NB TRACK
CL SB TRACK
OMFS LEAD TRACK
(344TH SITE)
NB 1590+00
S60°52'31.83"W
NB 1592+02
SB 1590+00
S60°52'31.83"W
85+00
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET
A
AERIAL GUIDEWAY
480
440
400
360
320
280
-2.00%
331.3 367.69
332.0 366.69
331.5 365.69
333.4 364.69
333.2 363.69
333.5 362.69
332.6 361.69
331.5 360.69
330.3 359.69
328.9 358.69
328.3 357.69
327.1 356.69
326.1 355.69
325.4 354.69
325.2 353.69
324.4 352.69
323.9 351.69
308.5 350.69
304.8 349.69
1588+00
1589+00
1590+00
1591+00
1592+00
1593+00
1594+00
1595+00
1596+00
1597+00

PRELIMINARY ENGINEERING

NOT FOR CONSTRUCTION

5/5/2023 4:45:30 PM
ASCHEPPE
C:\PWWORKING\WEST01\D3124286\ZOMFS-S08A-KAP105-110.DWG

SOUNDTRANSIT

HDR

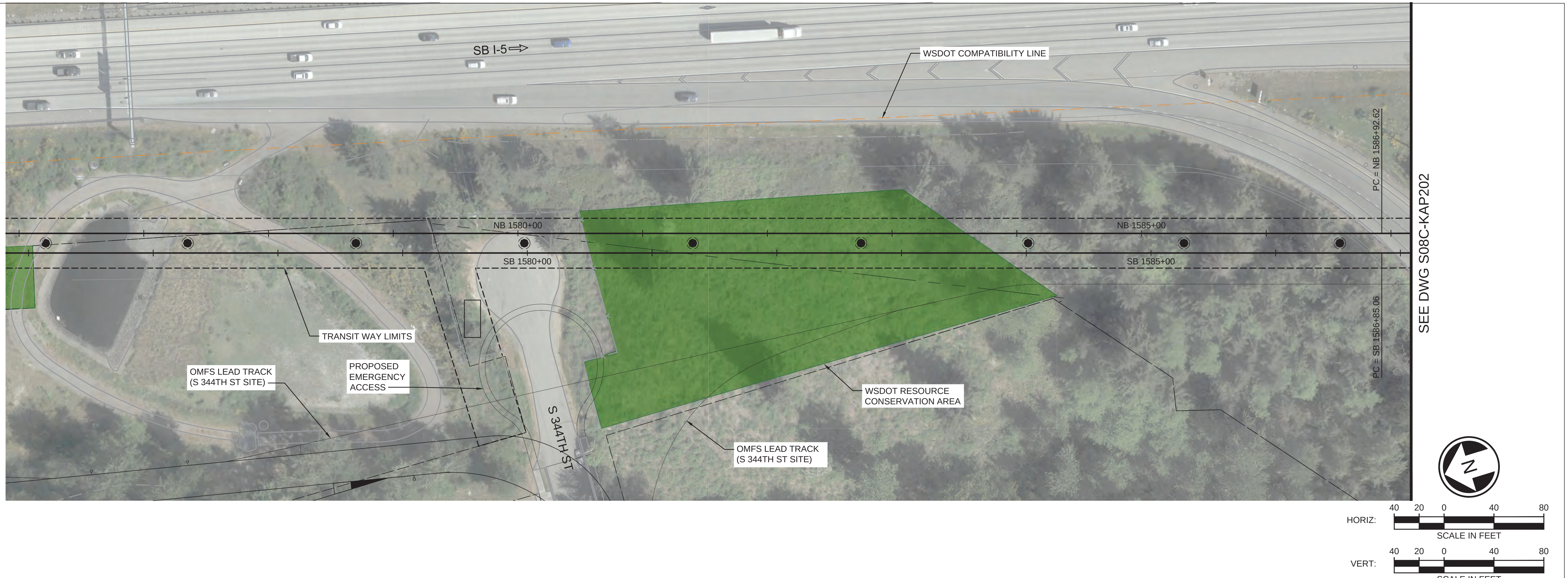
LEGEND:

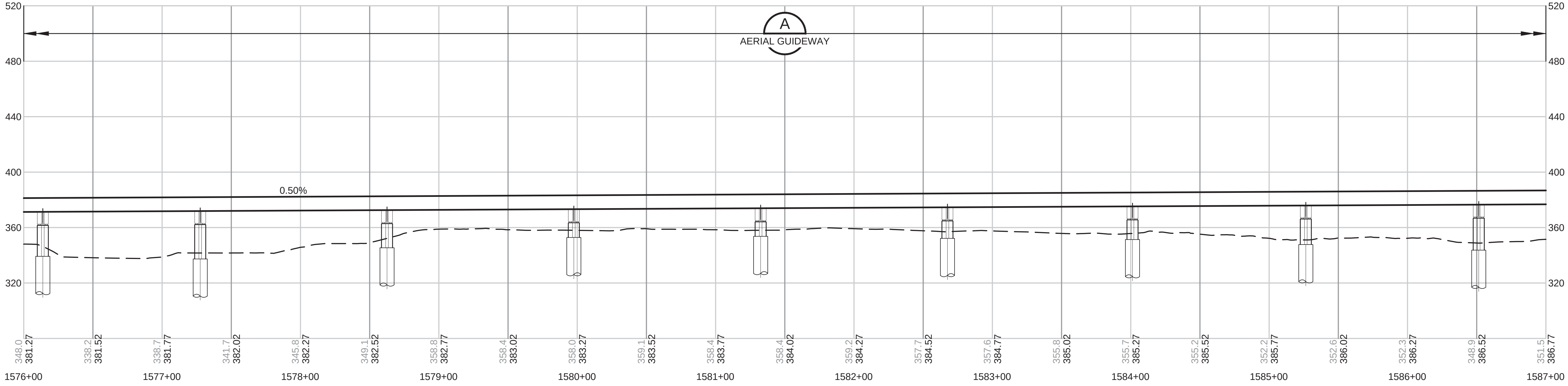
○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

S08C - S 344TH ST SITE
TRACK PLAN AND PROFILE
SB STA 1588+00 TO SB STA 1599+00

S08C-KAP110
34

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SB I-5
WSDOT COMPATIBILITY LINE
NB 1580+00
NB 1585+00
SB 1580+00
SB 1585+00
PC = NB 1586+92.62
PC = SB 1586+85.06
SEE DWG S08C-KAP202
TRANSIT WAY LIMITS
OMFS LEAD TRACK
(S 344TH ST SITE)
PROPOSED
EMERGENCY
ACCESS
S 344TH ST
WSDOT RESOURCE
CONSERVATION AREA
OMFS LEAD TRACK
(S 344TH ST SITE)
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET


520
480
440
400
360
320
A
AERIAL GUIDEWAY
0.50%
348.0 381.27
338.2 381.52
338.7 381.77
341.7 382.02
345.8 382.27
349.1 382.52
358.8 382.77
358.4 383.02
358.0 383.27
359.1 383.52
358.4 383.77
358.4 384.02
359.2 384.27
357.7 384.52
357.6 384.77
355.8 385.02
355.7 385.27
355.2 385.52
352.2 385.77
352.6 386.02
352.3 386.27
348.9 386.52
351.5 386.77
1576+00
1577+00
1578+00
1579+00
1580+00
1581+00
1582+00
1583+00
1584+00
1585+00
1586+00
1587+00

CONCEPTUAL
ENGINEERING

NOT FOR
CONSTRUCTION

5/5/2023 4:02:17 PM JLUM
C:\PWWORKING\WEST01\D3124286\DEIS_OMFS-S08C-KAP201-202.DWG

SOUNDTRANSIT

HDR

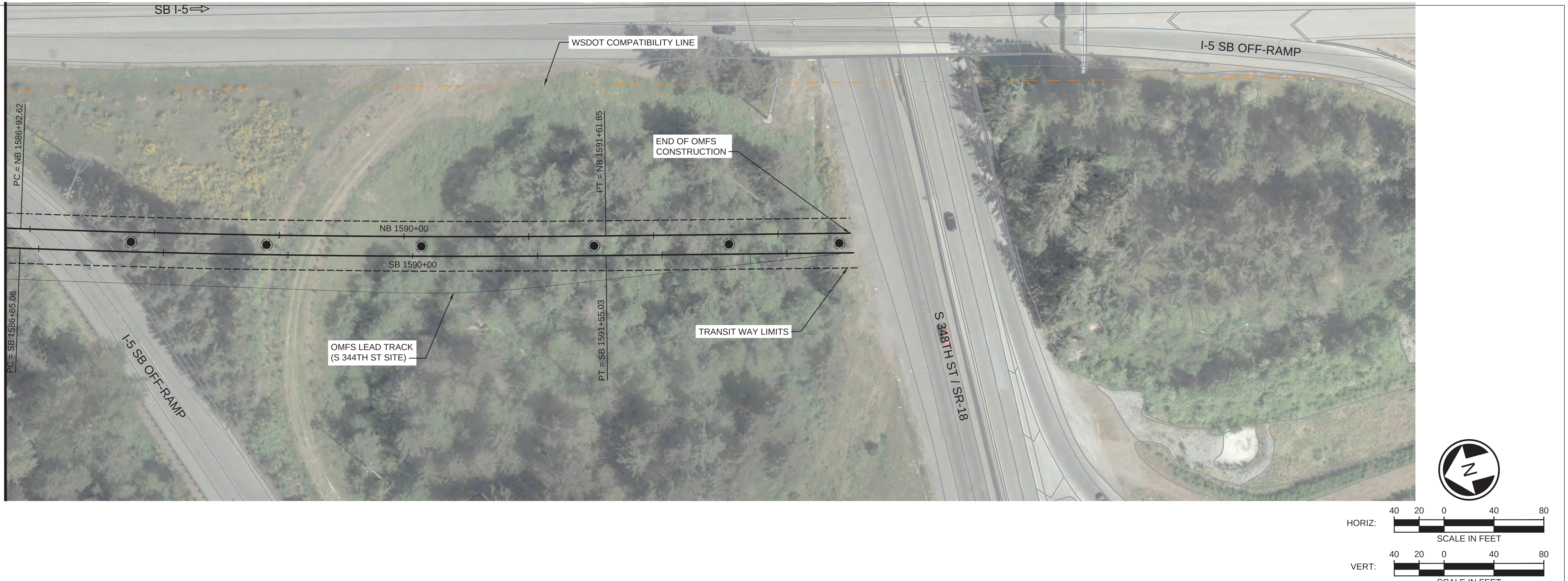
LEGEND:

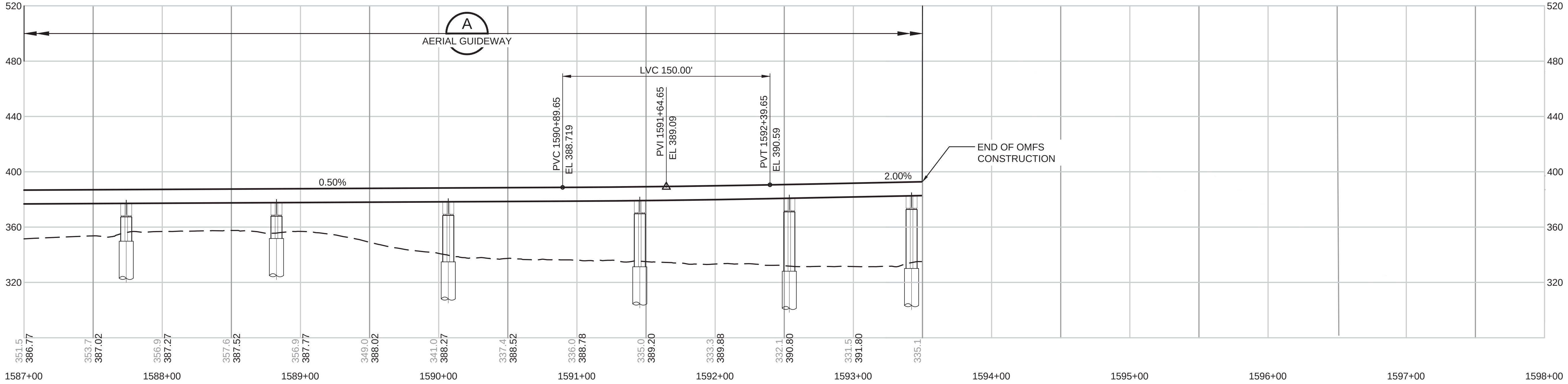
○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— · — · —	WSDOT COMPATIBILITY LINE

S08C - I-5 OPTION S 344TH ST SITE
TRACK PLAN AND PROFILE

S08C-KAP201

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


SB I-5
WSDOT COMPATIBILITY LINE
I-5 SB OFF-RAMP
SEE DWG S08C-KAP201
PC = NB 1586+92.62
PC = SB 1586+85.06
PT = NB 1591+61.85
PT = SB 1591+55.03
END OF OMFS CONSTRUCTION
NB 1590+00
SB 1590+00
OMFS LEAD TRACK (S 344TH ST SITE)
TRANSIT WAY LIMITS
I-5 SB OFF-RAMP
S 348TH ST / SR-18
N
HORIZ:
40 20 0 40 80
SCALE IN FEET
VERT:
40 20 0 40 80
SCALE IN FEET


520
480
440
400
360
320
A
AERIAL GUIDEWAY
LVC 150.00'
PVC 1590+89.65
EL 388.719
PVI 1591+64.65
EL 389.09
PVT 1592+39.65
EL 390.59
0.50%
2.00%
END OF OMFS CONSTRUCTION
351.5 386.77
353.7 387.02
356.9 387.27
357.6 387.52
356.9 387.77
349.0 388.02
341.0 388.27
337.4 388.52
336.0 388.78
335.0 389.20
333.3 389.88
332.1 390.80
331.5 391.80
335.1
1587+00
1588+00
1589+00
1590+00
1591+00
1592+00
1593+00
1594+00
1595+00
1596+00
1597+00
1598+00

CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
— · — · —	STREAM / WETLAND
- - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

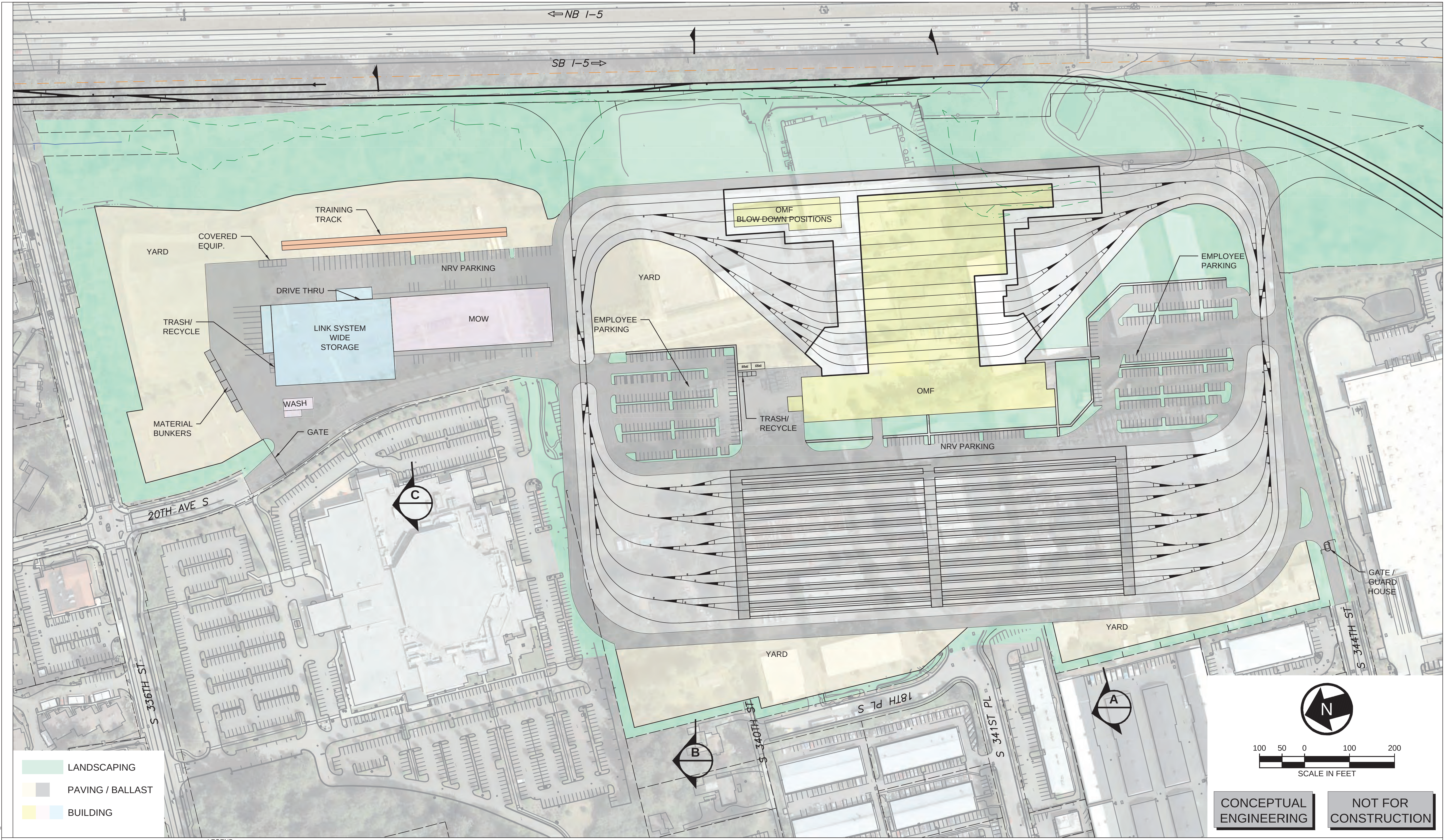
HDR

S08C - I-5 OPTION S 344TH ST SITE
TRACK PLAN AND PROFILE

S08C-KAP202
36

JLUM
5/5/2023 4:02:42 PM
C:\PWWORKING\WEST01\D3124286\DEIS_OMFS-S08C-KAP201-202.DWG

SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH


⇐NB I–5
SB I–5⇒
TRAINING TRACK
COVERED EQUIP.
YARD
NRV PARKING
DRIVE THRU
TRASH/ RECYCLE
LINK SYSTEM WIDE STORAGE
MOW
WASH
MATERIAL BUNKERS
GATE
20TH AVE S
C
OMF BLOW DOWN POSITIONS
YARD
EMPLOYEE PARKING
TRASH/ RECYCLE
OMF
NRV PARKING
EMPLOYEE PARKING
GATE / GUARD HOUSE
YARD
YARD
S 336TH ST
S 340TH ST
18TH PL S
S 341ST PL
S 344TH ST
A
B
N
100 50 0 100 200
SCALE IN FEET
CONCEPTUAL ENGINEERING
NOT FOR CONSTRUCTION
🟩 LANDSCAPING
⬜ PAVING / BALLAST
🟨 BUILDING

SOUNDTRANSIT

HDR

LEGEND:

○ ○━━○ COLUMNS / STRADDLE BENTS

— · — · — STREAM / WETLAND

- - - - - - - - CONSTRUCTION LIMITS

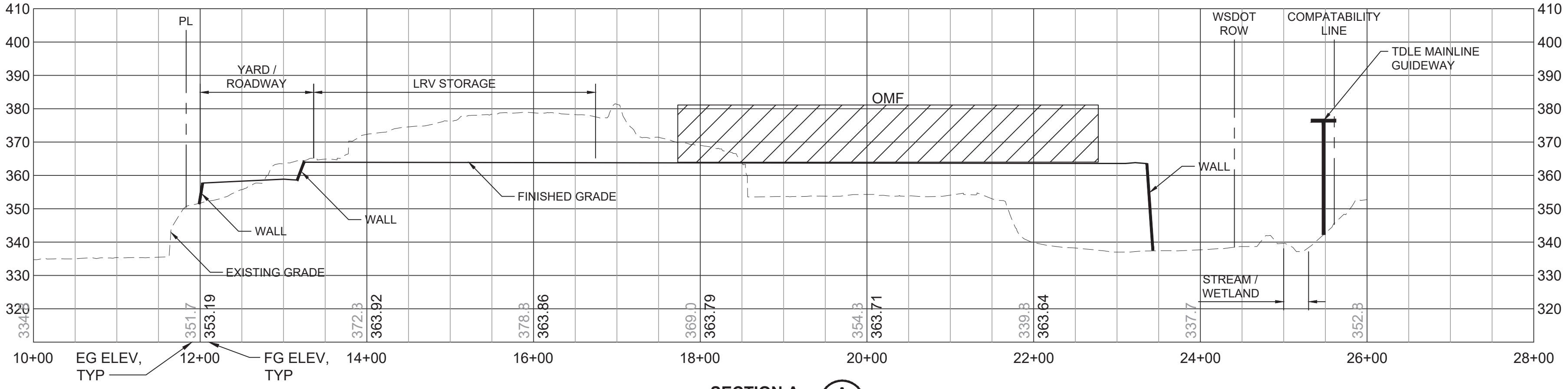
— — — — — TRANSIT WAY LIMITS

— · — · — WSDOT COMPATIBILITY LINE

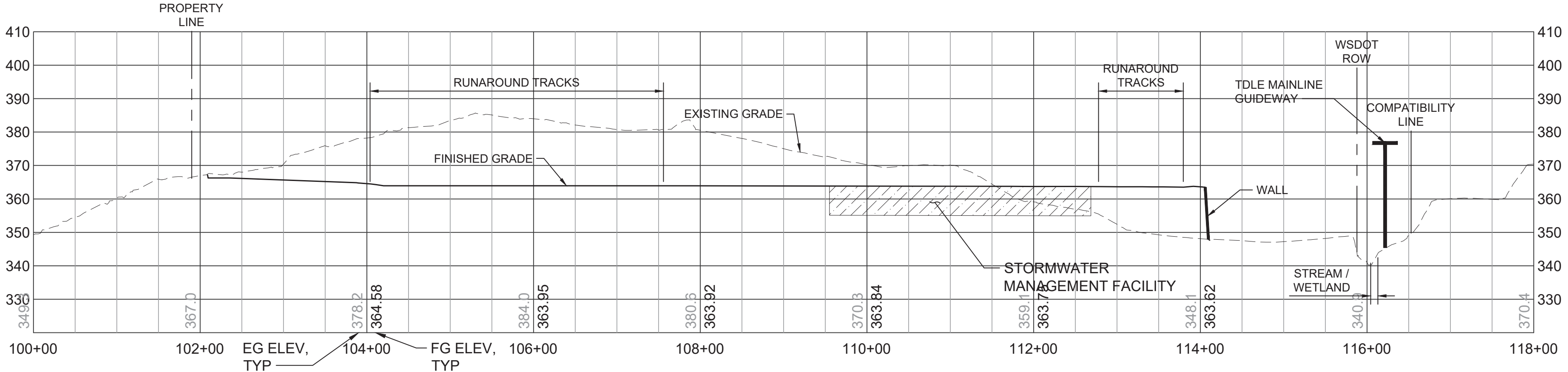
M06C - S 344TH ST SITE
ARCHITECTURAL SITE PLAN

M06C-ASP701
37

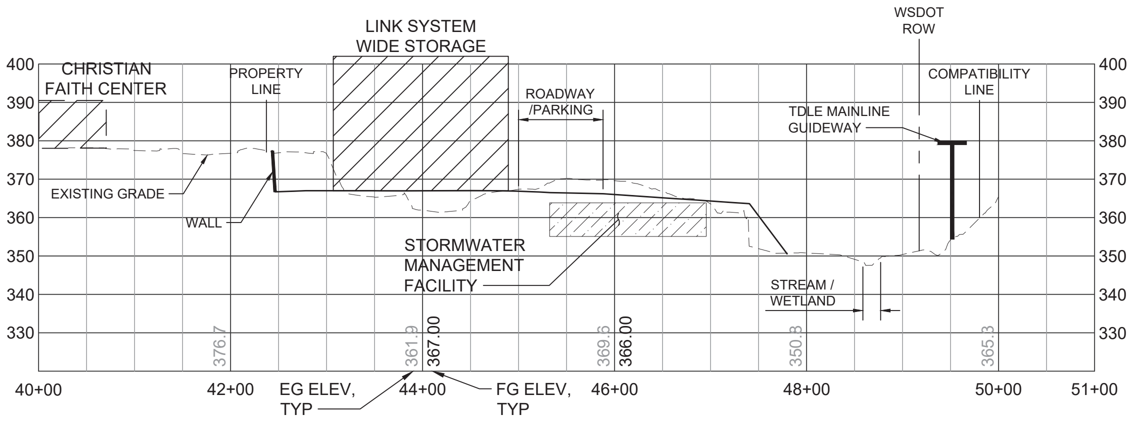
5/11/2023 3:19:50 PM JLUM
C:\PWWORKING\WEST01\D3124286\DEIS_OMFS-M06C-ASP701.DWG


410
400
390
380
370
360
350
340
330
320
PL
YARD / ROADWAY
LRV STORAGE
OMF
WSDOT ROW
COMPATABILITY LINE
TDLE MAINLINE GUIDEWAY
WALL
WALL
WALL
FINISHED GRADE
EXISTING GRADE
STREAM / WETLAND
351.7
353.19
372.3
363.92
378.3
363.86
369.0
363.79
354.3
363.71
339.3
363.64
337.7
352.3
10+00
EG ELEV, TYP
12+00
FG ELEV, TYP
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00

SECTION A (A) M06C-ASP-701


PROPERTY LINE
410
400
390
380
370
360
350
340
330
RUNAROUND TRACKS
EXISTING GRADE
FINISHED GRADE
RUNAROUND TRACKS
WSDOT ROW
TDLE MAINLINE GUIDEWAY
COMPATIBILITY LINE
WALL
STORMWATER MANAGEMENT FACILITY
STREAM / WETLAND
367.0
378.2
364.58
384.0
363.95
380.3
363.92
370.3
363.84
359.1
348.1
363.62
370.4
100+00
102+00
EG ELEV, TYP
104+00
FG ELEV, TYP
106+00
108+00
110+00
112+00
114+00
116+00
118+00

SECTION B (B) M06C-ASP-701


LINK SYSTEM WIDE STORAGE
WSDOT ROW
CHRISTIAN FAITH CENTER
PROPERTY LINE
ROADWAY /PARKING
COMPATIBILITY LINE
TDLE MAINLINE GUIDEWAY
EXISTING GRADE
WALL
STORMWATER MANAGEMENT FACILITY
STREAM / WETLAND
400
390
380
370
360
350
340
330
376.7
361.9
367.00
369.5
366.00
350.3
365.3
40+00
42+00
EG ELEV, TYP
44+00
FG ELEV, TYP
46+00
48+00
50+00
51+00

SECTION C (C) M06C-ASP-701

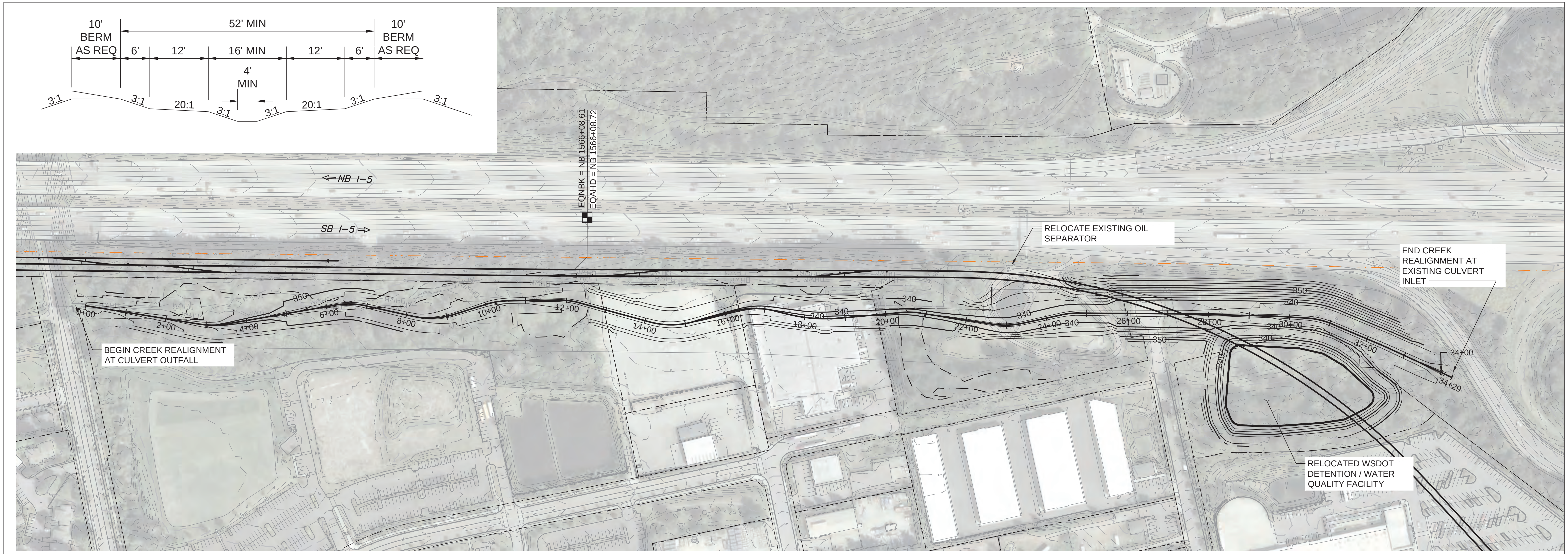
100 50 0 100 200

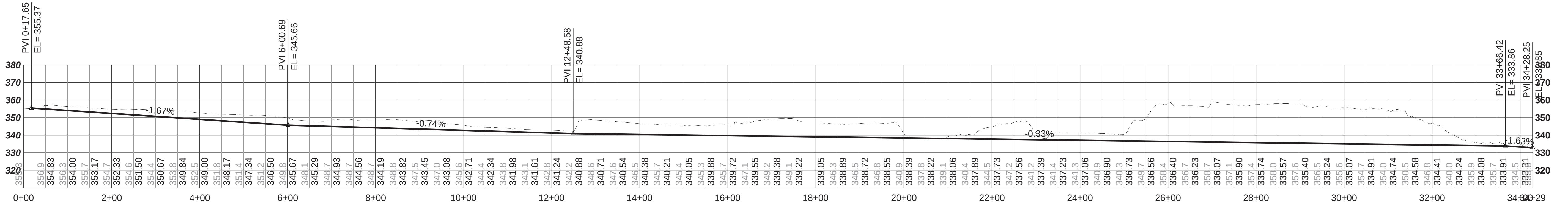
SCALE IN FEET

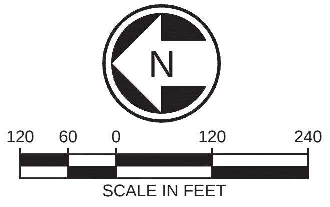
CONCEPTUAL ENGINEERING

NOT FOR CONSTRUCTION

M06C - S 344TH ST SITE
GRADING CROSS SECTIONS


10' BERM AS REQ
52' MIN
10' BERM AS REQ
6'
12'
16' MIN
12'
6'
4' MIN
3:1
3:1
20:1
3:1
3:1
20:1
3:1
3:1
EQNBK = NB 1566+08.61
EQAHD = NB 1566+08.72
NB I–5
SB I–5
RELOCATE EXISTING OIL SEPARATOR
END CREEK REALIGNMENT AT EXISTING CULVERT INLET
BEGIN CREEK REALIGNMENT AT CULVERT OUTFALL
RELOCATED WSDOT DETENTION / WATER QUALITY FACILITY
0+00
2+00
4+00
6+00
8+00
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00
30+00
32+00
34+00
34+29
350
340
350
340




N
120
60
0
120
240
SCALE IN FEET

NOTES:

1. STREAM REALIGNMENT AND STORMWATER FACILITY RELOCATION SHOWN IS CONCEPTUAL AND HAS NOT BEEN REVIEWED OR APPROVED BY AHJs

LEGEND:

○ ○═══○	COLUMNS / STRADDLE BENTS
—·—·—·—	STREAM / WETLAND
- - - - - - -	CONSTRUCTION LIMITS
— — — —	TRANSIT WAY LIMITS
— — — —	WSDOT COMPATIBILITY LINE

SOUNDTRANSIT

HDR

M06C - S 344TH ST SITE
CREEK DRAINAGE PLAN

5/5/2023 3:45:01 PM PLOPEZHILF
C:\PWWORKING\WEST01\D3124280\DEIS_OMFS-M06C-CDP751.DWG

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix D: Midway Landfill Support Documents

Federal Transit Administration

SOUNDTRANSIT

June 2024

Appendix D: Midway Landfill Support Documents

Appendix D1	Midway Landfill Site Engineering Optimization Report
Appendix D2	Interim Midway Landfill Preparation Memorandum
Appendix D3	Conceptual Landfill Site Reuse Plan
Appendix D4	Midway Landfill Human Health Risk Assessment

Operations and Maintenance Facility South

Appendix D1:
Midway Landfill Site Engineering Optimization Report

Federal Transit Administration

SOUNDTRANSIT

January 2020

TACOMA DOME LINK EXTENSION –
Phase 2 OMFS

Midway Landfill Site Engineering Optimization Report

Draft 2

SOUNDTRANSIT

CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

SOUNDTRANSIT

Tacoma Dome Link Extension
Phase 2 – OMF South

Midway Landfill Site
Engineering Optimization Report

Prepared for:
Sound Transit

Prepared by:
HDR Engineering, Inc.

January 15, 2020

Table of Contents

1. Study Purpose ... 1
2. Proposed Phase 1 and Phase 2 Site Layouts ... 2
3. Midway Landfill Site Optimization Workshop No.1 ... 4
   - 3.1 Workshop Objectives ... 4
   - 3.2 Light Rail Operations and Maintenance Criteria ... 4
   - 3.3 Brainstorming Ideas and Evaluation ... 5
   - 3.4 Next Steps ... 5
4. Midway Landfill Site Settlement Workshop No.2 ... 6
   - 4.1 Workshop Objectives ... 6
   - 4.2 Review of the Forest Street OMF Detail ... 6
   - 4.3 Optimization of Midway Landfill Site Layout ... 6
   - 4.4 Review of the Brainstorming Design Concepts Evaluation ... 9
   - 4.5 Review of the Brainstorming Design Concepts ... 10
   - 4.6 Refinements to Design Concepts ... 16

Exhibits

EXHIBIT 2-1 Phase 1 Site Layout ... 2
EXHIBIT 2-2 Phase 2 Site Layout per Programming Requirements ... 3
EXHIBIT 4-1 Optimization of Midway Site Layouts ... 8
EXHIBIT 4-2 Site Section Key Map ... 10
EXHIBIT 4-3 #1. High Structural Platform on Drilled Shafts with no Excavation ... 11
EXHIBIT 4-4 #2. Low Structural Platform with some Excavation ... 12
EXHIBIT 4-5 #3. Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts) 13
EXHIBIT 4-6 #4. Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks) .. 14
EXHIBIT 4-7 #5. Full Excavation and Backfill with Competent Soils ... 15
EXHIBIT 4-8 High Structural Platform with No Excavation ... 17
EXHIBIT 4-9 Low Structural Platform with Some Excavation ... 18
EXHIBIT 4-10 Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts) ... 19
EXHIBIT 4-11 Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Shafts) ... 20
EXHIBIT 4-12 Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Shafts) ... 21

Tables

TABLE 4-1 Rating System 9
TABLE 4-2 Basis for a Rating of: 3 = High Performing 9

Appendices

Appendix A 23
Appendix B 31

1. Study Purpose

The Midway Landfill site is one of the three sites identified by the Sound Transit Board to be included in the Draft EIS as part Phase 2 of the OMF South project. The other two OMF South sites are located in South Federal Way.

The Phase 2 scope of work included a task to help optimize the Midway Landfill site layout. As a former landfill with varying depths of waste, ground settlement is a major concern that needs to be addressed during design. To accomplish this, two workshops were conducted with representatives from the City of Kent, the City of Federal Way, City of Seattle, Seattle Public Utilities (SPU), WSDOT, and various consultants and ST staff.

2. Proposed Phase 1 and Phase 2 Site Layouts

Exhibit 2.1 shows the site layout for the Midway Landfill alternative, Site 3 (North/South) that was developed during OMF South Phase 1: Alternatives Analysis. The site plan included the additional 5-acre storage area with a 30,000 sq. foot warehouse building as requested by ST. The site was adjacent to I-5 and covered the eastern portion of the landfill with the storage tracks on the eastside of the site and the maintenance building on the west side of the site.

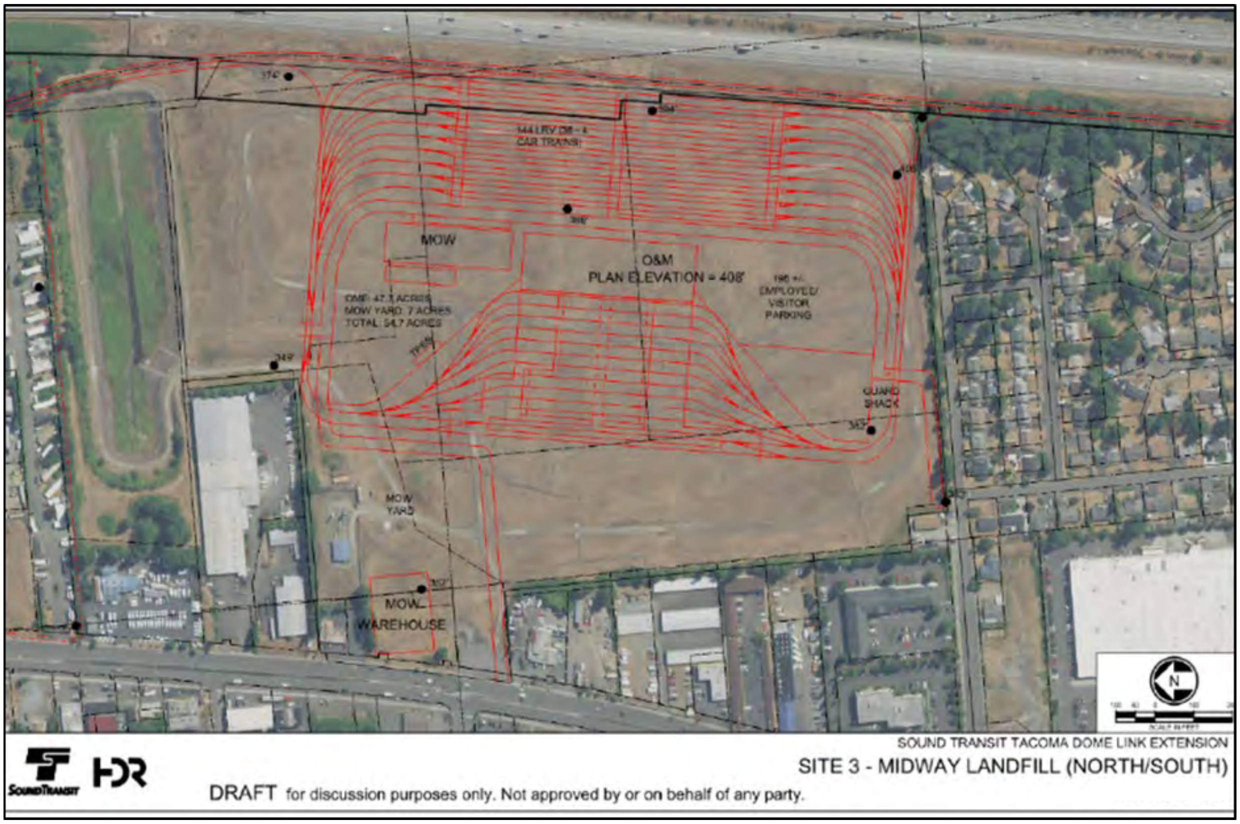

144 LRV (36 - 4 CAR TRAINS)
MOW
O&M
PLAN ELEVATION = 408'
195 +/- EMPLOYEE/ VISITOR PARKING
OMF: 47.7 ACRES
MOW YARD: 7 ACRES
TOTAL: 54.7 ACRES
GUARD SHACK
MOW YARD
MOW WAREHOUSE
N
SOUND TRANSIT TACOMA DOME LINK EXTENSION
SITE 3 - MIDWAY LANDFILL (NORTH/SOUTH)
DRAFT for discussion purposes only. Not approved by or on behalf of any party.

EXHIBIT 2-1
Phase 1 Site Layout

Exhibit 2.2 shows the Midway Landfill site after the Phase 2 site programming was completed. Using a Charrette process, the consultant team met with Sound Transit Operations staff to identify the key elements of the OMF South facility and yard program.

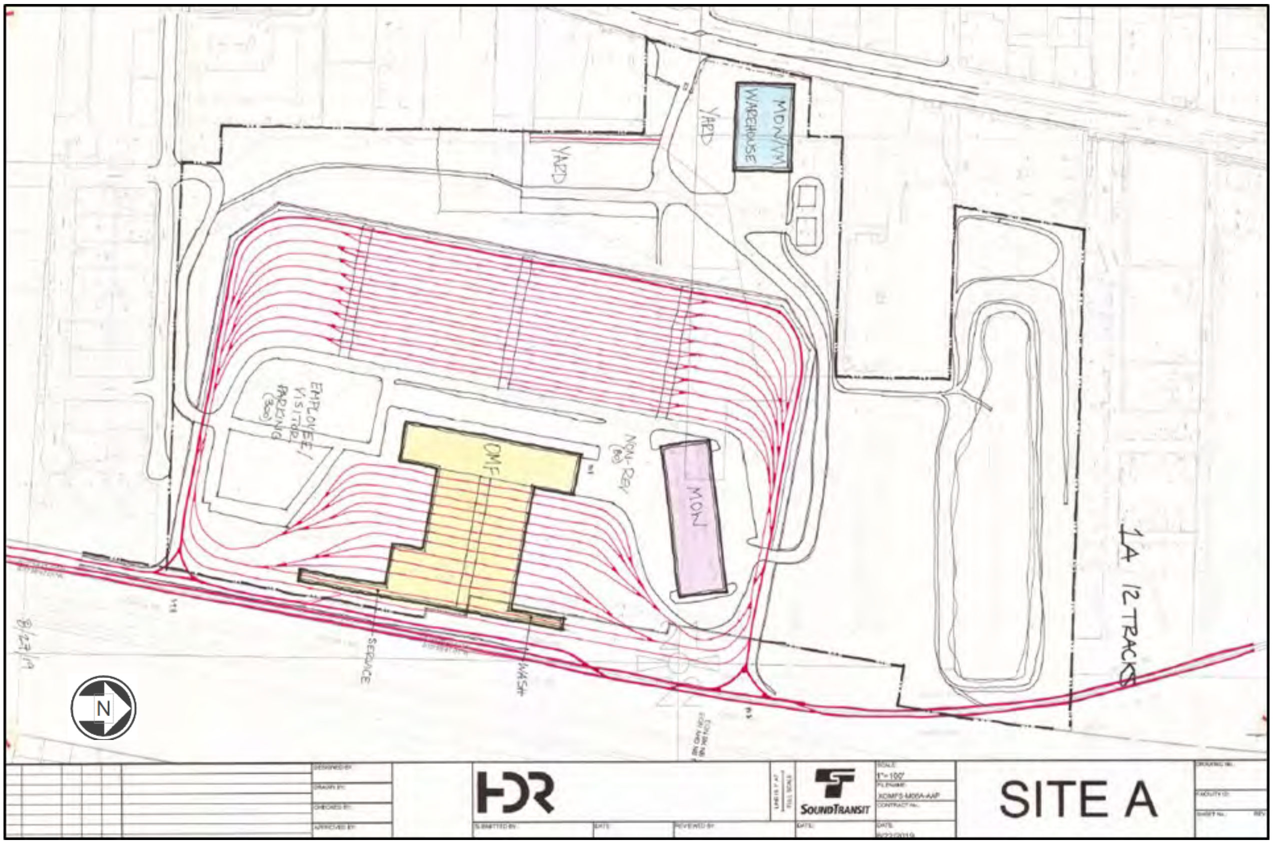

MOW/VM WAREHOUSE
YARD
YARD
EMPLOYEE/ VISITOR PARKING (300)
OMF
NON-REV (80)
MOW
SERVICE
WASH
1A 12 TRACKS
8/27/19
N
HDR
SOUNDTRANSIT
SCALE: 1"=100'
FILENAME: XOMFS-M06A-AAP
DATE: 8/22/2019
SITE A

EXHIBIT 2-2

Phase 2 Site Layout per Programming Requirements

3. Midway Landfill Site Optimization Workshop No.1

The first Midway Landfill Workshop was held at Sound Transit on August 13, 2019. The purpose of the workshop was to launch a collaborative effort to understand and brainstorm Midway Landfill OMF Sound ground settlement solutions. The minutes from the workshop are attached.

3.1 Workshop Objectives

The objectives of the workshop are listed below:

- Create a shared understanding of Sound Transit's operational and maintenance criteria
- Create a shared understanding of the basis of design used to develop Sound Transit's current Midway Landfill concept for the OMFS
- Review and understand additional information that has become available on the Midway Landfill site
- Outline an action plan for how and when additional ideas will be implemented into the planning process

3.2 Light Rail Operations and Maintenance Criteria

Paul Denison, Light Rail Executive Operations Director and the person charged with overseeing their efficient, clean, and safe daily light rail operations, gave an overview of typical light rail OMF operations

Maintenance work occurs at night in regimented order, requiring about 35 minutes per train (assuming no issues). Any train requiring work beyond ordinary nightly maintenance is decoupled and brought into the shop. Paul clarified that light rail is electric propulsion train technology. These vehicles run on very precise electrical connections, which require a precise contact pattern for interface with the electrical distribution system. Tolerances are in a fractions-of-an-inch range.

The most expensive aspect of light rail operations is labor; when more labor is required due to the inefficiency of a site or its upkeep, the cost model would need to be revised.

Paul walked through Sound Transit's Design Criteria Manual (DCM) specific criteria relative to operations and maintenance facility sites. The DCM doesn't specify maintenance cycles for buildings or track, nor acceptable maintenance practices. On the site, there is a lot of special track work – crews have to regularly lubricate rail by hand on tight turns to prevent wheel climb. Also, FTA requires the facility to be in a “state of good repair” to be able to receive grant money; they consider and inspect equipment, access, and the overall program. The facility must meet certain criteria and document any adjustments through a work order process.

Other clarifications provided:

- Pantograph contact with the OCS has tight tolerances. Wires are fixed tension.
- Yard inspections are held every 30 days.
- Drainage is of critical importance. Mechanical drainage systems don’t work, as the failure rate is too high.
- Grounding is floating. Must keep the grounding for the building and for the track separate.
- At the Forest Street OMF, hand tamping is completed every 3-12 months to adjust for settling. Historically, the site was a tide flat. Some fine tuning is expected. Additional details on maintenance criteria used by Operations can be found in Appendix A.

3.3 Brainstorming Ideas and Evaluation

Below is a list of brainstorming ideas which have been identified by group:

- Excavation (EX)
- Ground improvement (GI)
- Structural (STR)
- Layout optimization (LAYOUT OPT)
- Maintenance (MAINT)
- Schedule (to be ready for opening day and major milestones)
- Construction (means, methods, coordination)
- Code conformance
- Risk factors
- Ability to provide level of light rail service (efficiency and operability)
- Cost

The team went through the exercise of ranking the brainstorming ideas qualitatively as High, Low, and Medium for each category with respect to settlement risk, with respect to the brainstorming ideas listed above.

3.4 Next Steps

Sound Transit took the brainstorming ideas and put them in format that could be readily evaluated. A matrix was developed and sent to the participants with instructions on how to provide comments on the various brainstorming ideas. The result of this activity was used to develop material for the second Workshop.

4. Midway Landfill Site Settlement Workshop No. 2

The second Midway Landfill Workshop was held at Sound Transit on October 3, 2019. It provided an opportunity to review the results of the work that had taken place since Workshop No. 1 in August. The minutes from the workshop are attached.

4.1 Workshop Objectives

The objectives of the workshop are listed below:

- Review brainstorming solutions from OMF South Landfill Settlement Workshop No. 1
- Share evaluation process and initial results of brainstormed settlement design concepts
- Understand collective perspectives around design concepts
- Outline plan for designs to continue to pursue

4.2 Review of the Forest Street OMF Detail

During the first workshop, the question came up of whether or not the Forest Street OMF was built on a landfill similar to what is being considered for the Midway Landfill site. Sound Transit did some research on the Forest Street site design, including geotechnical borings that were done prior to construction of the facility. The research revealed that the Forest Street OMF is built on tidal flats that had been filled over time. The initial contract for the Forest Street OMF was for site preparation. Three to four feet of the site was excavated and the soil mixed with concrete to stabilize the soil. This was followed by the construction contract to build the facility, which included the maintenance building which is constructed on over 1,200 piles driven to a depth of up to 130 feet. The conclusion was that the Forest Street OMF site conditions are not comparable to the site conditions at the Midway Landfill site.

4.3 Optimization of Midway Landfill Site Layout

Steve Radomski explained how the optimized layout was refined with priority to operational efficiency, and analysis of brainstormed solutions from the first Settlement Workshop. This meant that, rather than defining the shallowest areas of solid waste and placing specific site elements in those locations, the site layout is currently optimized for in/out efficiency and minimization of necessary train movements on a daily basis. Layout refinements and assumptions included:

- Locating the staff parking lot entrance away from S 252nd St., which could have impacted traffic and residents in the adjacent residential area, as opposed to from SR 99.

- Moved the MOW building inside the yard.
- Increased the number of service tracks from 12 to 14 to provide additional wash and training lanes.
- No significant frontage improvements anticipated on SR 99 at the Midway Landfill site.
- Mitigating disruption to the existing stormwater detention pond on the landfill.
- Relocated the landfill gas flare facility to the west side of the detention pond.
- While refining the layout, it became apparent that proposed site layout was slightly off of the landfill. Sound Transit reviewed the Board motion language which instructed that it be built mostly on the landfill, so an additional need for some property in the vicinity of SR 99 was not deemed in conflict with Board direction.

Exhibit 4.1 shows the evolution of the Midway Landfill Site layouts as the Charrette with Sound Transit Operations staff progressed over a four-day period. The diagram in the bottom right corner of **Exhibit 4.1**, shows the final layout that will be used to document the facility requirements in a separate report.

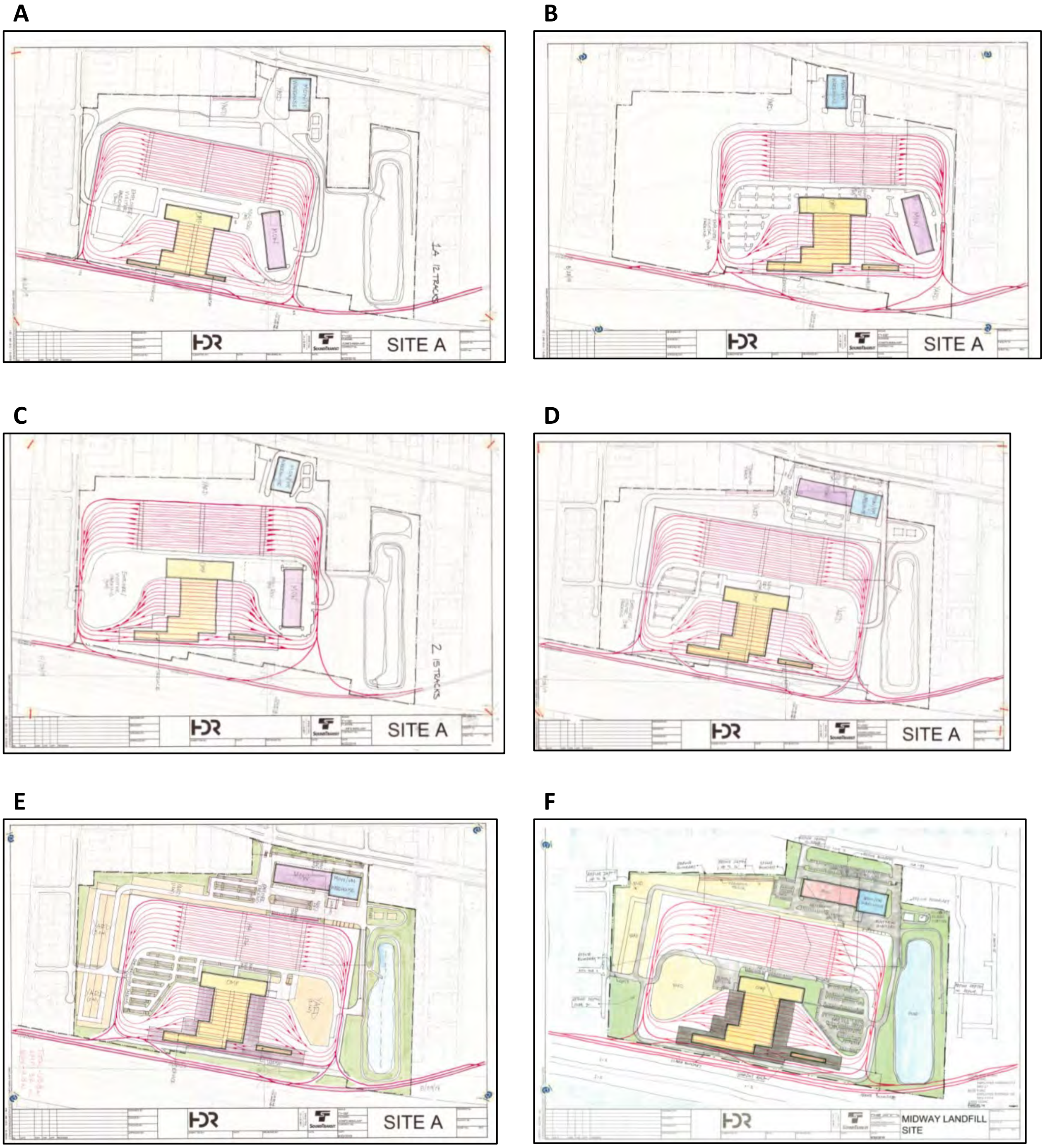

A
B
C
D
E
F
1A 12 TRACKS
2 15 TRACKS
HDR
SITE A
SITE A
SITE A
SITE A
SITE A
MIDWAY LANDFILL SITE

EXHIBIT 4-1
Evolution/Optimization of Midway Site Layouts

4.4 Review of the Brainstorming Design Concepts Evaluation

The brainstorming ideas from the first workshop were grouped into five major subject categories as listed below:

1. Structural
2. Excavation
3. Geotechnical
4. Layout
5. Maintenance

Within each of the categories listed above, Settlement Risk Criteria were used to evaluate the brainstorming ideas. These five criteria are listed below:

1. Regulatory
2. Schedule
3. Cost
4. Constructability
5. Maintenance and Reliability

Appendix B includes individual tables for the five major subject categories listed above. The tables also include the individual Settlement Risk Criteria listed above, applied to each of the major subject categories. The next step in the process was to rate each brainstorming concept using the color coded system shown in **Table 4.1** below.

TABLE 4-1
Rating System

1 = Low performing	🟥
2 = Medium performing	🟨
3 = High performing	🟩

The basis for a rating of 3 = High Performing is shown in **Table 4.2** below.

TABLE 4-2
Basis for a Rating of 3=High Performing

Settlement Risk Criteria	Measure
Regulatory Risk	Predictable Permitting (ROD, EPA. Closure Plan, Ownership, Long-Term)
Schedule	Ability to Open in 2026
Cost Rick	Meets ST3 Budget
Construction Risk	Assuming Routine Means and Methods
Maintenance & Reliability	Supports Revenue Service & Maintenance Operations without Impacts (settlement)

4.5 Review of the Brainstorming Design Concepts

Sound Transit introduced five potential design concepts based on the brainstormed ideas from the first workshop. The five design concepts are listed below:

1. High structural platform on drilled shafts with no excavation
2. Low structural platform on shorter drilled shafts with some excavation
3. Hybrid 1: Excavation with ground improvements (buildings on drilled shafts)
4. Hybrid 2: Excavation with ground improvements (slab on grade for tracks and buildings on drilled shafts.
5. Full excavation and backfill with competent soils

Each design concept has a north/south cross-section through the site which illustrates the native soils and fill depths. **Exhibit 4.2** shows the location of the "cut" through each site that was used to illustrate the cross sections.

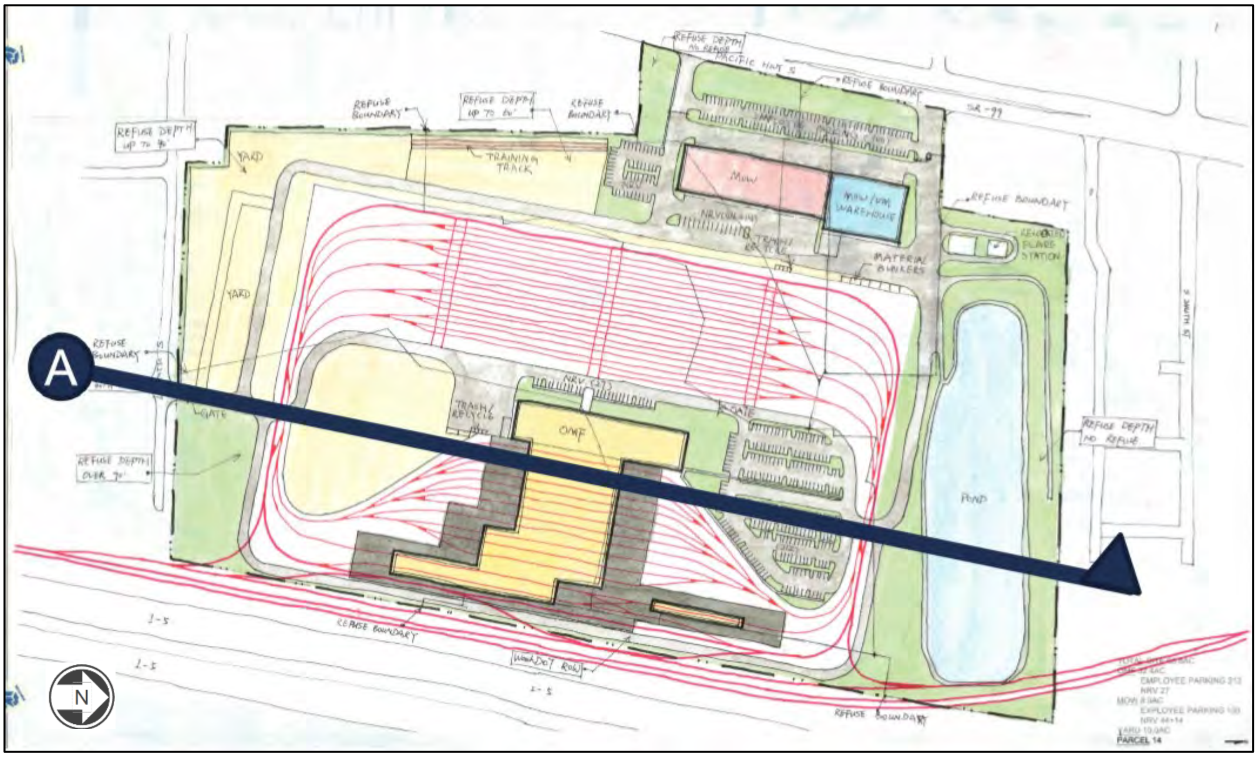

REFUSE DEPTH NO REFUSE
PACIFIC HWY S
REFUSE BOUNDARY
SR-99
REFUSE BOUNDARY
REFUSE DEPTH UP TO 60'
REFUSE BOUNDARY
REFUSE DEPTH UP TO 90'
YARD
TRAINING TRACK
MOW
MOW/VM WAREHOUSE
REFUSE BOUNDARY
MATERIAL BUNKERS
STATION
YARD
A
REFUSE BOUNDARY
NRV (27)
TRASH/ RECYCLE
OMF
GATE
GATE
REFUSE DEPTH OVER 90'
REFUSE DEPTH NO REFUSE
S 348TH ST
POND
I-5
REFUSE BOUNDARY
I-5
WSDOT ROW
I-5
N
REFUSE BOUNDARY
EMPLOYEE PARKING 212
NRV 27
MOW
EXPLOYEE PARKING 130
NRV 44+14
PARCEL 14

EXHIBIT 4-2
Site Section Key Map

1. High Structural Platform on Drilled Shafts with no Excavation

- Same as Phase 1 option
- Minimum impact to landfill Cap(a goal, as we assessed the potential to impact regulatory components in case we excessively disturb the CAP)
- 3 ft. thick slab, supported by 10 ft. diameter shafts
- Requires elevated guideway to connect to transit mainline
- Approx. 70,000 CY of excavation (augured) for shafts

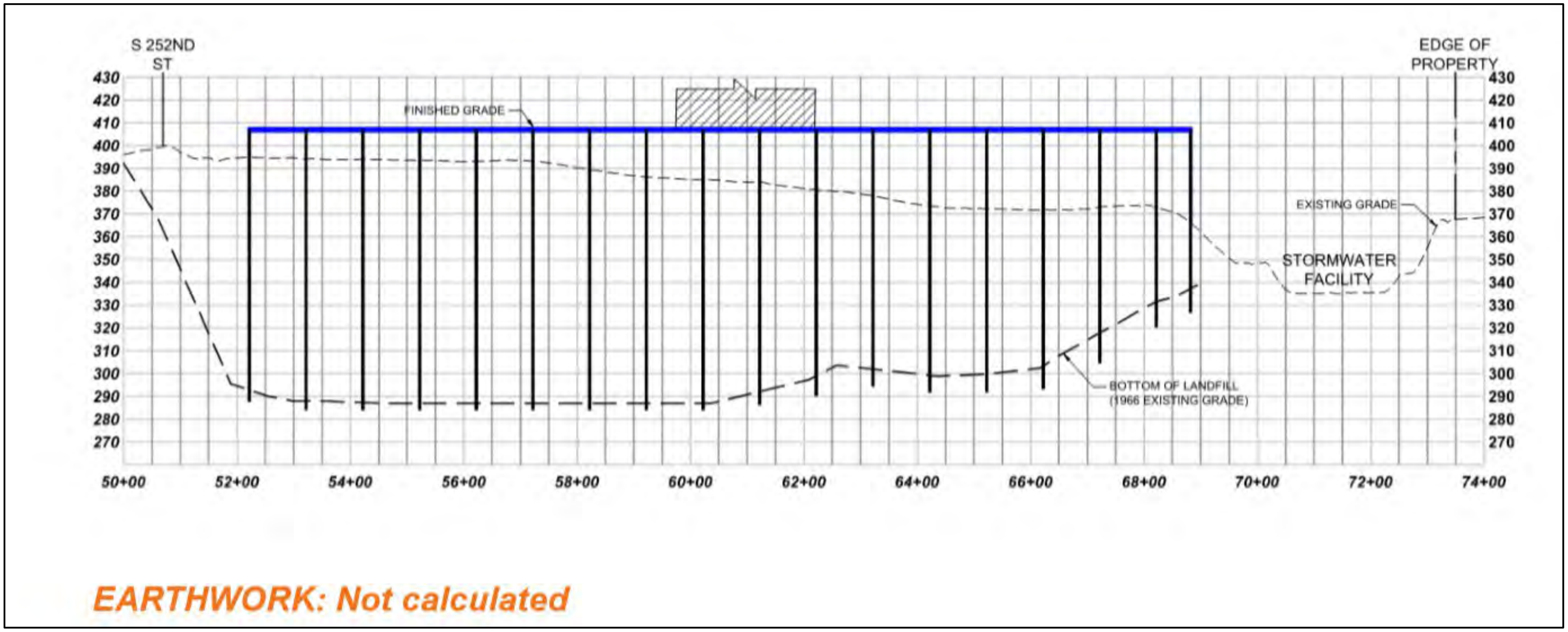

S 252ND ST
EDGE OF PROPERTY
FINISHED GRADE
EXISTING GRADE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EARTHWORK: Not calculated

EXHIBIT 4-3

#1. High Structural Platform on Drilled Shafts with no Excavation

2. Low Structural Platform on shorter drilled shafts with some Excavation

- Remove and replace Cap
- Works with at-grade FWLE tracks (current FWLE design concept being advanced)
- 1.7 million CY (in place) equates to 2.7 million CY (loose) excavation required
- No imported material required

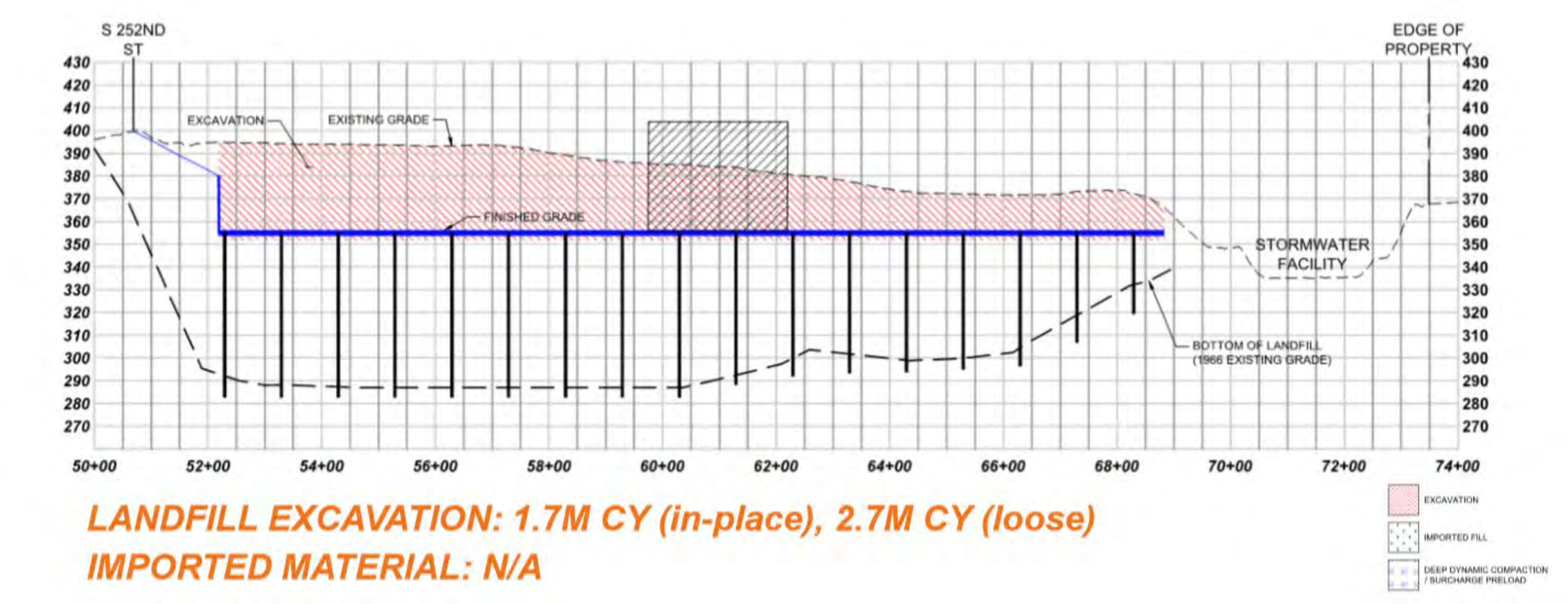
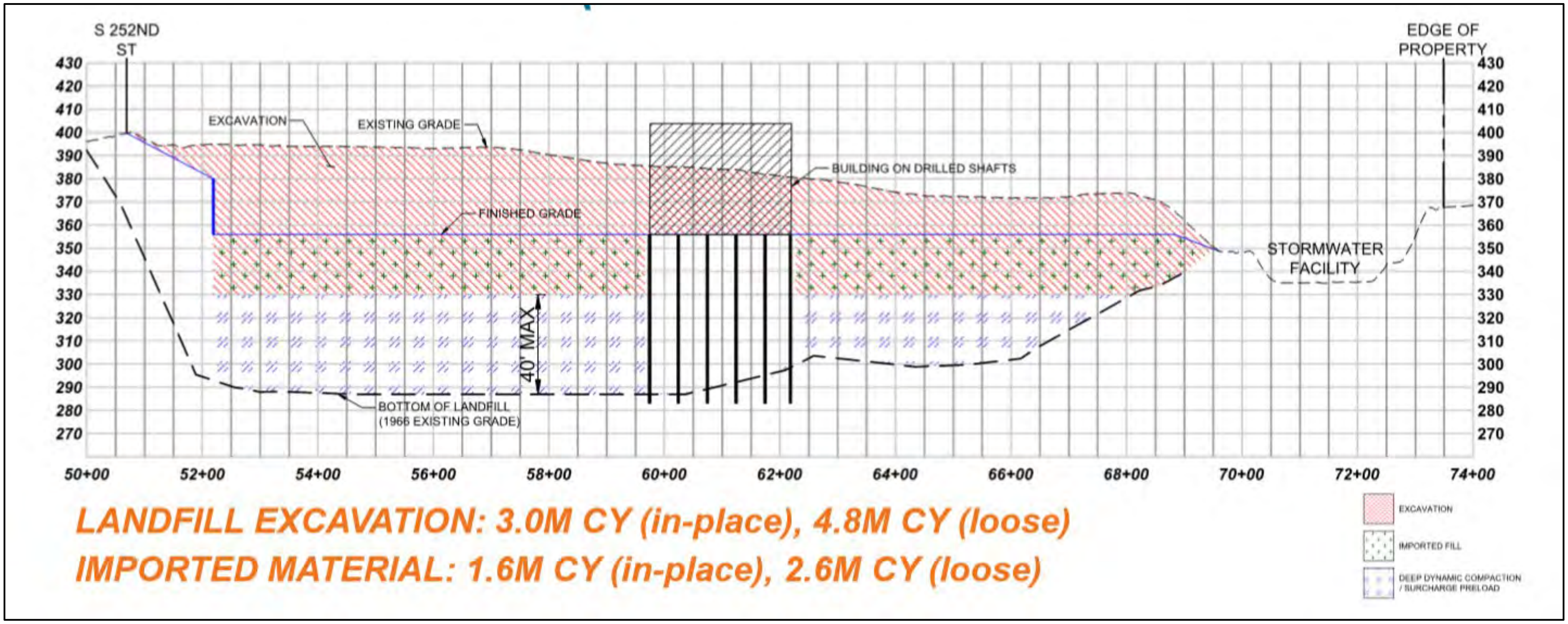

S 252ND ST
EDGE OF PROPERTY
EXCAVATION
EXISTING GRADE
FINISHED GRADE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
LANDFILL EXCAVATION: 1.7M CY (in-place), 2.7M CY (loose)
IMPORTED MATERIAL: N/A
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

EXHIBIT 4-4

#2. Low Structural Platform with some Excavation

3. Hybrid 1: Excavation with Ground Improvements (buildings on drilled shafts)

- Remove and replace cap
- Works with at-grade FWLE tracks
- Requires over-excavation and backfill
- Deep dynamic compaction – 40 foot max. assumed
- Landfill excavation: 3.0 million CY (in-place) equates to 4.8 million CY (loose)
- Imported material: 1.6 million CY (in-place) equates to 2.6 million CY (loose)


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
STORMWATER FACILITY
40' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

LANDFILL EXCAVATION: 3.0M CY (in-place), 4.8M CY (loose)

IMPORTED MATERIAL: 1.6M CY (in-place), 2.6M CY (loose)

EXHIBIT 4-5
#3. Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts)

4. Hybrid 2: Excavation with Ground Improvements (slab on grade for tracks and buildings on drilled shafts.

- Remove and replace cap
- Works with at-grade FWLE tracks
- Slab-on-grade to minimize settlement
- Requires over-excavation and backfill
- Deep dynamic compaction – 40 ft. max. assumed
- Landfill excavation: 3.0 million CY (in-place) equates to 4.8 million CY (loose)
- Imported material: 1.6 million CY (in-place) equates to 2.6 million CY (loose)

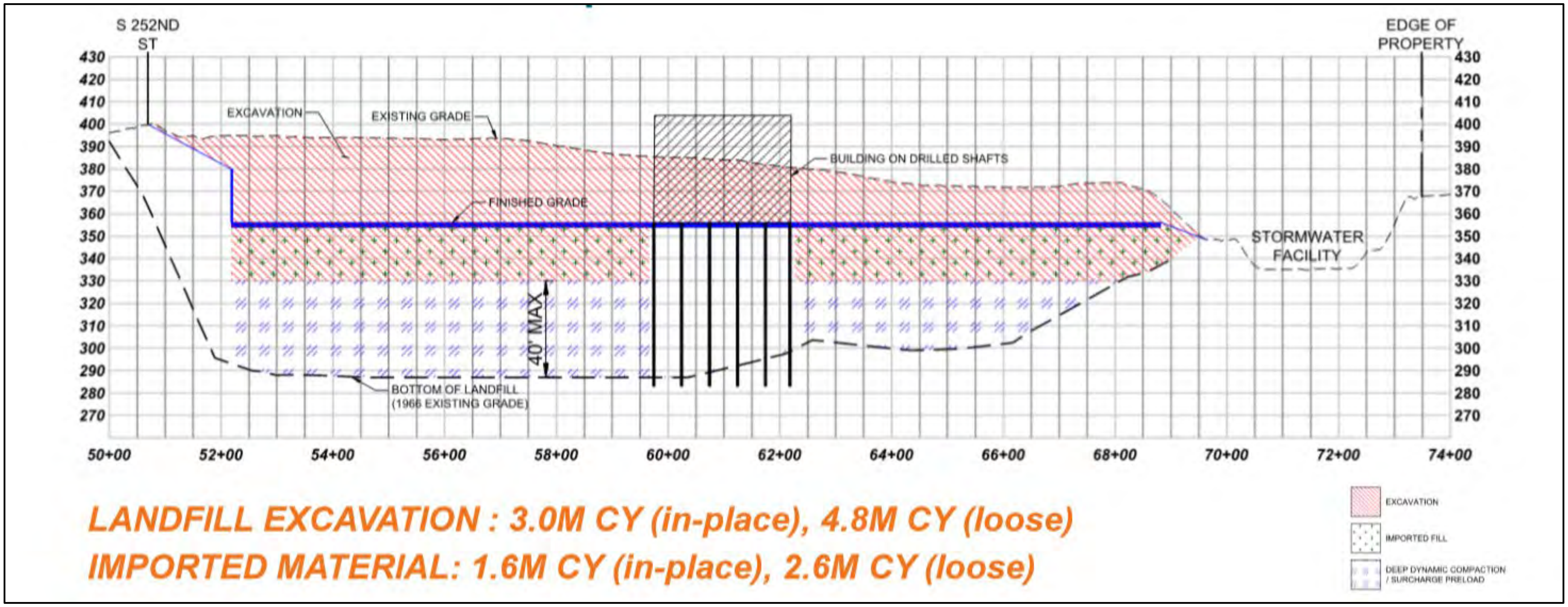

S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
40' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
STORMWATER FACILITY
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
LANDFILL EXCAVATION : 3.0M CY (in-place), 4.8M CY (loose)
IMPORTED MATERIAL: 1.6M CY (in-place), 2.6M CY (loose)
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

EXHIBIT 4-6

#4. Hybrid: 2: Excavation with Ground Improvements (Slab-on-Grade for Tracks)

5. Full Excavation and Backfill with Competent Soils

- Works with at-grade FWLE tracks
- Landfill excavation: 5.0 million CY (in-place) equates to 8.0 million CY (loose), with the quantity to be removed and hauled away estimated to be 8.0 million CY
- Imported material: 2.9 million CY (in-place) equates to 4.6 million CY (loose)

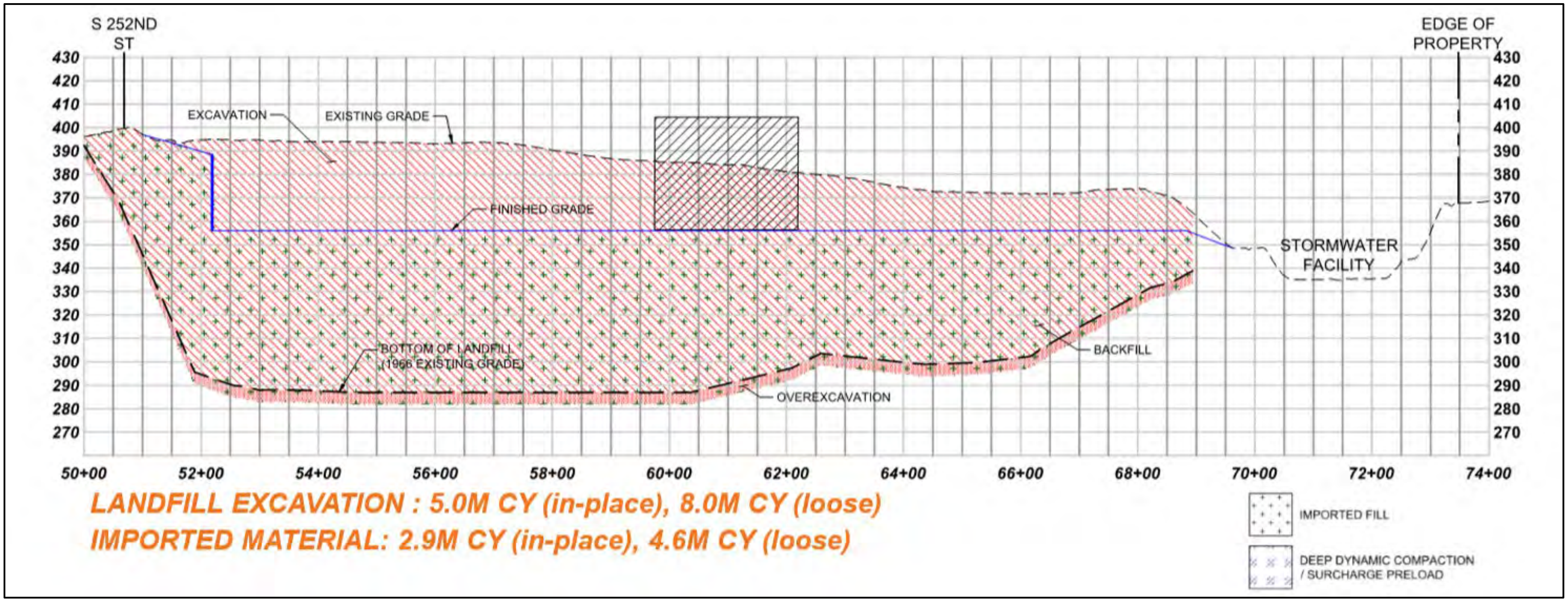

S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
FINISHED GRADE
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
BACKFILL
OVEREXCAVATION
STORMWATER FACILITY
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
LANDFILL EXCAVATION : 5.0M CY (in-place), 8.0M CY (loose)
IMPORTED MATERIAL: 2.9M CY (in-place), 4.6M CY (loose)
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

EXHIBIT 4-7
#5. Full Excavation and Backfill with Competent Soils

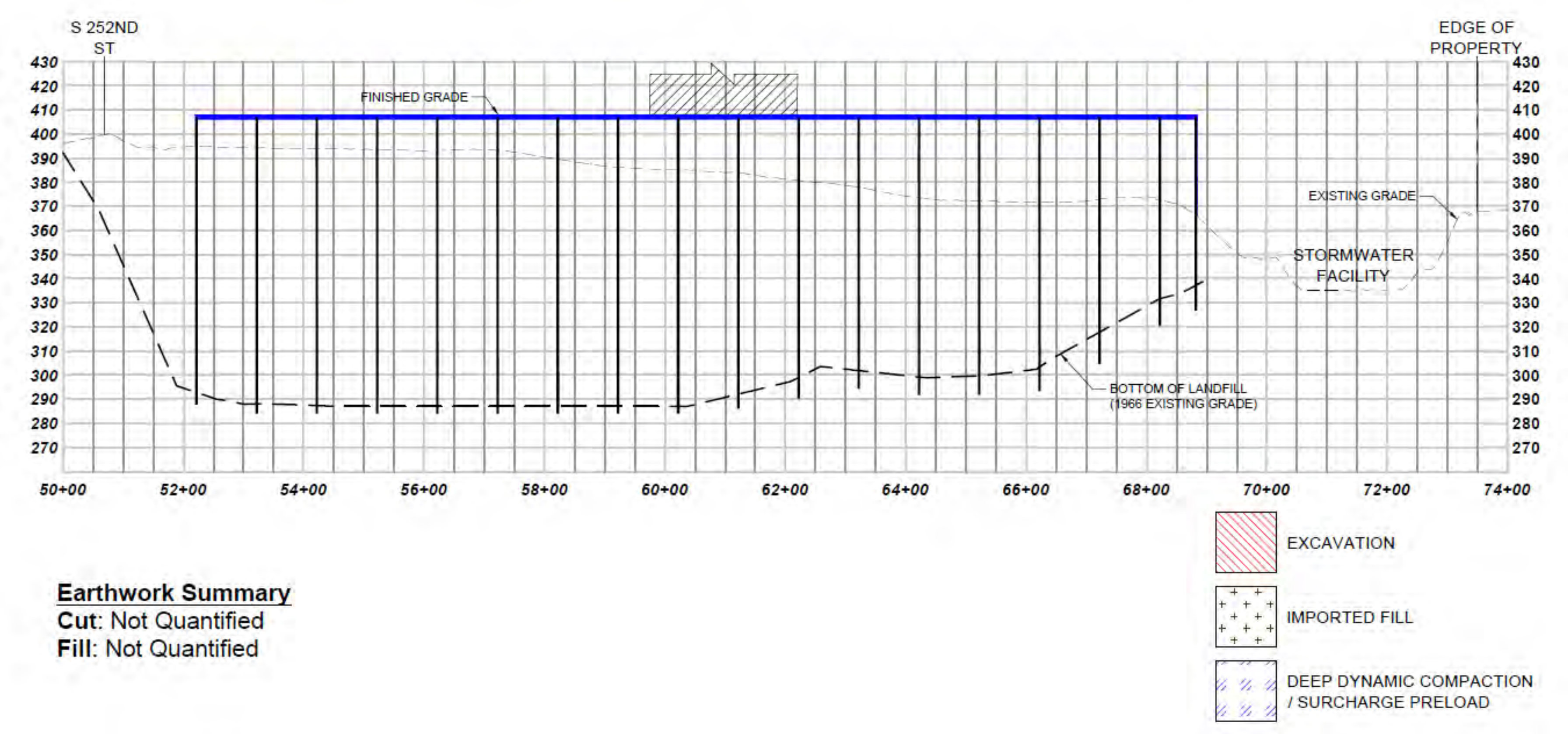
4.6 Refinements to Design Concepts

At the conclusion of the second workshop the cross-sections for the initial design concepts were modified as shown in **Exhibits 4.8 through 4.12** on the following pages.

The new cross-sections include an earthwork summary with the estimated amount of cut and fill. They also show the limits of the excavation, the imported fill, and the deep dynamic compaction and surcharge preload, if applicable. The design concepts will be refined during the 10% design based on the Federal Way Link extension guideway alignment as well as the landfill excavation and reuse information from the Design Builder.

4.7 Summary of Next Steps

1) 5 approaches to be carried forward to 10% CE design; will continue to investigate ways to optimize the approaches
2) Assessment of schedule, budget, and constructability for each approach
3) Meetings with Ecology, EPA, KC Public Health & SPU to understand regulatory framework
4) ST Legal Department review of property rights, conditions/covenants, risks
5) Preparation of a Human Health Risk Assessment


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
FINISHED GRADE
EXISTING GRADE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

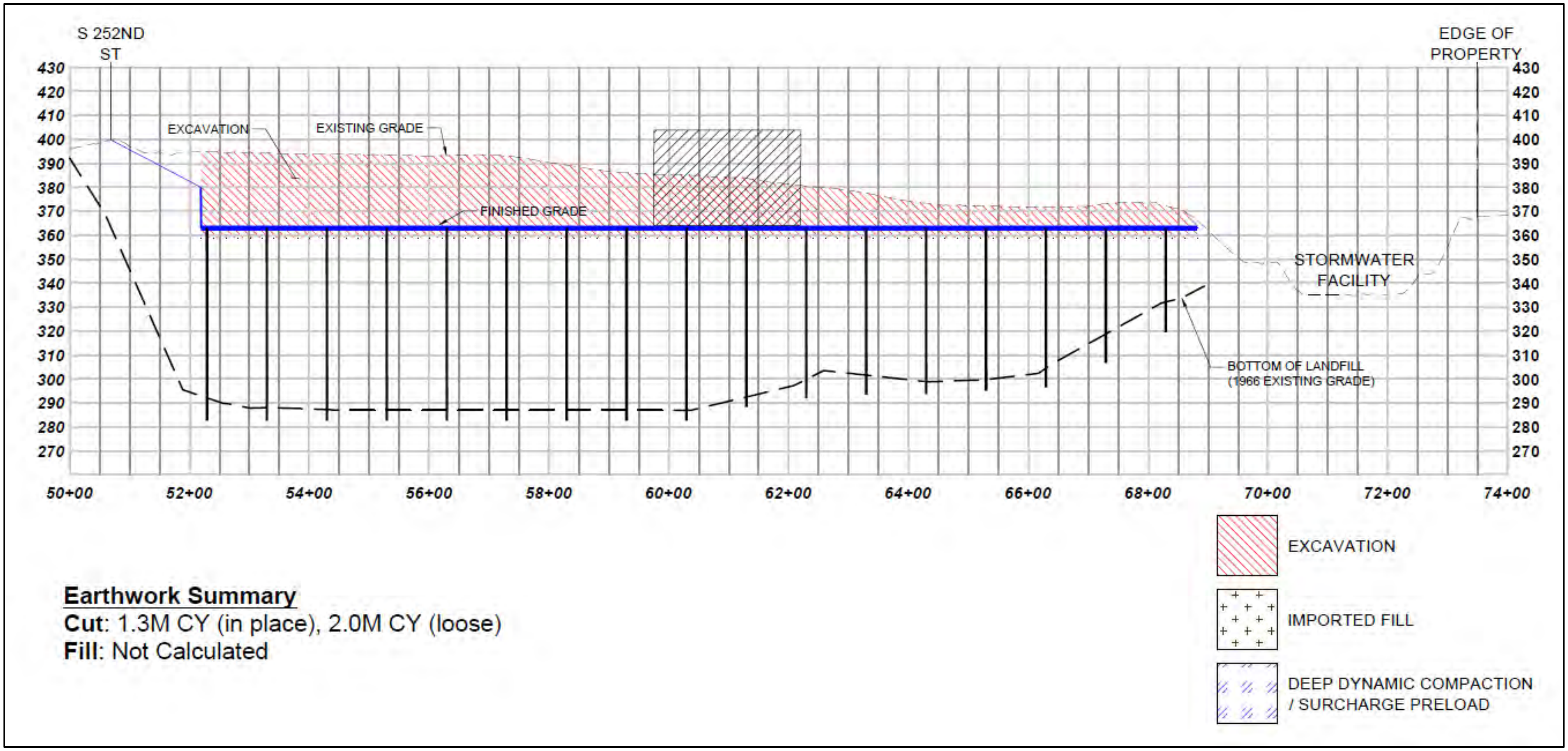
Earthwork Summary

Cut: Not Quantified

Fill: Not Quantified

EXHIBIT 4-8

High Structural Platform with No Excavation


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
FINISHED GRADE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

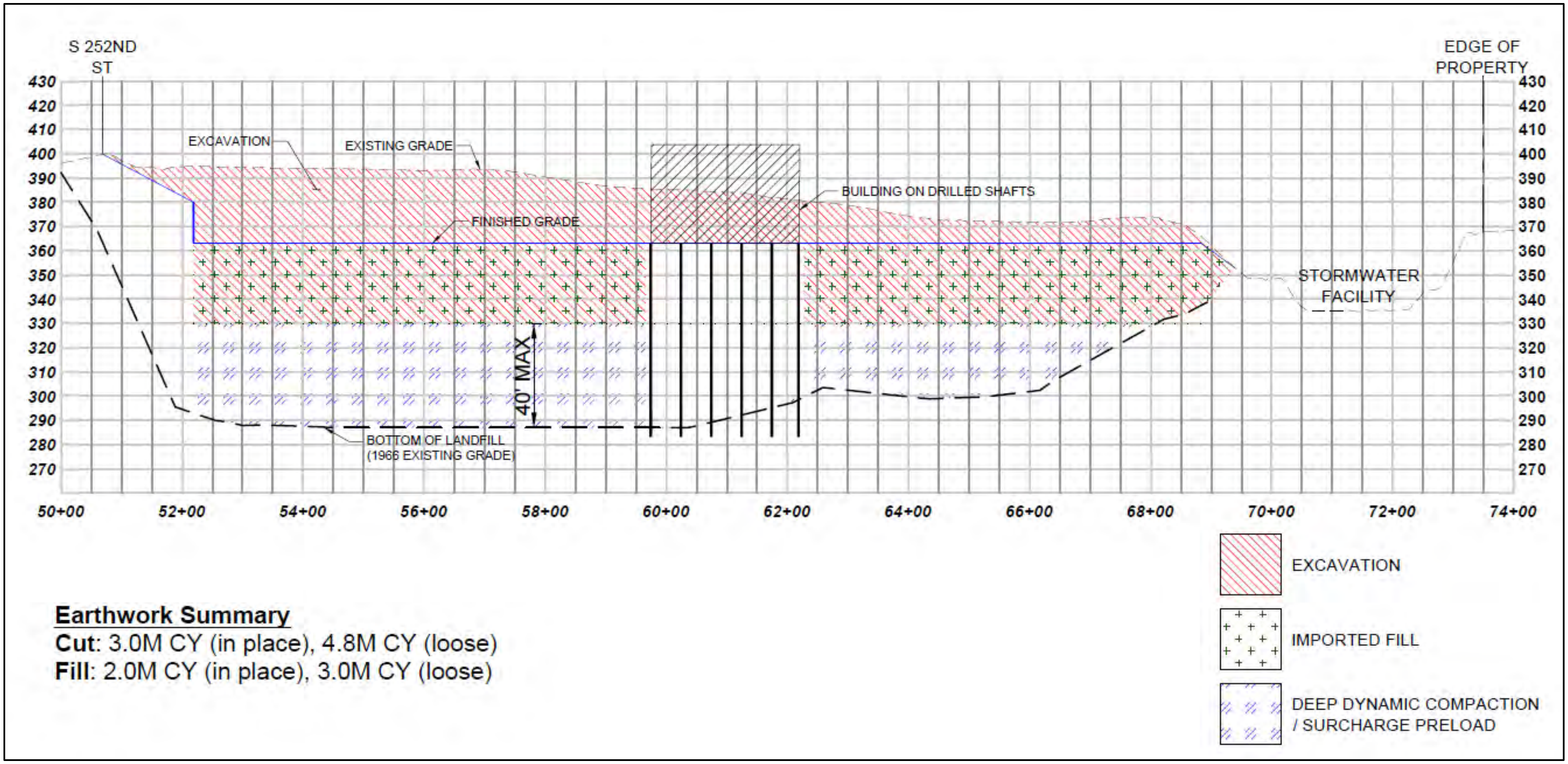
Earthwork Summary

Cut: 1.3M CY (in place), 2.0M CY (loose)

Fill: Not Calculated

EXHIBIT 4-9

Low Structural Platform with Some Excavation


S 252ND ST
EDGE OF PROPERTY
EXCAVATION
EXISTING GRADE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
STORMWATER FACILITY
40' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

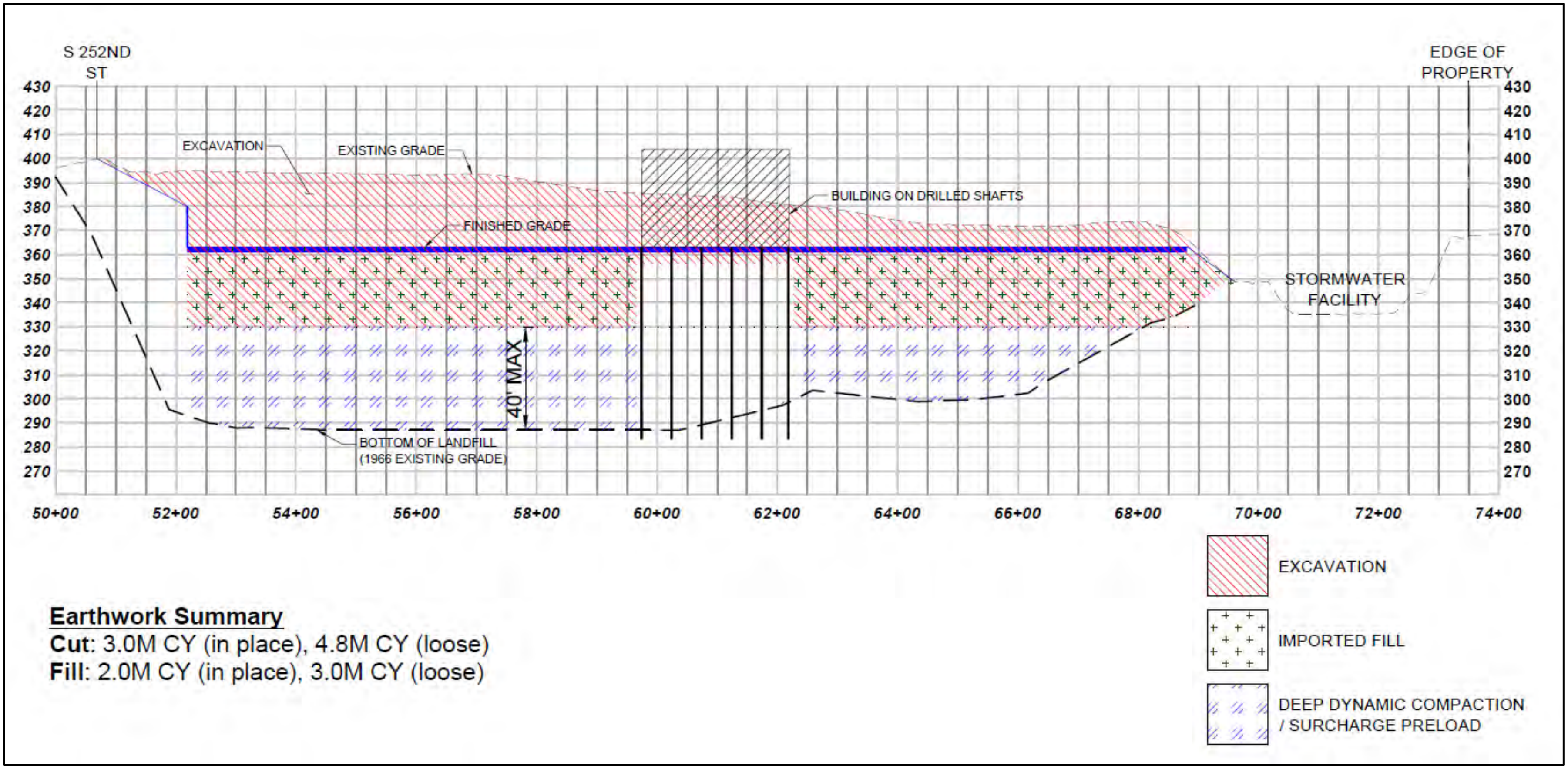
Earthwork Summary

Cut: 3.0M CY (in place), 4.8M CY (loose)

Fill: 2.0M CY (in place), 3.0M CY (loose)

EXHIBIT 4-10

Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts)


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
FINISHED GRADE
BUILDING ON DRILLED SHAFTS
STORMWATER FACILITY
40' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

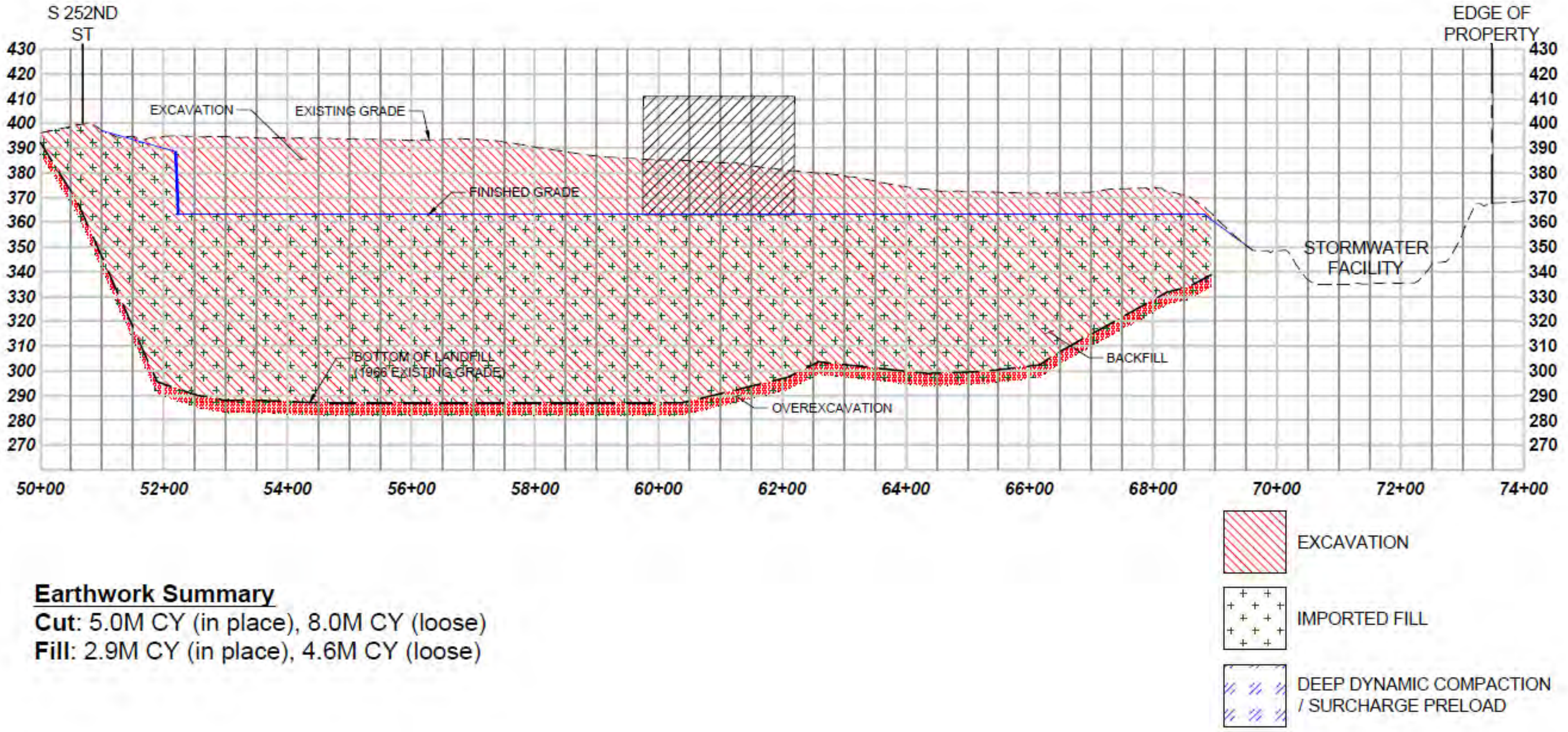
Earthwork Summary

Cut: 3.0M CY (in place), 4.8M CY (loose)

Fill: 2.0M CY (in place), 3.0M CY (loose)

EXHIBIT 4-11

Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Shafts)


S 252ND ST
EDGE OF PROPERTY
EXCAVATION
EXISTING GRADE
FINISHED GRADE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
BACKFILL
OVEREXCAVATION
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00
EXCAVATION
IMPORTED FILL
DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

Earthwork Summary

Cut: 5.0M CY (in place), 8.0M CY (loose)

Fill: 2.9M CY (in place), 4.6M CY (loose)

EXHIBIT 4-12

Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Shafts)

Appendix A

WORKSHOP SUMMARY
Operations and Maintenance Facility South

Meeting Subject: Midway Landfill Site Settlement Workshop No. 1
Meeting Date: August 13, 2019
Meeting Time: 8:30 AM – 4:0 PM
Meeting Location: Sound Transit, 401 S Jackson, Santa Fe Room
Meeting Purpose Launch collaborative effort to understand and brainstorm Midway Landfill OMF South ground settlement solutions

Meeting Objectives

- Create shared understanding of Sound Transit's operational and maintenance criteria
- Create shared understanding of basis of design used to develop Sound Transit's current Landfill concept for the OMF South
- Review and Understand additional information that has become available on the Midway Landfill site
- Outline and action plan for how and when additional ideas will be implemented

Time	Agenda Topic	Lead(s)
8:30	Introductions and expectations	Taylor, Long and All
	Erin welcomed the group and expressed appreciation for their participation for the day. She asked for a round of introductions with question: "what do you hope to begin today for the Operations and Maintenance Facility South (OMF South) Midway Landfill site?" The group introduced themselves and provided hopes for the day. The group committed to the following ground rules for the workshop: • Be present (phones) • Listen • Speak from intentions (not entrenched positions) • Offer space to everyone to speak • Remember: we are unlikely to solve everything today, but we are setting a course/path forward together	
8:45	Safety Moment	Bennett
	Paul offered safety/evacuation information for being in Sound Transit offices.	

Time	Agenda Topic	Lead(s)
8:50	Review Meeting Agenda, Objectives	Taylor
	Erin covered the workshop agenda and objectives. She noted that it that some ideas or issues that came out of the day may be very relevant to Midway Landfill analysis, but unrelated to the settlement workshop purpose, and would be noted as a parking lot item.	
9:00	OMF South: Process to date and looking ahead	Hawkins

	Curvie provided a project overview for the group. He clarified that the OMF South was included in the Sound Transit 3 plan, to be one of four OMFs in the region (others are central/Forest Street operating today, East under construction, and north to be sited in the future). The facility will support multiple projects, and ultimately entire light rail network; timing for its opening is anticipated support Tacoma Dome and West Seattle extensions when they are slated to open in 2030.
	• Sites under consideration. Curvie clarified that while there is a focus on the Midway Landfill today, there are three sites under consideration as part of SEPA Environmental Review: the Midway Landfill in Kent, and two sites in Federal Way. These three are narrowed from an initial screen of 24 sites identified through public early scoping in April 2018. The environmental process will evaluate all sites equally, with the end goal of identifying the best site possible to serve the south corridor.
	  • Site needs. Curvie covered multiple needs to site this facility to store and maintain light rail vehicles at the end of each operational day (1-4 a.m.): it must be minimum of 30 acres, but due to topography and site circulation a likelihood of 40-50 acres in size. It must connect to the Federal Way or Tacoma Dome Link extensions, and provide system-wide operational needs. It will require 18 storage tracks to accommodate 140+ vehicles, Maintenance of Way building, parking, track leads.
	  • Schedule. Curvie provided the timing of the project as a key driver for feasibility analysis of settlement solutions. The site must be open by 2026 to receive and hold vehicles as they are commissioned for service ahead of TDLE in 2030. He clarified that each of the two Federal Way sites, if selected, would necessitate building guideway ahead of TDLE schedule. A Draft EIS for the OMF South is expected in late 2020, and the Board Decision on the site to be built is anticipated for mid/late 2021.	

9:15	Light rail operations and maintenance criteria	Dobbins, Denison,
	Paul Denison provided an overview of typical light rail maintenance and operations as the person charged with overseeing their efficient, clean and safe daily operations. Maintenance work occurs at night in regimented order, requiring about 35 minutes per train (assuming no issues). Any train beyond ordinary nightly maintenance is decoupled and brought into the shop. Paul clarified that Light rail is electrical train technology. These vehicles run on very precise connections, which requires correct contact pattern necessary for electrical interface. Tolerances are fractions-of-an-inch range.	

<table>
<tr><th>Time</th><th>Agenda Topic</th><th>Lead(s)</th></tr>
<tr><td></td><td colspan="2">

Paul provided perspective that the most expensive aspect of light rail operations is labor; when more labor is required due to inefficiency of a site or its upkeep, he needs to revise the cost model.

Paul walked through Sound Transit’s DCM specific criteria relative to operations and maintenance sites (see previous slides). The DCM doesn’t specify how long the building or track must be maintained. On the site, there is a lot of special track work – crews have to lubricate rail by hand on tight turns to prevent wheel climb. FTA requires the facility to be in a “state of good repair” to be able to receive grant money; they consider and inspect equipment, access, and overall program. The facility must meet certain criteria and document any adjustments through work order process. Other clarifications he provided:

Pantograph, tight tolerances. Wires are fixed tension.
Yard inspections are held every 30 days.
Drainage is of critical importance. Mechanical drainage system doesn’t work, failure rate is too high.
Grounding is floating. Must keep the grounding for the building and for the track separate.
At Forest Street, hand tamping is completed every 3-12 months to adjust for settling. Historically, the site was a tide flat. Some fine tuning is expected.

</td></tr>
<tr><td>9:30</td><td>Perspectives from other agencies (5 min each)</td><td>All</td></tr>
<tr><td></td><td colspan="2">

SPU / City of Seattle

The Midway Landfill began to accept waste in 1960s (existing quarry before then). It discontinued accepting waste in 1983, and the cleanup remedy was complete in 1991.
Over the past 25 years, numerous proposals for re-use of the site; this particular proposal may be the best potential match.
SPU will help facilitate exploring the feasibility of the site. From their perspective: “if it works out, great. If not, we gave it our best try.”
Reflecting on the age of the remedy and settlement to date, the site is “running out of gas”, and settlement is reduced.
Waste varies in thickness in different zones (0-60-100 feet), and settlement will follow that trend.
Settlement mapping has been completed since 1988, and there are more current aerial surveys.

City of Kent

Kelly: Reflected is has already been a difficult process to locate this OMF so far, but the City of Kent welcomes the OMF South with open arms on the landfill location. The city believes this is a good solution for the region and wants help make it work.

</td></tr>
</table>

Time	Agenda Topic	Lead(s)
	3. City of Federal Way • Tony: Other two site options for the OMF South are located in Federal Way, but both likely come with major impacts – including industrial/business and church relocations. The Midway Landfill site is the City's preferred location. 4. WSDOT • WSDOT will be most interested where this site could potentially tie into the mainline, and protect WSDOT assets. They want to help Sound Transit understand, then get through the protocols.	
9:45	Break and conversations	
10:00	Q&A for previous presentations	Taylor
	• Erin and Blane asked for questions from the orientation presentations earlier in the morning. o Kate S: Is there work specific to storage track vs. the rest of maintenance track? ▪ Paul D: We want to avoid working on trains while on the tracks. We do not allow anyone in/around trains when they're on storage tracks, as they trains move around. The shop is where most of the maintenance takes place. When the yard is at capacity, that means even more moves, tighter work area. o Jeff N: Would more "elbow room" increase curvature tolerances? Would it help to make yard bigger? ▪ Paul D: Our maintenance staff walk, so their efficiency is a consideration due to their ability to do the job, and number of people to do so/paid to be on site at any given time. But yes, if we had bigger curves, wouldn't have to hand grease them. ▪ Jason B: Physically, you can increase turn radius, but larger turnouts take up a lot more room. In addition, the turns we have are interchangeable across our system, so changing these would be a consideration. o Kate S: What is the preferred method for drainage to work? ▪ Jason B: Preferred way is a ditch with a 33% slope. We do use under drains; the track is flat, so we make up that hydraulic gradient under track. Drains placed every two tracks. For collection and discharge, Forest Street had existing storm/sewer lines, and we have an agreement with city for discharge. ▪ Jeff N: For understanding, the landfill has a detention pond, that was sized in 1991. [The group considered the potential need to bring the pond to code.] ▪ Landfill is impermeable, and it has existing underdrains that drain to a pond. o Jeff N: Is there a way to rank in descending order the heaviest programming elements to the lightest?	

Time	Agenda Topic	Lead(s)
	▪ Paul D. – The building is the most important and heaviest element, and must be stationary due to vehicles entering/existing. ▪ Jason B: Building would be biggest load, then storage tracks, we cannot adjust the building if there's settlement. [DCM states loads required] ▪ Steve R: Forest Street is a good example. Parking lot has tolerances, but parking areas fit into dead areas, surrounded by track areas. Most of the site has very small tolerances, it needs to be very stable. ▪ Mike W: At Forest Street, the building was constructed on 1200 piles (on tidal flat), pounded in. Today, there are limits to what can be done with that building due to its foundational structure. For example, a newer refurbishment required selection of an above-ground lift because to accommodate inability to cut into the floor of the structure. o Ian S: The building is supported by piles, but surrounding area is not? ▪ Jason B: At Forest Street, the building is supported by piles with a transition area. There was ground improved to support loads under ballast. Impact slabs, concrete aprons on either side that support gradual transition out to yard. o Kate S: It was mentioned that five more acres would be beneficial – why? ▪ Paul D: Ideally, we need an area for "laydown" to store items for the entire system. At Forest Street there is no place to store things specific to service. Need a 30,000 SF building to store stuff like spare rails, spare switches, machines, clips, and glasswork. If we cannot site a building of this nature at OMF South, it could require a separately staffed facility. All three sites include this building (included in programming). o Kelly: Are there issues with OCS settlement at Forest Street? ▪ Paul D. – There were issues with door bridges early on, but was not due to settlement. Each OCS was constructed on real piles; the guideway piles are around 15 feet deep; OCS structure throughout the yard has been stable. o Jason B: Is there a historic record of aerial photography of the landfill? ▪ Jeff N: Yes, supplemented by on the ground work from GeoEngineers in April 2019 ▪ Ed H: In April 2019, the TDLE team flew the entire corridor at .2 feet. The comparison work has not been completed.	
9:40	Overview of current ST design	Mudayankavil/ Harris
	▪ **T**homas presented the current design. At this level of design, it has used a typical, non-modified layout (also used for all sites considered). This meant a template was dropped in for Phase 1. The unique aspect at this location was connection tracks to mainline (to be refined in Phase 2 of the project). ▪ Based on potential settlement considerations, the current design placed the entire site on slab supported by piles. Piles are 160 feet deep. For a conservative approach, everything was assumed to be above grade, with	

Time	Agenda Topic	Lead(s)
	nothing on the landfill itself. An underlying assumption was the requirement to maintain the landfill below the slab. ■ In the upcoming design work (to 10% design), the site will be modified for an optimized site fit. The Sound Transit Board direction identifies the site as on the landfill itself; this limits any acquisition of private parcels west of the site. ■ Dave Peters clarified that assuming we stay above the existing cap, this would govern elevation, but some pits within the facility are required to maintain trains from beneath (roughly six feet deep). ■ Ed Herald provided context that the existing landfill structural design was completed as the project also considered 22 sites over a 3-week period, so there was limited time invested in the site solution. The team did come up with platform solution but not sure that's the best solution. The team provided the perspective that settlement understanding will be the key to how we optimize this site.	
10:10	Overview of GeoEngineers report for City of Kent	Kent/ GeoEngineers
	• **Tim Bailey** outlined the study that the City of Kent commissioned in order to investigate if landfill is "old and not settling much." This work included comparison of LiDAR data from 2005-2016, predicted future settlement, and compared to actual settlement 2016-2019. Overall, the actual measure of settlement was less than what they predicted with the model. • Tim also projected forward 50 years out from closure (1991), which would expect to see less than a foot of settlement anywhere across site except for WSDOT ROW. He reflected in comparison to the criteria provide for operations and maintenance by Sound Transit, that "that's not where we need it to be, but at least bounds the problem." In general, the site has completed primary and secondary settlement; now there is long-term component, which indicates a steady rates of settling moving towards zero. • Doug: What is settling and what is causing it? Tim: Based on records/borings, landfill waste has a lot of soil intermixed so long term settlement is due to degradation of the waste. The site is capped, keeping stormwater out. Jeff N: There is reduce stormwater-contaminated runoff. Groundwater levels are below the waste. Shallower waste is extremely dry. A lack of moisture has slowed the degradation/ creation of gas. Landfill gas is down 85% from where it was in the 1990s. The settlement curve flattens out for a long time. If waste gets wet, that could change decomposition rate. • Gwen: Any common themes about why previous site proposals would not work? Jeff N: As a theme, those proposers found better alternatives for their development sites. • Dwight: Will employees working at site be affected by anything? Jeff N: If we do our job, no. There is no exposure pathway for groundwater.	

Time	Agenda Topic	Lead(s)
	Kate: Landfill is required by EPA to prevent pathways for exposure. The City of Seattle needs to maintain those controls in perpetuity. We can reconstruct landfill cap as part of doing the site. • Jason B: What's the maintenance life of a cap? Kate: It depends on how you design it, but a cap is designed to last in perpetuity. • Curvie: We must be sensitive to schedule, and it is not clear on what is involved in breaking cap and regulations associated with that, and impacts to schedule. Kate: The City is working on a separate path with FWLE to work through regulatory process, so will have answers for timing on pathway when agreement done by next June (2020). • Dwight: In terms of degradation and settlement, are there other ideas to preloading? How much consolidation would you get out of this? Tim: In general, there will need to be a design so that any/all of the primary and secondary settlement is taken care of. Preloading time depends on thickness of area. Perhaps years, but could be accelerated.	
10:45	Discussion/brainstorm alternatives for consideration	Long and All
	• Blane Long conducted a brainstorm to generate settlement and site alternatives for consideration based on the seed ideas. [See attachment to summary for brainstormed and categorized ideas in raw form, from the workshop for documentation purposes]	
11:30	Lunch	
12:40	Additional clarification for each of the brainstormed ideas	Long and All
	• Blane Long continued the discussion of brainstormed ideas for settlement, clarifying details and grouping the ideas into categories for additional analysis and detail: o Excavation (EX) o Ground improvement (GI) o Structural (STR) o Layout optimization (LAYOUT OPT) o Maintenance (MAINT) [See attachment to summary for brainstormed and categorized ideas in raw form, from the workshop for documentation purposes]	
1:30	Review, add to, and confirm evaluation criteria (requirements vs. performance attributes), alternatives to be examined and extent of study	Long and All
	• Blane Long conducted a brainstorm of criteria to evaluate settlement alternatives relative to each other: o Schedule (to ready for opening day and major milestones) o Construction (means, methods, coordination) o Code conformance	

Time	Agenda Topic	Lead(s)
	o Risk factors o Ability to provide light rail service (efficiency and operability) o Cost [See attachment to summary for brainstormed and categorized criteria in raw form, from the workshop for documentation purposes]	
2:00	Define follow-up activity/report • In concluding the workshop, the team asked: "What have we forgotten?" for the good of the order: o Ian – Please consider needs around property transaction, acquisition, property rights, regulatory engagement. Opening of ROD could impact schedules o Jeff N. – Request for tour of Forest Street Facility, offers a site visit at Midway Landfill. The team said that could be arranged, and late night when the site is most active would be most illustrative.	Sound Transit
2:30	Adjourn and Next Steps/future for meetings 2 and 3: Erin concluded the meeting asking for the group to reflect on a learning item from the meeting; many reflected they learned from one another and appreciated the collaborative environment. Future meetings were detailed as follows: - Meeting 2: Draft evaluation report of alternatives from HDR and feedback (TBD timing, likely mid-September) - Meeting 3: Sound Transit communicates solution(s) taken into the design as reflected in Draft EIS (TBD timing)	

Handouts/Reference Materials:

- Midway Landfill Early Conceptual Site Plan
- Midway Landfill Basis of Design
- GeoEngineers' Report for City of Kent

Attendees:

Dave Peters, Curvie Hawkins, Gwen McCullough, Chelsea Levy, Mark Jusayan, Kate Snider, Ian Sutton, Hui (Hugh) Yang, Jeff Neuner, Tim Bailey, Allison Dobbins, Jason Baily, Michael Williams, Steve Radomski, Paul Bennett, Tony Doucette, Kelly Peterson, John Sleavin, Paul Denison, Hussein Rehmat, Jessica Giblin, Thomas Mudayankavil, Brian Harris, Bob Mitchell, Jason Funk, Ed Herald, Cristina Seo, Dwight Miller, Andrew Austin, Ben Wolters, Erin Taylor, Blane Long

Appendix B

STRUCTURAL

		RISK					
NO.	**BRAINSTORM IDEAS**	**REGULATORY**	**SCHEDULE**	**COST**	**CONSTRUCT-ABILITY**	**MAINTENANCE / RELIABILITY**	**FACTORS CONSIDERED FOR RANKING**
1	Heaviest building loads toward middle of site with piles, with transition slabs, west dynamically compacted and/or partially excavated – Kate, depending on area of site	1 (a, b,e,f)	2 (a, b, c)	1 (a, b,c)	1 (a, b, c,)	1 (d)	a. Dynamic compaction impacts to exist. solid waste b. Landfill excavation c. Transition slabs - some settlement expected d. Settlement concern e. Potential groundwater contamination f. Construction noise and vibration
2	On east side, consider a floating mat foundation that is connected by hinged slabs – Kate (landfill grading would be necessary)	2 (a,b)	2 (a,b,c)	1 (a,c)	2 (a,c)	1 (d)	a. Floating slab b. Some excavation c. Non-traditional construction methods d. Uneven settlement concern
3	Take current track bridge technology being used on I-90 bridge; alternatively use track bridge throughout the site – Paul	2 (b)	1 (b,e)	1 (a,b,c,e)	1 (b, e)	1 (c,d,e)	a. Layout impact b. Includes excavation c. Maintainance d. Uneven settlement concern e. New technology was designed for bridges
4	Consider track on rigid structure, as opposed to the entire site on structure (e.g., pin piles/bridge structures) - David	2 (a,c)	2 (a,c)	1 (a,b,c)	2 (a,c)	3 (a,b)	a. Buildings on deep piles b. Track on slab supported by piles c. Includes excavation
5	Consider track on floating slab so that tracks are settling as a unit on a rigid slab Note: Difficult transitions to the buildings	2 (a)	2 (a,c)	1 (a,c)	1 (a,c)	1 (b)	a. Includes some excavation b. Uneven settlement concerns c. Non-traditional construction methods
6	Consider OCS on shallow foundations – Tim Note: Minor element compared to larger OMFS considerations and effectiveness depends on adjacent track construction	NA	NA	NA	NA	NA	a. Settlement concerns
7	Consider storage tracks on floating slab and pin piles on turnouts/ladders with carefully monitored transition slabs between the two (monitor drainage) - Jason Note: Transition design will be critical to the success of this approach	2 (a)	2 (a,b)	1 (a,b)	1 (b)	1 (c)	a. Includes excavation b. Non traditional construction methods c. Uneven settlement between transition slabs
8	Consider lightweight fill materials for mass grading areas Note: May help reduce settlement	2 (a)	2 (b,c)	1 (b,c)	2 (c)	1 (d)	a. No special permits b. Includes excavation c. Special construction methods d. Long-term settlement concerns
9	Optimize current ST-proposed design for column size/structure size and ensure have right design to evaluate; use other deep foundation alternatives that do not create a pathway (groundwater) Notes: Expected to occur during detailed design if option is selected	2 (a,b)	2 (a,b)	1 (a,b)	3 (a,b)	3 (a)	a. Structural slab supported by optimum size piles b. Replace cap
10	Manage settlement/create interfaces and have redundancy to do so (e.g., extra runaround where you expect differential settlement) - Kate Note: This should be in combination with other options	2 (a)	2 (a,b)	1 (a,b,d)	2 (a)	1 (c)	a. Includes some excavation b. Added ROW and construction cost c. Differential settlement d. Manage settlement (maintenance cost)

LAYOUT

NO.	BRAINSTORM IDEAS	RISK					FACTORS CONSIDERED FOR RANKING
		REGULATORY	SCHEDULE	COST	CONSTRUCTABILITY	MAINTENANCE/ RELIABILITY	
1	Relocate SPU flare facility (on NW corner of site) to get area on native soils (where exist) – Jeff	2 (a)	NA	1 (a,b)	NA	1 (b)	a. Relocation of flare facility b. Layout on landfill
2	Use property to Northwest of site (west of pond, owned by SPU) due to availability of native soils - Jeff	NA	NA	1 (a,b)	NA	1 (b)	a. Requires additional ROW b. Layout on landfill
3	Move Maintenance of Way building location as depicted in initial concept to west, so that not just in center of site; optimize track yard layout to shift as much as possible to west, which may adjust to be a non-regular rectangle (some area between tracks in middle of site would be spread out)	NA	NA	1 (a,b)	NA	1 (b)	a. Requires additional ROW b. Layout on landfill
4	Move farther north with the track and turnouts, as well as some storage facilities - Dwight	NA	NA	1 (a,b)	NA	1 (b)	a. Requires additional ROW b. Layout on landfill
5	Manage settlement/create interfaces and have redundancy to do so (e.g., extra runaround where you expect differential settlement) - Kate	NA	NA	1 (a,b)	NA	1 (a,b)	a. Requires additional ROW b. Layout on landfill
6	Sophisticated, automatic-alerting settlement monitoring systems (use them) - Kate	NA	NA	NA	NA	1 (a)	a. Layout on landfill
7	Consider flipping building and storage tracks or layout of storage tracks - Blane	NA	NA	NA	NA	1 (a)	a. Layout on landfill
8	Relocate existing pond as it is on native soil/take advantage of north edge of the site - Thomas	NA	NA	1 (a)	NA	1 (b)	a. Requires additional ROW b. Layout on landfill
9	Make pond a vault underneath the yard/site	NA	NA	1 (a)	NA	1 (a)	a. Layout on landfill
10	Pervious pavement for parking lot/use gravel	NA	NA	1 (a)	NA	1 (a)	a. Layout on landfill
11	Reconfigure as a dogleg to take advantage of the shallow areas (in spite of track inefficiencies) – Paul	NA	NA	1 (a)	NA	1 (b)	a. Requires additional ROW b. Operationally inefficient

EXCAVATION

		RISK					
NO.	BRAINSTORM IDEAS	REGULATORY	SCHEDULE	COST	CONSTRUCTABILITY	MAINTENANCE/ RELIABILITY	FACTORS CONSIDERED FOR RANKING
1	Remove landfill/excavate - Dave	1 (a,b)	1 (a,b)	1 (b)	1 (b)	3	a. May need to reopen ROD b. Landfill excavation, disposal and backfill
2	Landfill mining to recover and use for engineered fill – Dwight	1 (a,b)	1 (a,b)	1 (b)	1 (b)	3	a. May need to reopen ROD b. Landfill excavation, disposal and backfill
3	Partial removal/west side - Remove areas where solid waste is less thick (western side of landfill), engineered backfill (Requires adjusting site layout) – Kate	2 (a)	2 (a,b)	1 (a,b)	2 (a,b)	1 (b)	a. Landfill excavation, disposal and backfill b.Combined with other design options
4	Partial removal of “dome” of landfill to make some level areas – Ian	1 (a)	1 (a,b)	1 (a,b)	1 (a,b)	1 (b)	a. Landfill excavation, disposal and backfill b. Combined with other design options
5	4-18 feet of overburden over the waste that is clean, engineered material and could be reused, Reuse overburden material as backfill or elsewhere on site	2 (a)	1 (a,b)	1 (a,b)	2 (a,b)	1 (a,b)	a. Landfill excavation, disposal and backfill b. Combined with other design options

GEOTECHNICAL

		RISK					
NO.	BRAINSTORM IDEAS	REGULATORY	SCHEDULE	COST	CONSTRUCTABILITY	MAINTENANCE/ RELIABILITY	FACTORS CONSIDERED FOR RANKING
1	Deep dynamic compaction – drop huge weight (down to 30') on top of an area - Tim	1 (a,b,d,e)	1 (a,b)	1 (a,b)	1 (a,b)	1 (c)	a. Dynamic compaction impacts on exist. solid waste b. Includes some landfill excavation c. Settlement concern d. Potential groundwater contamination e. Construction noise and vibration
2	Injection or compaction grouting to improve the waste – Tim	1 (a,b)	1 (b,c,d)	1 (c,d)	1 (a,b,c)	3 (d)	a. Groundwater contamination b. Some excavation c. Non-traditional construction methods d. Large grout volume needed
3	Stone columns - Jason	2 (a,c)	1 (a,b)	1 (a,b)	1 (b)	2 (d)	a. Includes some excavation b. Non-traditional construction methods c. Construction noise and vibration d. Uneven settlement concern
4	Surcharge and pre-load the site – Tim	2 (a)	1 (a,b)	1 (a,b)	2 (a)	2 (c)	a. Includes some excavation b. Schedule constraint c. Settlement concern
5	Look at thicker subgrade (6' deep subgrade) for area with geogrid reinforcement rather than concrete slab – Ian	2 (a)	2 (b)	1 (a,b)	2 (a,b)	2 (c)	a. Includes some excavation b. Non-traditional construction methods c. Uneven settlement concerns
6	Preload site now – as soon as possible – to be ready for project construction	1 (a)	1 (a, b)	1 (b,d)	2 (b,d)	2 (c,d)	a. Reqiuires approval b. Includes some excavation c. Uneven settlement concerns d. Combined with other design options
7	Waste treatment: thermal treatment and removal/replacement of residue – Mark	1 (a)	1 (a,b)	1 (b,c)	1 (b)	3 (c)	a. Need permit for onsite treatment plan b. Non-traditional construction methods c. Assumes approved backfill

Midway Landfill Alternatives Evaluation

		Alternative				
		High Structural Platform on Piles with No Excavation	Lower Structural Platform on Piles with Some Excavation	Hybrid 1 : Excavation with Ground Improvements (bldgs. on piles)	Hybrid 2 : Excavation with Ground Improvements (slab on grade for tracks and bldgs. on piles)	Full Excavation and Backfill with Competent Soils
	Criteria	1	2	3	4	5
Structural	**Regulatory Risk**	🟨	🟨	🟥	🟥	N/A
	Schedule Risk	🟨	🟨	🟨	🟨	N/A
	Cost Risk	🟥	🟥	🟥	🟥	N/A
	Constructability Risk	🟨	🟨	🟨	🟥	N/A
	Maintenance/Reliability	🟩	🟩	🟥	🟨	N/A
Layout	**Regulatory Risk**	N/A	N/A	N/A	N/A	N/A
	Schedule Risk	N/A	N/A	N/A	N/A	N/A
	Cost Risk	N/A	N/A	N/A	N/A	N/A
	Constructability Risk	N/A	N/A	N/A	N/A	N/A
	Maintenance/Reliability	N/A	N/A	N/A	N/A	N/A
Excavation	**Regulatory Risk**	N/A	🟥	🟥	🟥	🟥
	Schedule Risk	N/A	🟨	🟨	🟨	🟥
	Cost Risk	N/A	🟥	🟥	🟥	🟥
	Constructability Risk	N/A	🟨	🟨	🟨	🟥
	Maintenance/Reliability	N/A	🟩	🟥	🟥	🟩
Geotechnical	**Regulatory Risk**	🟨	🟨	🟨	🟨	N/A
	Schedule Risk	🟨	🟨	🟨	🟨	N/A
	Cost Risk	🟥	🟥	🟥	🟥	N/A
	Constructability Risk	🟨	🟨	🟨	🟨	N/A
	Maintenance/Reliability	🟩	🟩	🟥	🟥	N/A

Low = 🟥

Medium = 🟨

High = 🟩

OMF South Landfill Site Settlement Workshop #2

Date: **Thursday, October 3, 2019 - 8:30 a.m. to 3 p.m.:**
Location: **Sound Transit, 401 S. Jackson**
Room: 625 Building, Floor 2, Downtown Room

Meeting objective(s):

- Review brainstormed solutions from Operations and Maintenance Facility South (OMF South) Landfill Site Settlement Workshop #1;
- Share evaluation process and initial results of brainstormed settlement design concepts;
- Understand collective perspectives around design concepts; and
- Outline plan for designs to continue to pursue

Review in advance of meeting:

- Landfill Site Settlement Workshop #1 Summary
- Settlement Design Concepts Evaluation Matrix Template

Time	Agenda item	Lead
8:30 a.m.	**Introductions and expectations** • Agenda review - • Workshop Summary #1 review, (as needed) corrections and/or clarifications from workshop • Overview of materials available	Erin Taylor
	Erin Taylor welcomed the group and expressed appreciation for their participation. She asked attendees to identify whether or not they were present at the first workshop and led the group in a round of introductions. Attendees committed to the The group committed to the following ground rules for the workshop: • Be present (phones) • Listen • Speak from intentions (not entrenched positions) • Offer space to everyone to speak • Remember: we are unlikely to solve everything today, but we are setting a course/path forward together **Erin** then provided an overview of the agenda for the workshop.	
8:55 a.m.	**Safety Moment**	*Paul Bennett*
	Paul Bennett *offered safety/evacuation information for being in Sound Transit offices.*	
9:00 a.m.	**Sound Transit status updates** • Other ongoing evaluation of priority concerns • Forest Street facility additional detail	Curvie Hawkins Paul Bennett Gwen McCullough

Erin introduced this section of the agenda and informed the group that Sound Transit would provide updates about other ongoing evaluation and address inquires posed in the first workshop related to the existing Forest Street OMF.

Gwen McCullough shared that in addition to the settlement analysis, the Sound Transit team is also working to address health and safety and regulatory areas of priority concern for the Midway Landfill site.

Paul Bennett explained that the Forest Street facility was not built on a landfill site and is not congruent to the Midway Landfill site, even though it is also built on a fill area. He clarified that there will be a section in the report dedicated to the Forest Street piece that illustrates this from a geotechnical borings perspective.

- Tony D.: Could Sound Transit share information about the type of fill present and used on the Forest Street site?
    - **Paul** explained that this information would be included in the report.

Curvie Hawkins shared that the OMF South and Tacoma Dome Link Extension teams would be conducting outreach in November as a "project update to the community." The intent of this engagement is to remind the community of the project(s) status, and ongoing technical work.

- Mark H.: How will Sound Transit reach the communities in November?
    - **Curvie** explained it will be similar to past outreach periods—will do a postcard mailer and jurisdictional coordination in combination with other relevant project outreach efforts (e.g. FWLE open houses in November).

9:20 a.m. **Additional status updates (if needed)**

- City of Kent
- SPU
- City of Federal Way
- WSDOT

Jeff N. (Seattle Public Utilities) shared SPU is doing a great deal of regulatory work with Ecology and EPA for FWLE waste removal. He believes lessons learned from this process will inform how the Midway Landfill site could be remediated.

Tony D. (City of Federal Way) shared that the most recent City Council meeting was pretty contentious and highlighted community confusion about the two potential OMF South sites in Federal Way.

Philip H. (WSDOT) added WSDOT is still working steadily on the FWLE project.

9:40 a.m. **Work progress since Workshop #1** Thomas Mudayankavil *Dave Peters*

- Evaluation process recap for brainstormed concepts
- Review of evaluation criteria

Thomas Mudayankavil and **Dave Peters** explained how the project team evaluated the participants' brainstormed design concepts from the first workshop. Ideas were sorted by type—structural, geotechnical, layout, and excavation—and evaluated by structural, geotechnical and solid waste engineers in each category. For each idea and based on each of the criteria members of the consultant team provided their rating on a scale of 1, 2, 3 with definitions for each. A low risk/green rating was a 3 for this exercise. The tables presented are attached to this summary. This work set the stage for settlement concepts to be developed and then also rated.

9:50 a.m. **Layout optimization conclusions** *Steve Radomski*

Steve Radomski explained how the optimized layout was refined with priority to operational efficiency, and analysis of brainstormed solutions from the first Settlement Workshop. This meant that rather than defining potentially the shallowest areas of fill and placing specific site elements in those locations, the site layout is currently optimized for in/out of and minimization of necessary train movements on a daily basis. Layout refinements and assumptions included:

- Locating the staff parking lot entrance away from S 252nd St, which could have impacted traffic and residents in the adjacent residential area, instead to off SR 99.
- Moved the MOW inside the yard.
- Increased the number of service tracks from 12 to 15 to provide additional wash and training lanes.
- No significant frontage improvements anticipated on SR 99 at the Midway Landfill site.
- Mitigating disruption to the detention pond on the landfill.
- Relocated the landfill gas flare facility to the west side of the detention pond.
- While refining the layout, it became apparent that site was slightly off the landfill. ST consulted Board motion language which stated to build mostly on the landfill, so additional need for some property in vicinity of SR 99 ROW is not in conflict with Board direction.

Steve reported that the optimized layout is the same for all potential OMF South sites as of now, with an eye toward operational efficiency. The optimized layout assumes the OMF is built on stable ground.

- Jeff N.: How many staff in MOW?
    - **Steve:** Currently planning 100 employee parking spaces for MOW; 207 parking spaces for maintenance folks. A little more than 400 employees per shift.

- Tony D.: How can we consult this information after the meeting?
    - **Paul:** This is all real time information. All information shared today will be in the final report.

- Hui (Hugh) Y.: Why do we have the heaviest facility on I-5 (deeper section of the landfill) vs. SR 99 (shallower section of the landfill)?
    - **Steve:** The current rectangle is the ideal shape – we resized the overall perimeter. Run around track is a little under a mile in length—big facility. Within the yard, LRV run at 7 mph on average. Time halfway around the site is about 5 minutes; 5 x 144 cars, 2x day – 25 hours per day in getting vehicle out of the yard. Costs would be incurred in mileage on the vehicles and maintenance staff time if we reoriented the facility.

Paul explained that the "dog leg" brainstormed concept was sketched for illustrative purposes, but determined it would impede operational efficiency, and widens the footprint. The ability to run service is impacted because there's no efficient way to charge the line or maintain the trains, and therefore not cost effective. **Curvie** added, this configuration would also push impacts off the landfill, in conflict with public feedback and the Sound Transit Board's direction.

10:30 a.m.	*Break*	
10:45 a.m.	**Settlement design concepts analysis** • Review brainstormed settlement concepts, by category *Structural and Substructure* *Geotech* *Excavation* • Current working settlement concepts	Erin Taylor Thomas Mudayankavil Dave Peters

Thomas and **Dave** then took the group through each remaining brainstormed design concept category: structural and substructure, geotechnical and excavation. After highlighting examples in each category, workshop participants were prompted to ask clarifying questions. [See Brainstormed Settlement Concepts handouts for the basis of discussion].

Structural

- Jeff N.: Did you compare each brainstormed structural concept to one to one another?
    - **Dave:** No, we did not. Each brainstormed structural concept is compared to the cost and time projections of the ST3 schedule.
- Mark J.: Is property acquisition part of this cost?
    - **Dave:** No, just purely construction. We did look at preliminary estimates for property acquisition in Phase 1 so we have extremely rough number.

- Tony D.: Wil all this background analysis be summarized in report?
    - **Paul:** Yes. There will be a formal comment period on the 10% design.
- Hui (Hugh) Y: Why is “Constructability” on 9 green?
    - **Dave:** Item 9 was the concept developed in Phase 1, so we looked at a 30 ft thick slab. The diameter shaft and was similar to FWLE guideway on the landfill, so we believe it’s more feasible.

Excavation

Ian Sutton shared some rough calculations about the impact of excavating the full landfill—it would require significant truck trips (18 trucks total, 3 trucks loading on the site at a time; 10-hour days), which would result in significant construction delays. This would require ~10,000+ truck trips. Getting that excavated material to rail would require some sort of construction of a transfer facility, which takes additional time to permit and construct.

Jeff N. commented that the means and methods of excavation and waste removal will inform the regulatory and schedule components of evaluation, and the project team agreed.

Geotech

Dave reported that the team was confident they could effectively compact a 30-foot layer. If the strategy was instead to excavate down to minimize settlement, you would have to excavate and then dynamically compact. He shared the team also looked into processing the waste and actually using the processed waste as fill, but there’s still contamination in the material, so it may need to be disposed of despite best efforts to mitigate. Sound Transit’s analysis didn’t try to rank order the brainstormed ideas. In some red boxes, it’s a no-go, in others it’s a hurdle we can work through.

Hui (Hugh) Y. shared one potential blind spot: the structural solution had 10 ideas, some were overall/ some were detailed. Recognize potential for piles. 10 foot diameter shaft, 90 foot down – if you created steel casing, it would significantly increase cost.

- Paul D.**:** Do you have a good summary page of how you got to red/yellow/green?
    - **Dave:** See “Factors considered for ranking”, which is reflective of what engineers were thinking when we ranked it. We don’t have granularity yet to drill down to months over 2026 opening, for example. The number of truck trips, haul distance all contributed to an estimated number of years beyond 2026 required. In summary, all of these brainstormed ideas would require additional time beyond 2026 complete. Sound Transit partnered Geotech efforts with City of Kent report, and we’re working in conjunction with them on geotechnical analysis.

Sound Transit asked attendees whether or not an explanation of the layout refinement should be included in the final report. Attendees agreed it should be included to demonstrate that the brainstormed ideas were looked at. Several of the ideas were incorporated into the optimized layouts.

Design concepts

Sound Transit introduced the five potential design concepts based on the brainstormed ideas from the first workshop. Discussion is generally directed specifically to each design concept.

Jeff N. reminded the group that there's a 24-hour landfill gas system, which is something that needs to be considered in all potential options moving forward.

1. **High structural platform on drilled shafts with no excavation.**
    a. Same as Phase 1 option.
    b. Minimum impact to landfill CAP → a goal, we accounted for potential to impact regulatory component in case we disturb the CAP too much.
    c. 3 ft. thick slab, supported by 10 ft. diameter shafts
    d. Require elevated guideway to connect
    e. Approx. 70,000 CY of excavation (augured)

2. **Low structural platform with some excavation**
    a. Remove and replace CAP
    b. Works with at-grade FWLE tracks – starts to work better with FWLE
    c. 1.7 million CY (in place); 2.7 million CY (loose) excavation required.
    d. No imported material

Discussion:

- Mark H.: Does the estimate of "tens of thousands" of truck trips (20 CY per truck) account for the cap material, or just solid waste?
    - **Thomas:** Haven't gotten to that level of detail yet, but 2-3 feet above the cap in some places/ 14 feet in others.
- **Paul**: we don't typically go down to 100 foot radius on tracks. DCM is 500 foot radius.
- There's room to optimize elevation in this option, could go up or down.
- Tony D. Would #1 or #2 work better for FWLE design assumptions?
    - **Thomas:** #2 would require less effort on FWLE part; #1 would require significant increase in FWLE elevation. This elevation is set to optimize tie-in to FWLE. FWLE will be operational in 2024 – we would want to have those sections completed before 2024 so we don't impact the opening of that line, or need to accommodate construction once the extension is operational.

3. Hybrid 1: Excavation with ground improvements (buildings on shafts)

  a. Remove and replace Cap
  b. Works with at-grade FWLE tracks
  c. Requires over-excavation and backfill
  d. Deep dynamic compaction – 40 foot max.
  e. Landfill excavation: 3.0 million CY (in-place), 4.8 million CY (loose)
  f. Imported material: 1.6 million CY (in-place), 2.6 million CY (loose)

Discussion:

- Potential operation noise reduction if you're down lower, rather than elevated.
- Jeff N.: Is there concern for settlement on buildings? Would deep dynamic compaction eliminate settlement risk in this option?
  - **Dave:** Yes, a bit. Assume excavation and deep dynamic compaction to get to a density that's acceptable to mitigate settlement. We would get benefit for placing backfill for preload. Solid waste weight of removed waste would likely be heavier than backfill. We would hope to improve this enough to avoid settlement.
- Hui (Hugh) Y.: Is building on piles because you expect some degree of settlement even with deep dynamic compaction?
  - **Thomas**: Yes, buildings are the heaviest part. You might not have to put them on piles, but we're being conservative. Buildings would weigh an estimated 5,000-7,000 kips.

4. Hybrid 2: Excavation with ground improvements (slab on grade for tracks and buildings on piles)

  a. Remove and replace CAP
  b. Works with at-grade FWLE tracks
  c. Slab on grade to minimize settlement
  d. Requires over-excavation and backfill
  e. Deep dynamic compaction – 40 ft. max.
  f. Landfill excavation: 3.0 million CY (in-place), 4.8 million CY (loose)
  g. Imported material: 1.6 million CY (in-place), 2.6 million CY (loose)

Discussion:

- Hui (Hugh) Y.: Concern about building on piles because of uneven surface risk as a result of settlement underneath piles. May want to refine that piece.

5. Full excavation and backfill with competent soils

  a. Works with at-grade FWLE tracks
  b. Landfill excavation: 5.0 million CY (in-place), 8.0 million CY (loose)
    i. Quantity removed and taken away is 8.0 million
  c. Imported material: 2.9 million CY (in-place), 4.6 million CY (loose)

Discussion:

- **Dave:** Advantage is that, after complete excavation, ground settlement, legal risk, regulatory risk, employee health and safety are totally mitigated with this issue.
- **Thomas and Ian:** Superfund designation is a result of groundwater condemnation. This means there are limitations on how much of the cap can be exposed at any given time. Given rainy seasons here, we can't have significant amount uncovered at any given time. Have to work during dry season, only 20-22 weeks of actual excavation time per year, which would take approximately 16 years. Limits you to assume include: 5-ish acres open at any given time; trucks would load up (3 at a time); 18 trucks on the road at any given time that would need to travel 20-ish miles. When considering 400,000 truck trips loaded on local roads—estimated 400,000 truck trips to empty landfill; 200,000 to backfill. Hauling to a railhead and tipping fees in OR/WA-- $650 million cost estimate.
  - **Paul:** To be direct, ST can't get permission from WSDOT for direct access to I-5 and we would need to use local roads. We assume Kent may have a concern about this and therefore potential support of the site alternative.
    - Mark H.: Good question to think about, it might. The City of Kent's preference would be for direct access to I-5 and avoid traffic on local roads.
    - Philip H.: We could look into WSDOT permission, but it's not something that's typically granted.
  - Tony D.: Could ST get direct access to I-5 if FWLE tracks are already in place?
    - **Paul:** Just north of the OMFS potential site, there is an elevated alignment. Could excavate under private property. Not a fatal flaw, but something ST is thinking about.
  - Jeff N. We're 300 miles from a landfill with capacity. It would require a transfer facility—nearest existing one is at Black River.
- Not fatal flaw: If we worked double shifts, 6 days/week, we might be able to reduce time by 7-8 years. Maybe we can up the LRV delivery to 6 per week, from 3 per week, to ramp up 2024 delivery more quickly.
- Jeff N.: So far associated with the FWLE contractor discussions, we understand in that area that the fill is up to 70% soil in the landfill by volume. Going to get rusted things, plastics and wood. This means solid waste from excavation is greatly reduced. 8 million CY loose, maybe looking at 2 million CY?
  - This evaluation is from deeper zone of the landfill, not sure what it's like in shallower sections.
  - If you sift through everything and remove solid waste, the dirt is still contaminated. I could see benefit if Ecology would let you put the dirt back.
  - SPU is doing this analysis in real time right now with Ecology—and determining if it might be possible to put dirt back. This will require an amendment to cleanup action plan and consent decree, which will be out for comment in November. Regulatory approach will be available within a week or two; Sound Transit, due to separation of projects, will want to wait to

expand on this concept until it's in public domain. We might have a soil contamination determined before 10% design (Spring 2020).

  - Settlement risk and landfill gas issues are gone if fully excavate. Not trying to clean it up, just trying to get MSW out and approval for competent soils.
  - Except for the middle section, landfill is largely dewatered now. Where you would be working in groundwater, assume it's contaminated and would need to be treated.
  - With other hybrid options, would be nowhere near groundwater area.
  - Gross excavation is somewhere 188,000 CY or 200,000 CY. In terms of scale, significant difference
  - Important data point: production rates on cleanout. SPU thinks estimates is 3-4 months.
- Mark J.: Shannon Wilson is doing Geotech data—maybe could get ahold of it?
- **Paul:** This changes the remedy from removing the cap to fully eradicating the landfill. Could have significant regulatory impacts. We'll be having conversation with Ecology in a couple months.
- Tony D. expressed concern that Hybrid 1 and 2 are too similar, so it might make sense to take two more different options into the design phase.

12:00 p.m.	*Lunch on own*	All
1:00 p.m.	**Comparing the settlement concepts** • What do we take into design?	Erin Taylor and all

Dave explained the Brainstormed Settlement Design Concepts: Summary handout. Different expertise evaluated each category on the summary sheet, which is why the criteria is repeated for each category. Cost is red for each design concept because it is assumed that all options will have a higher cost than the ST3-approved project. A key factor informing the color of bars in this risk analysis is the level of unknowns. You can only know so much.

- Hui (Hugh) Y.**:** 160 foot shafts are significant length for deep foundation elements. Not similar to slab on grade. What's the on-center distance on 10-foot shafts?
  - **Dave:** 700 feet.

- Jeff N.: Sound Transit expects there to be a learning curve on expedited permitting process for FWLE, which is heartening for this process.

- Why is Hybrid 1 and 2 risk different (Hybrid 1 = yellow/ Hybrid 2 = red) for structural and maintenance and reliability?
  - **Thomas**: Different number of construction sequences. Construction schedule will be dictated by time-sensitive elements. More construction in Hybrid 2 – 40-50 acres of concrete slab. Don't want to cast a slab until we're sure it's not going anywhere, so there's levels of cost and time with additional structures built.

Maintainability is also different between the two Hybrid options. Trade-off – more time built into the schedule/construction sequence before can cast the slab. There's a little more flexibility with the piles.

- Tony D.: How does this risk profile compare to the other two sites? Are the FW sites all green? Not talking same alternatives, but still dealing with soil conditions. Are the unknowns that much less at the other sites vs. this one?
    - **DAVE**: Don't have geotechnical borings in the Federal Way area. We've identified areas to do borings along the alignment and near the site. City of Federal Way will receive permits this month so we can do borings in the ROW. Will have to do this same analysis for the 10% design.

Erin then asked the group to highlight any potential blind spots:

Blind spots:

- Paul D..: Would prefer to have Hybrid 1 and 2 as well as full excavation compared to the cleanup happening on FWLE (e.g. Hybrid 1 with waste/soil sifting AND Hybrid 1 comparison).
- Tony D.: Is there a risk with doing FWLE and OMF South projects at the same time? (e.g. excavating significantly next to already-laid track)?
    - **Paul:** This is a real potential.
- Hui (Hugh) Y.: Alternative to Hybrid 2: Consider slab with ground improvement below to limit differential settlement with grouting ports to re-stabilize solid slab. Perhaps optimization of Hybrid 2 option. Might need a cap before you can place the slab option.
- Is Number 1 still an option with an at-grade FWLE?
    - **Paul:** Preference would be to determine if options 2-5 are feasible, then remove option 1. Conversation with Ecology and EPA would happen after final report of this workshop series.
- Mark H.: When will the fall report be ready?
    - **Gwen:** End of November. Goal is to have a final report of the Settlement Workshop series in the next 30-45 days. 10% design analysis for some of these options start tomorrow. **Paul:** In April 2020, we'll be doing cost estimating and value engineering, then constructability.
- Jeff N.: Look at FWLE lessons-learned, even though on a significantly smaller scale, and see how Option 5 could work. Would like an out for Option 5 depending on regulators' input and conversation with FWLE development.

Erin walked the group through an exercise to see what could be removed from further consideration or modified. The result of this conversation is attached to this summary, highlighting group agreements on what to carry forward and next steps. Sound Transit shared their agreement with the current set of settlement concepts to continue moving forward.

2:30 p.m.	**Attendee reflections**	Erin Taylor

	Next steps *Meeting 3: Sound Transit communicates concepts will be taken into the design as reflected in Draft EIS*	
3:00 p.m.	• Adjourn	All

Handouts/Reference Materials:

- Midway Landfill Settlement Brainstorm Settlement Concepts:
    - Structural
    - Excavation
    - Geotechnical
    - Layout
    - Summary

Attendees: Dave Peters, Curvie Hawkins, Gwen McCullough, Mark Jusayan, Ian Sutton, Hui (Hugh) Yang, Allison Dobbins, Jason Baily, Michael Williams, Steve Radomski, Paul Bennett, Tony Doucette, Kelly Peterson, Ian Sutton, John Sleavin, Paul Denison, Thomas Mudayankavil, Phil Harris, Bob Mitchell, Jason Funk, Ed Herald, Andrew Austin, Ben Wolters, Erin Taylor, Alexandra Streamer, Mike Rayburn, Yvonne Olson, Jason Bailey, Jeff Neuner, Mark Howlett

Operations and Maintenance Facility South

Appendix D2:
Interim Midway Landfill Preparation Memorandum

Federal Transit Administration

SOUNDTRANSIT

February 2020

OMF SOUTH

Interim Midway Landfill Preparation Memorandum – Draft 2

SOUNDTRANSIT

CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

SOUNDTRANSIT

OMF SOUTH

Interim Midway Landfill Preparation Memorandum

Prepared for:
Sound Transit

Prepared by:
HDR Engineering, Inc.

February 14, 2020

Table of Contents

Acronyms and Abbreviations iii
Units iii
1.0 Introduction 4
1.1 Purpose 4
1.2 Five Landfill Subsurface Construction Design Options 4
2.0 Construction Evaluation 11
2.1 Earthwork Process 11
2.2 Drilled Shaft and Slab Installation 12
2.3 Environment Considerations during Construction 13
2.4 Disposal Considerations 15
2.5 Construction Phasing and Material Reuse 16
2.6 Truck Trips – Export and Import 17
2.6.1 Disposal Export 17
2.6.2 Soil Import 17
2.6.3 Concrete Import 18
2.7 Results 18
3.0 Traffic Analysis 21
3.1 Truck Haul Routes 21
3.2 Level of Service Considerations 21
4.0 Schedule 27
5.0 Preliminary Landfill Preparation Cost Estimate 35
6.0 Compatibility with the Known Status of FWLE Construction 39
7.0 Potential Settlement 41
8.0 Conclusions and Next Steps 43
8.1 Confirm Assumptions 43
8.2 Landfill Investigations 43
8.3 Constructability Review 47
8.4 Final Landfill Preparation Memorandum 47
9.0 References 48

Tables

2-1 Regional Disposal Capacity

2-2 Landfill Preparation Material Requirements

2-3 Landfill Preparation Hauling Requirements

3-1 Passenger Car Equivalency for Each Approach

4-1 Landfill Preparation Schedule Summary

5-1 Landfill Preparation Cost Summary

5-2 Detailed Landfill Preparation Costs

6-1 Track Summary

8-1 Subsurface Construction Design Options Evaluation Matrix

Figures

1-1 High Structural Platform with No Excavation

1-2 Low Structural Platform with Some Excavation

1-3 Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts)

1-4 Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shafts)

1-5 Full Excavation and Backfill with Competent Soils

3-1 Proposed Haul Routes

3-2 AM Operating Conditions

3-3 PM Operating Conditions

4-1 Schedule – High Structural Platform with No Excavation

4-2 Schedule – Low Structural Platform with Some Excavation

4-3 Schedule – Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts)

4-4 Schedule – Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shafts)

4-5 Schedule – Full Excavation and Backfill with Competent Soils

Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe Railroad
DB	design-build
DBB	design-bid-build
EIS	Environmental Impact Statement
FFE	final floor elevation
FWLE	Federal Way Link Extension
LFG	landfill gas
OMF South	Operations and Maintenance Facility South
PCE	passenger car equivalency
RCRA	Resource Conservation and Recovery Act
ROM	rough order of magnitude
UP	Union Pacific Railroad

Units

cy	cubic yard
day/wk	days per week
hr/day	hours per day
lb/cf	pounds per cubic foot
ton/cy	tons per cubic yard
wk/yr	weeks per year

1.0 Introduction

1.1 Purpose

The Midway Landfill is currently being evaluated as one of three site alternatives in the Draft Environmental Impact Statement (EIS) for the Sound Transit Operations and Maintenance Facility South (OMF South) Project. The subsurface development of the OMF South on a landfill will require unique design considerations to maintain the in-place remedial environmental controls and protect the facility against settlement. The landfill specific design considerations are not present at the other OMF South site alternatives. Five landfill subsurface construction design options (options) are currently being explored, as described in Section 1.2. This memorandum provides a high-level, interim assessment of landfill site preparation requirements based on existing data and reasonable assumptions to compare and contrast the five options to inform the Sound Transit decision-making process when advancing options further into the siting evaluation process.

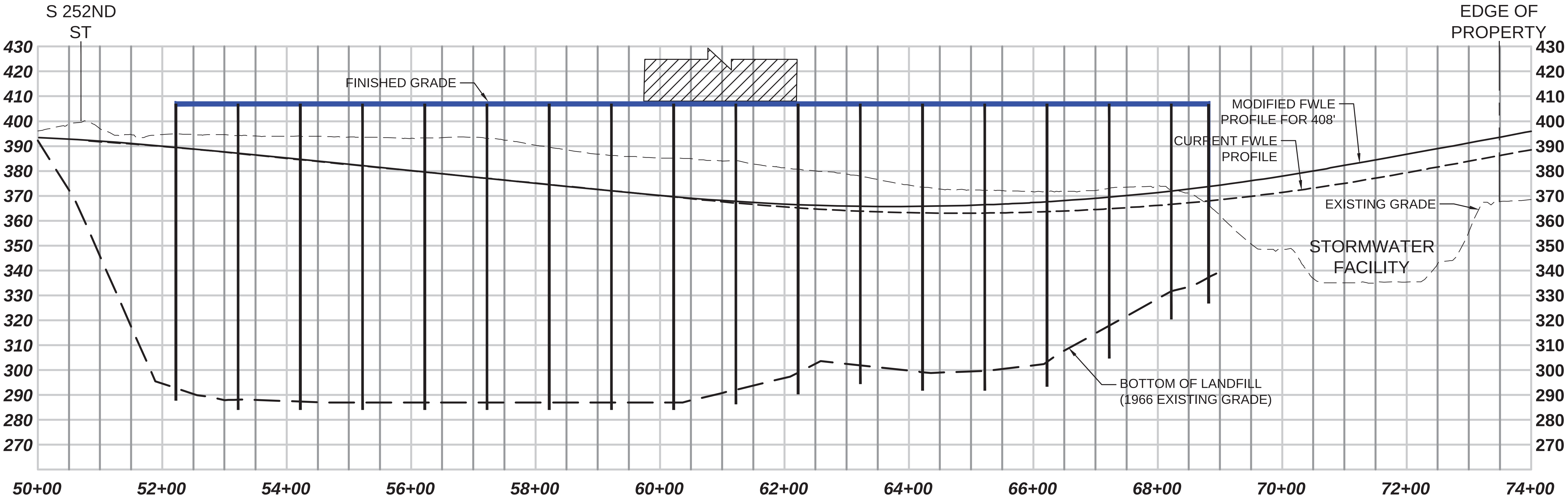
1.2 Five Landfill Subsurface Construction Design Options

Each of the five OMF South subsurface construction design options generally has the same horizontal layout and surface features. The five options primarily vary in subgrade and foundation concepts. The five options include:

1. High Platform – High Structural Platform with No Excavation
2. Low Platform – Low Structural Platform with Some Excavation
3. Hybrid 1 – Excavation with Ground Improvements (Buildings on Drilled Shafts)
4. Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
5. Full Excavation – Full Excavation and Backfill with Competent Soils

The options are consistent with those described in the Midway Landfill Site Engineering Optimization Report. Exhibits 4-3 through 4-7 from the report have been included as Figures 1-1 through 1-5 to illustrate each concept. The report should be reviewed for more detail pertaining to the OMF South project and each construction approach.

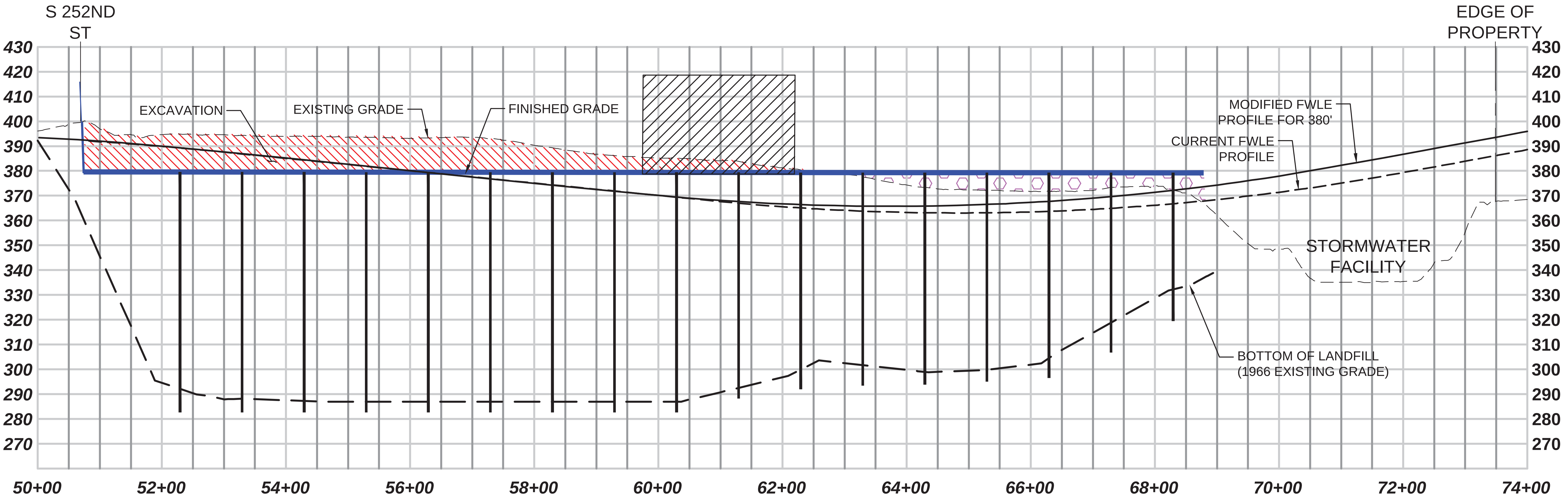
1 HIGH STRUCTURAL PLATFORM WITH NO EXCAVATION



High Platform (408 OMF FFE, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	0.1	0.1		

Only accounts for excavation associated with drilled shafts

2 LOW STRUCTURAL PLATFORM WITH SOME EXCAVATION


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
FINISHED GRADE
MODIFIED FWLE PROFILE FOR 380'
CURRENT FWLE PROFILE
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Low Platform (380 OMF FFE, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	0.46	0.05		
Borrow Fill			0	
Screen (100% Reusable)	0.41	0		0.41
Total		0.05	0	0.41

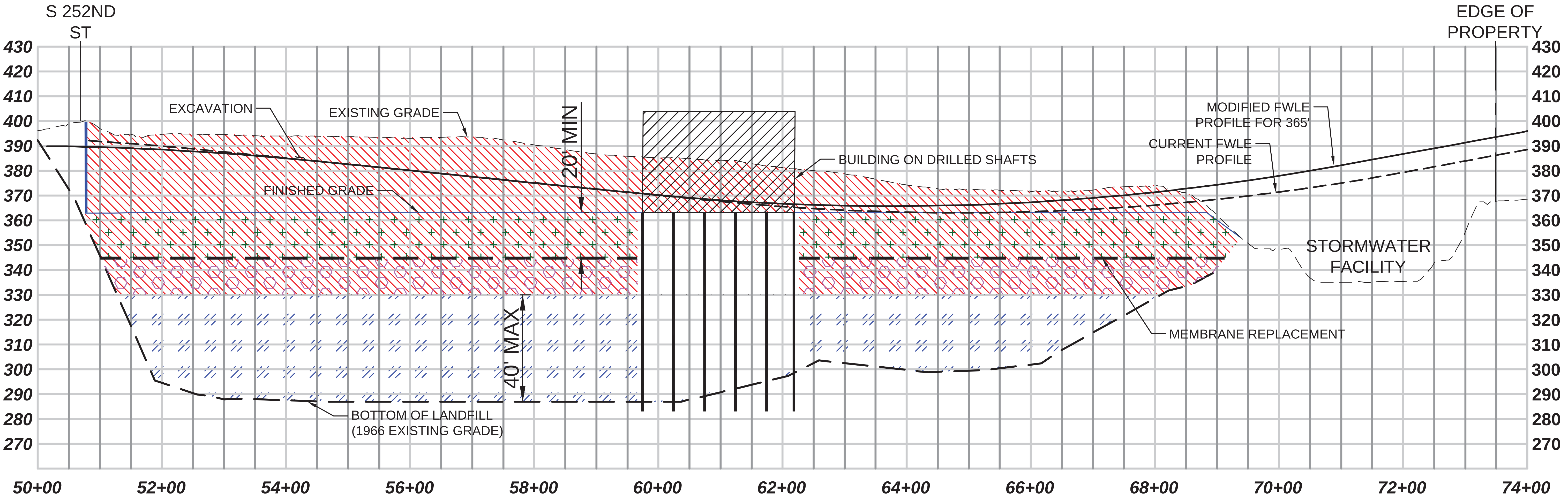
Assumes all excavated soil can be placed on site below proposed fill areas

▨ EXCAVATE

⬡ FILL WITH EXCAVATED MATERIAL

3

HYBRID 1: EXCAVATION WITH GROUND IMPROVEMENTS (BUILDINGS ON DRILLED SHAFTS)


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
20' MIN
FINISHED GRADE
BUILDING ON DRILLED SHAFTS
MODIFIED FWLE PROFILE FOR 365'
CURRENT FWLE PROFILE
STORMWATER FACILITY
40' MAX
MEMBRANE REPLACEMENT
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Hybrid 1 (365 OMF FFE, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	2.9	1.7		
Borrow Fill			1.1	
Screen (50% Reusable)	1.2	0.6		0.6
Total		2.3	1.1	0.6

Assumes excavation to flat elevation (330) across entire landfill area regardless of depth of landfill below

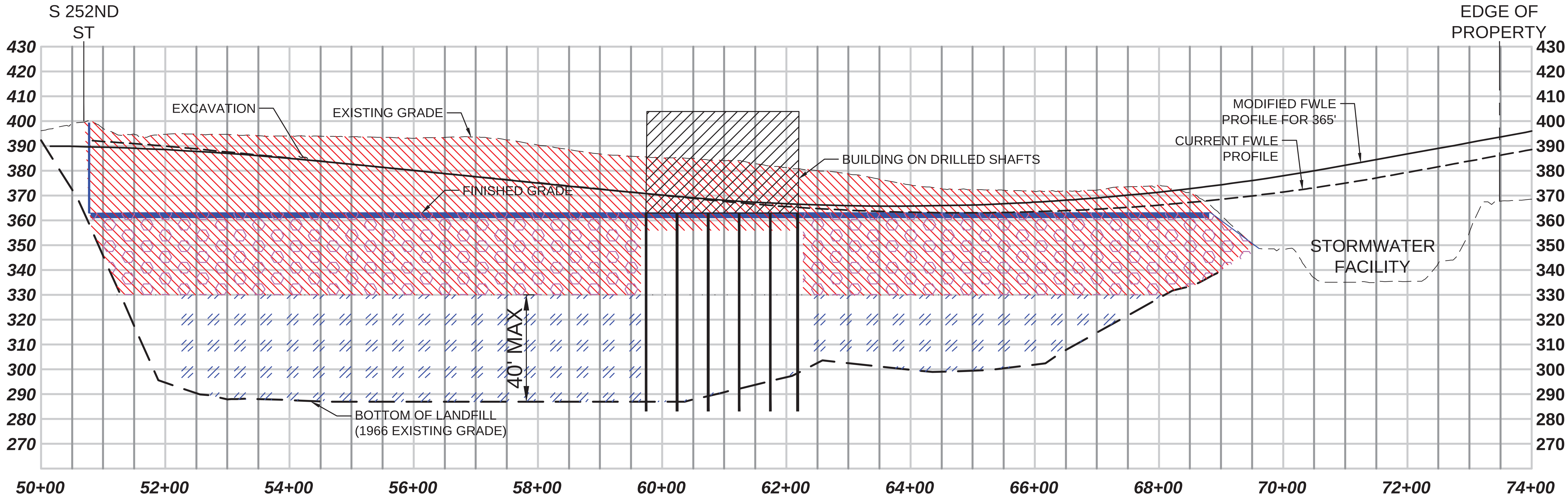
▨ EXCAVATE

▨ FILL WITH SCREENED EXCAVATED MATERIAL

▨ FILL WITH IMPORT MATERIAL

▨ DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

4 HYBRID 2: EXCAVATION WITH GROUND IMPROVEMENTS (SLAB ON GRADE FOR TRACKS AND BUILDINGS ON PILES)


S 252ND ST
EDGE OF PROPERTY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
EXCAVATION
EXISTING GRADE
MODIFIED FWLE PROFILE FOR 365'
CURRENT FWLE PROFILE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
STORMWATER FACILITY
40' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Hybrid 2 (365 OMF FFE, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	2.9	0		
Borrow Fill			0.25	
Screen (50% Reusable)	2.9	1.45		1.45
Total		1.45	0.25	1.45

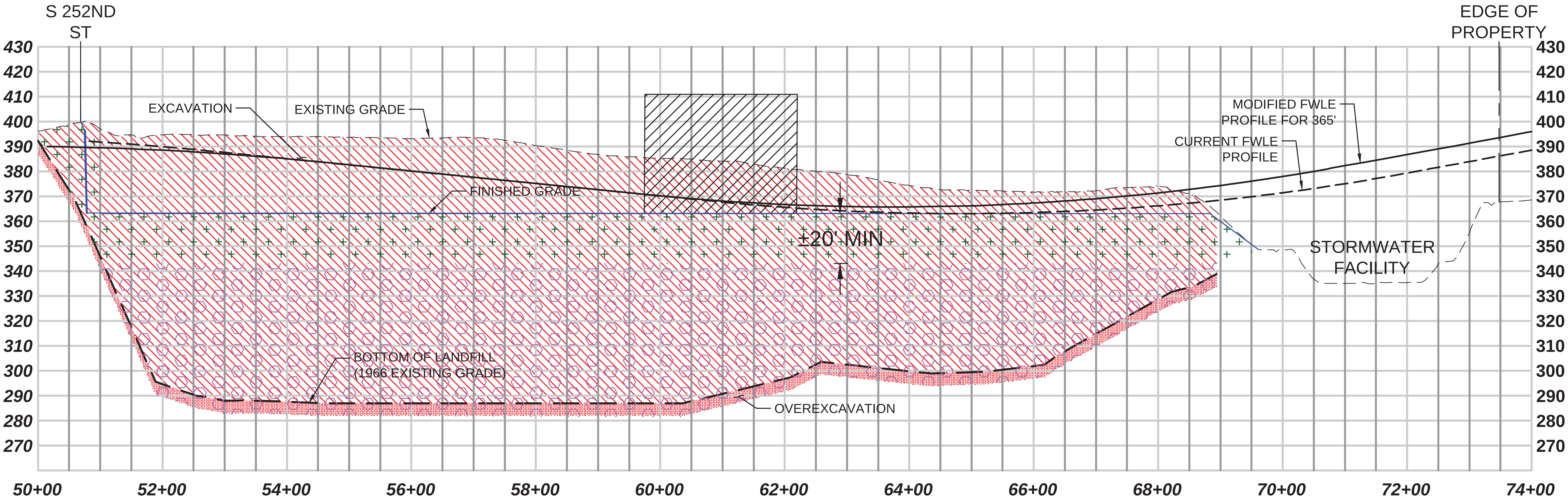
Assumes excavation to flat elevation (330) across entire landfill area regardless of depth of landfill below

▨ EXCAVATE

▨ EXCAVATE & BACKFILL WITH REUSABLE CUT MATERIAL / IMPORTED FILL

▨ DEEP DYNAMIC COMPACTION / SURCHARGE PRELOAD

5 FULL EXCAVATION & BACKFILL WITH COMPETENT SOILS


S 252ND ST
EDGE OF PROPERTY
EXCAVATION
EXISTING GRADE
FINISHED GRADE
MODIFIED FWLE PROFILE FOR 365'
CURRENT FWLE PROFILE
±20' MIN
STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
OVEREXCAVATION
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Full Excavation (365 OMF FFE, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	5.3	0.5		
Borrow Fill			1.6	
Screen (50% Reusable)	4.8	2.4		2.4
Total		2.9	1.6	2.4

Assumes 5' depth of overexcavation required below 1966 existing grade

▨ EXCAVATE

▨ EXCAVATE AND BACKFILL WITH IMPORTED FILL

▨ EXCAVATE AND BACKFILL WITH REUSABLE CUT MATERIAL / IMPORTED FILL

2.0 Construction Evaluation

The construction evaluation is a high-level discussion of landfill subsurface construction design options pertaining to the Midway Landfill site alternative for the OMF South Draft EIS. The discussion is based on operations and maintenance requirements, available information, and reasonable assumptions intended to develop a planning-level comparison among the five landfill options. As the redevelopment designs are progressed, assumptions are expected to be refined to create a more accurate assessment of landfill preparation requirements.

The discussion presents possible subsurface design options to the work in an effort to develop a planning-level estimate of earthwork and structural requirements, traffic impacts, cost, and schedule related to the landfill preparation required prior to OMF South and associated track construction. Assumptions and influencing factors may vary depending on construction contractor means and methods and regulatory requirements.

2.1 Earthwork Process

Materials anticipated to be encountered during landfill excavation include clean cover soil, landfill closure geosynthetic materials, and refuse material. Clean cover soil can be temporarily stored onsite for reuse during the OMF South construction. Closure geosynthetics and refuse material excavated will require either:

1. Export and disposal offsite,
2. Relocation onsite, or
3. Onsite material screening to retain competent soils for reuse onsite and export of deleterious materials for disposal offsite.

Using the Federal Way Link Extension (FWLE) screening approach as a guide, it is conservatively assumed that material screening will result in 50% of the landfill material reused onsite and 50% exported for disposal (FWLE assumed 70% of screened landfill material can be reused onsite [a published report is not available for reference]). This assumption will be reevaluated in the final report based on the recommendations from the geotechnical investigation of the landfill after borings are conducted at a later date. The reusable material will be contaminated and require environmental controls during handling to avoid contamination of clean material and surface water. The reuse of the material will require oversite by a geotechnical engineer to ensure proper mixing and placement for acceptable soil stability. During placement, some reuse material may be deemed unsuitable and require disposal offsite.

The Low Platform approach reuses excavated material without screening. This approach is intended to balance cut and fill quantities and reduce export requirements. The reused material is not required to be structurally competent since the Low Platform approach relies on drilled shafts for support.

Even though there is a quantity of clean cover material on the site, the amount is unknown. Based on the high-level nature of this evaluation and the proportionately larger quantity of refuse material, the entire excavation quantity calculated by the landfill site engineering optimization is assumed to be refuse. A quantity of clean cover material has not been distinguished from the bulk quantities.

The Preliminary Geotechnical Engineering Services Report Revised, by GeoEngineers, estimates the average in-place material density of the landfill is 120 pounds per cubic foot (lb/cf), or 1.62 tons per cubic yard (ton/cy). The loosening of material during the excavation process is assumed to result in an average loose material density after excavation of 100 lb/cf, or 1.35 ton/cy. This loose material conversion is an approximate factor of 1.2, which is different from the 1.6 assumed by the landfill site engineering optimization. The lower factor is being used based on the age and type of material expected to be encountered. Future geotechnical investigations are expected to refine these values.

Active excavation and hauling are assumed to be 12 hours per day (hr/day), 6 days per week (day/wk). The actual workday may be 16 hours with two shifts. Due to general inefficiencies, breaks, fueling and maintenance, irregularities at the start and finish of shifts, and other potential operational impacts, 12 hours of active hauling was assumed to be the average.

Excavation into refuse is assumed to be permitted only between May 1 and September 30, which excludes wet season construction. This results in a construction season of approximately 22 weeks each year. The construction season is assumed to be limited to reduce the amount of precipitation that may contact refuse and become contaminated water that could potentially infiltrate into the open area of the landfill, further contributing to contaminated groundwater that exists at the site. It is assumed that regulatory agencies will prohibit or restrict open landfill excavation during the wet season to protect against groundwater contamination.

Due to the irregular nature of the material typically found within a landfill, there will be the potential to encounter unexpected subsurface conditions during the excavation process. It is assumed that the construction contractor will be required to have resources available to manage irregular materials encountered during bulk excavation and redirect the work effort without delays to the project timeline. The assumed limited work area in comparison to the total site work area supports the reasonableness of this assumption.

2.2 Drilled Shaft and Slab Installation

Four of the five construction options for landfill preparation include drilled shaft and slab elements – the exception being the Full Excavation approach. The drilled shafts are assumed to be 10 feet in diameter, distributed throughout the building footprints and potentially the full extent of the track area on a 50-foot by 100-foot grid. The grid spacing has changed from the previous 100-foot by 100-foot grid assumed during the landfill optimization process. The assumed slab thickness did not change. The change is a result of design progression.

Shaft installation generally consists of a casing, reinforcement, and concrete embedded through the landfill approximately 15 feet into native, competent material. Shafts will support a structurally suspended concrete slab, approximately 3 feet thick. Hybrid 2 also includes a concrete slab on grade for the track area, without drilled shafts.

Shaft and slab installation are assumed to occur in coordination with the earthwork process, with similar material hauling hours and work season. The work will be phased in with the earthwork, with shafts installed in exposed refuse areas prior to landfill closure cover installation and clean backfill. Shafts through refuse will need to be booted through the replacement landfill closure cover to create a sealed system. Slab installation should be permitted to occur during the wet season, since this work will be performed in a completed landfill closure area without exposed refuse. Drill shaft installation may be permitted during the wet season based on a small and controllable work area pertaining to the individual shafts.

Refuse exhumed during drilling has been included in the earthwork quantities. The drilling process is assumed to be prohibitive to material screening and reuse of the exhumed material, requiring export for disposal. Concrete import is accounted for as an import quantity associated with the shafts and slabs.

2.3 Environment Considerations during Construction

As stated above, wet season construction is assumed to be prohibited during landfill preparation due to the greater potential to generate contaminated groundwater through penetrations through the existing landfill closure system. This restriction results in a May 1 to September 30 work window each year.

In general, the exposed refuse area of the work site is assumed to be limited to 5 acres in size. A specific allowable exposed refuse area size has yet to be established with the regulators. The 5-acre area was assumed as a reasonable size to perform work while managing environmental protection and preservation of the landfill environmental controls. It is assumed that a construction contractor will be able to secure (cover and manage stormwater) a 5-acre exposed area at the end of each day and in anticipation of inclement weather. The construction contractor will also need to control dust on dry and windy days. Precipitation and surface water run-on will need to be managed in the exposed refuse area to prevent water contamination and infiltration into the landfill that could result in further contamination of groundwater. Water collected within the open refuse area will need to be hauled offsite and disposed of as wastewater. It is assumed that some inclement weather will occur, which will increase the schedule duration by 5%.

It is also assumed that a 5-acre open refuse area can be managed without negatively impacting the active landfill gas (LFG) system at the landfill. The LFG collection and conveyance system will be required to remain active during construction to prevent offsite migration of LFG. During the construction, the LFG system will need to be continuously reconfigured to maintain effectiveness. Portions of the system will need to be demolished and replaced as the work progresses through the site. Additionally, the system will need to be managed to prevent air intake, from the open refuse area, that could contribute to a landfill fire.

If material screening will take place for onsite reuse of contaminated, competent backfill material, 5 acres may not be an adequate exposed refuse work area to accommodate continuous excavation, vehicle loading, screening, stockpiling, and backfill of material. The depth of excavation and layback of slopes will also factor into area requirements. If the horizontal footprint of the open refuse area is limited to 5 acres, the available work area within the excavation, or excavation floor, will be reduced in size based on depth and the space consumed by the sideslopes required for a stable excavation. Sideslopes could range from 1:1 (horizontal to vertical) to 2:1. It may be possible to use a non-open refuse area on the site for material processing and handling; however, the area would have to be set up to manage the contamination and protect clean areas.

Note that reuse of the screened material onsite will be subject to regulatory approval. Environmental regulators may require any exhumed refuse to be disposed of at a permitted facility meeting current standards without the option to reuse onsite. The FWLE project has been allowed to reuse refuse material onsite; however, the quality of that material is better understood and the scale of that work is significantly smaller than that proposed for OMF South.

The hauling of contaminated material will be in fully enclosed intermodal containers. If material is determined to be hazardous, hauling requirements will need to be verified based on the material.

Vehicles and equipment driving through a contaminated area will likely need to cross a wheel wash as they exit the area to clean the tires and avoid tracking contaminated material elsewhere onsite and offsite.

Each of the five options will result in refuse retained onsite, which will require the preservation, or reinstallation, of a permanent landfill closure cover system, LFG system, and groundwater monitoring system. The Full Excavation approach may be able to remove LFG-generating material through screening; however, contaminated soil may still result in contaminated soil vapor that will need management.

2.4 Disposal Considerations

Excavated material exported from the landfill will require disposal at a regulated facility, assumed to be a Subtitle D landfill in accordance with the Resource Conservation and Recovery Act (RCRA). Within the Pacific Northwest, it is expected that three solid waste firms have the available landfill capacity for the disposal of the material quantities required. Export disposal quantities are discussed in Section 2.7. The Full Excavation approach requires the most disposal export, at approximately 4 million tons.

The firms include Republic Services, Waste Management, and Waste Connections. The three firms each operate a regional landfill that is accessible by rail. Table 2-1 is based on the King County 2019 Comprehensive Solid Waste Management Plan and provides information on each landfill.

TABLE 2-1
Regional Disposal Capacity

Landfill	Location	Owner	Permitted Capacity (tons)	Remaining Capacity (tons, 2016)
Roosevelt Regional Landfill	Klickitat County, WA	Republic Services	244,600,000	120,000,000
Columbia Ridge Landfill and Recycling Center	Gilliam County, OR	Waste Management	345,275,000	329,000,000
Finley Buttes Regional Landfill	Morrow County, OR	Waste Connections	158,9000,000	131,000,000

The travel distance to these landfills warrants container shipment by rail. Trucks leaving the Midway Landfill will need to go to an intermodal facility for container offload onto trains. At the facility, the trucks will be reloaded with empty containers.

A number of intermodal facilities exist in the Seattle area that are owned by either a solid waste firm or a railroad. The two primary railroads are Burlington Northern Santa Fe Railroad (BNSF) and Union Pacific Railroad (UP).

The intermodal facility is expected to handle an export truck arriving every 2.5 minutes on average. It is assumed that one or multiple existing intermodal facilities in South Seattle will be able to accommodate the exported quantities from Midway Landfill. This may or may not be possible, considering the large quantity and schedule requirements, and a project-specific intermodal facility may be required or, at a minimum, an existing facility may require expansion. It is also assumed that the rail service provider can meet the train capacity requirements.

Based on an intermodal facility located in Seattle, the travel distance will be 20 miles, one way, requiring an assumed 40 minutes each direction. The queue, unload, and load time required at the intermodal facility is assumed to be 10 minutes.

Weighing of containers is assumed to occur at the intermodal facility or disposal landfill.

It is expected that the export disposal will be contracted through the construction contractor, with the solid waste firm as a subcontractor. The railroad component is expected to be a second-tier subcontractor through the solid waste firm. Due to the complexity of the solid waste handling and disposal component of the project, including the potential intermodal facility construct aspect, the bidding for this service under all the options is expected to require at least 6 months.

2.5 Construction Phasing and Material Reuse

As discussed in Section 2.3, construction phasing will be required to maintain the environmental controls at the landfill. A limited portion of the landfill will be allowed to be exposed at one time. Within this exposed refuse area, a number of activities are expected to occur simultaneously, depending on the construction approach, each activity will be in sequence after the preceding activity with the preceding activity moving on to the next area. The exposed refuse area would be able to advance once the landfill cover is reinstalled in the previous work area. Activities may include different combinations of the following.

1. Disassembly/removal and temporary reinstallation of the LFG system
2. Removal of the landfill cover system
3. Excavation of refuse material
4. Screening of refuse material
5. Export of screened unsuitable material
6. Dynamic compaction of the subgrade (if applicable)
7. Placement and compaction of screened competent reuse material
8. Drilled shaft installation (if applicable)
9. Installation of permanent landfill cover system and LFG system
10. Import and installation of competent material
11. Slab installation (if applicable)

The assumed 5-acre open refuse area will be very limiting for the space demands and to maintain efficiencies. Phasing will be further complicated with greater excavation depth requirements and the space consumption from layback slopes. There may be some relief if truck load-out and screening can be performed outside the open refuse area; however, this will create additional contamination areas to manage. Detailed construction phase planning is beyond the scope of this document.

The phased nature of the work allows the construction contractor to be able to respond to changed conditions by moving to another portion of the site, as needed, without greatly impacting schedule. This also provides the opportunity to effectively plan and execute preparatory and sequential work.

Also, the landfill preparation work can be performed concurrently with portions of the OMF South building and track construction. OMF South building and track construction can begin in areas that have achieved final grade or completion of the slab work.

2.6 Truck Trips – Export and Import

2.6.1 Disposal Export

Excavated material for export offsite is assumed to be loaded into 20-foot intermodal containers on waiting trucks. The intermodal containers will be limited to a capacity of 30 tons due to roadway load restrictions set by local agencies and the Washington State Department of Transportation. The containers will be transported offsite for direct load onto railcars at an intermodal facility.

The 5-acre open refuse area is assumed to be able to accommodate four active truck load-out locations, with an onsite load time of 10 minutes each. The number of load-out stations will depend on construction contractor means and methods to perform the work. Four stations were assumed as a possible number based on space limitations and competing work activities. This and other assumptions can be explored in accordance with the next steps described in Section 8.0.

Based on the discussion of intermodal facilities, total round-trip time for a truck will be 100 minutes. Each load station at the Midway Landfill will be able to accommodate up to 10 trucks, for a total of 40 export trucks operating during peak time.

Based on a 12-hour workday, each truck is assumed to make seven trips per day. At 40 operating trucks, this equates to 280 truck trips per day. This is an approximate value that does not account for irregularity at the beginning and end of the day.

2.6.2 Soil Import

Importing soil for backfill will need to be performed separately from the export operation for excavated refuse. There is not expected to an opportunity to gain efficiency from export trucks returning to the site with imported soil. The export trucks will use intermodal containers. The intermodal containers are used for transfer to and from the trains and are not suited for dumping import soil onsite if the containers were loaded with clean import soil on the return trip. Import trucks will need to be dump trucks with trailers with an assumed capacity of 20 cubic yards (cy).

The total round-trip time for import trucks is assumed to be 100 minutes. This assumption is based on a hypothetical material supply location in Maple Valley, Washington. When onsite, trucks will dump either in the fill area or at a stockpile location.

The demand for import material will be less than the export effort, based on assumptions pertaining to excavation screening and reusable material. The total amount of import trucks is assumed to be equally distributed throughout the export duration.

2.6.3 Concrete Import

Concrete import for shafts and slabs is assumed to arrive in 9-cubic-yard truckloads. The import is assumed to be equally distributed throughout the landfill preparation. Concrete will be locally sourced from an unknown location and is expected to be imported following the same site-access requirements as other import and export operations.

2.7 Results

The assumptions discussed above are summarized below.

Assumptions:

1. Average in-place density is 120 lb/cf, or 1.62 ton/cy
2. Average loose (post-excavation) density is 100 lb/cf, or 1.35 ton/cy
3. 50% reusable excavated material
4. Active excavation is 12 hr/day, 6 day/wk, 22 weeks per year (wk/yr)
5. Exposed refuse area is 5 acres
6. Inclement weather will increase the project duration by 5%
7. A 5-acre area can load 4 trucks at a time
8. Each truck is onsite for 10 minutes
9. Truck travel distance is 20 miles each way
10. Truck trip time each direction is 40 minutes
11. Truck time at the offsite facility is 10 minutes
12. Total truck trip time is 100 minutes per load
13. Export trucks operating per load area is 10
14. Total export trucks operating is 40
15. Export trips per day per truck is 7
16. Export truck trips per day is 280

17. Export truck capacity is 30 tons
18. Soil import truck capacity is 20 cubic yards
19. Concrete import truck capacity is 9 cubic yards

Applying these assumptions and the quantities developed during the landfill site engineering optimization to the five landfill options results in the landfill preparation requirements summarized in Table 2-2 and Table 2-3.

TABLE 2-2
Landfill Preparation Material Requirements

Construction Design Option	In-Place Excavation (cy)	Excavation (ton)	Material Export (ton)	In-Place Fill (cy)	In-Place Reuse (cy)	In-Place Import (cy)	Concrete Import (cy)
High Platform	100,000	162,000	135,000	0	0	0	200,000
Low Platform	460,000	745,200	67,500	410,000	410,000	0	180,000
Hybrid 1	2,900,000	4,698,000	3,105,000	1,700,000	600,000	1,100,000	160,000
Hybrid 2	2,900,000	4,698,000	1,957,500	1,700,000	1,450,000	250,000	8,000
Full Excavation	5,300,000	8,586,000	3,915,000	4,000,000	2,400,000	1,600,000	0

The in-place excavation volume was converted to excavation tonnage to be consistent with the industry approach to material export and disposal. In-place volume remains applicable to the assessment for import materials.

TABLE 2-3
Landfill Preparation Hauling Requirements

Construction Design Option	Export Truck Trips per Day	Soil Import Truck Trips per Day	Concrete Import Truck Trips per Day	Total Truck Trips per Day
High Platform	13	0	26	39
Low Platform	7	0	11	18
Hybrid 1	280	179	0	459
Hybrid 2	280	64	10	354
Full Excavation	280	206	0	486

The High Platform and Low Platform export and import truck trips are equally dispersed over the schedule durations for shaft and slab installation.

Hybrid 1, Hybrid 2, and Full Excavation options have landfill preparation schedules dominated by refuse export hauling durations. Soil import trucks have been equally dispersed over the required export period. Concrete import trucks have been dispersed over the concrete work period, if applicable.

Truck trips include only bulk earthwork and concrete. Other vehicle trips (i.e., landfill closure system materials and concrete reinforcement) have not been evaluated. Complete construction traffic will be evaluated as part of the Draft EIS.

3.0 Traffic Analysis

3.1 Truck Haul Routes

Access to and from the site for inbound and outbound trucks is assumed to be via right turns. No left turns into or out of the site are assumed. Left turns would increase the likelihood of onsite or offsite queueing of vehicles causing congestion. Outbound trucks exiting the site would travel north on SR 99 and access I-5 via Kent-Des Moines Road (SR 516). Inbound trucks would travel on I-5, exiting at S 272nd Street. The inbound trucks would travel westbound on S 272nd Street to SR 99, where they would turn north and travel to the site. Excavation export is assumed to be to the north to reach an intermodal facility. Trucks importing material would follow the same routes in the vicinity of the site, although the assumed origin for import concrete and soil material is unknown.

Assumed construction haul routes to the north are shown on Figure 3-1. Actual traffic routes will need to be established for the construction through coordination with the local jurisdiction permit process.

3.2 Level of Service Considerations

Trucks would traverse the haul routes during the entirety of the assumed 12-hour daily hauling period, including both directions during AM and PM peak. As described in Section 2.6, the maximum number of export trucks operating at the site is 40, each performing 7 round trips per day, for a total of 280 daily truck trips. With 280 truck trips during the daily construction period, the average number of truck trips per hour is 23-24. Trucks are assumed to be accessing the site at uniform intervals throughout the daily hauling period, with some potential for irregularity or bunching at the beginning and end of the day. Import trucks represent fewer truck trips than the maximum assumed export truck trips. Given that the daily truck trip volume is estimated to increase by about 206 trips per day to facilitate importing material for the Full Excavation option, it is estimated that 18 additional trucks would be operating at the site each hour. The other construction options also include import of concrete and soil material, but they would require fewer truck trips than the Full Excavation approach. They would range between 1 and 16 additional trucks per hour.

Given their size and slower operating speeds, trucks were assigned a passenger car equivalency (PCE) value of 2.5 for this evaluation. Additionally, each round trip includes an outbound and inbound segment, resulting in a total of 700 PCE daily trips in the study area associated with export activity (280 truck trips x 2.5 PCE). Import activity would result in nearly 515 PCE daily trips in the study area (206 truck trips x 2.5 PCE).

To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the day and are based on the ability of the yard and the receiving facility to process the trucks. These assumptions are outlined in Section 2 of this memorandum. The 2.5 PCE factor is applied to the truck volume to give planners information about the number of new trips that would need to be accommodated along the truck routes. Below, Table 3-1 outlines the number of peak hour trucks and associated PCEs for each construction scenario.

TABLE 3-1
Passenger Car Equivalency for Each Approach

Construction Design Option	Daily			Hourly			Hourly PCE		
	Export	**Import**	**Total**	**Export**	**Import**	**Total**	**Export**	**Import**	**Total**
High Platform	13	26	39	2	3	4	5	8	13
Low Platform	7	11	18	1	1	2	3	3	6
Hybrid 1	280	179	459	24	15	39	60	38	98
Hybrid 2	280	74	354	24	7	31	60	18	78
Full Excavation	280	206	486	24	18	42	60	45	105

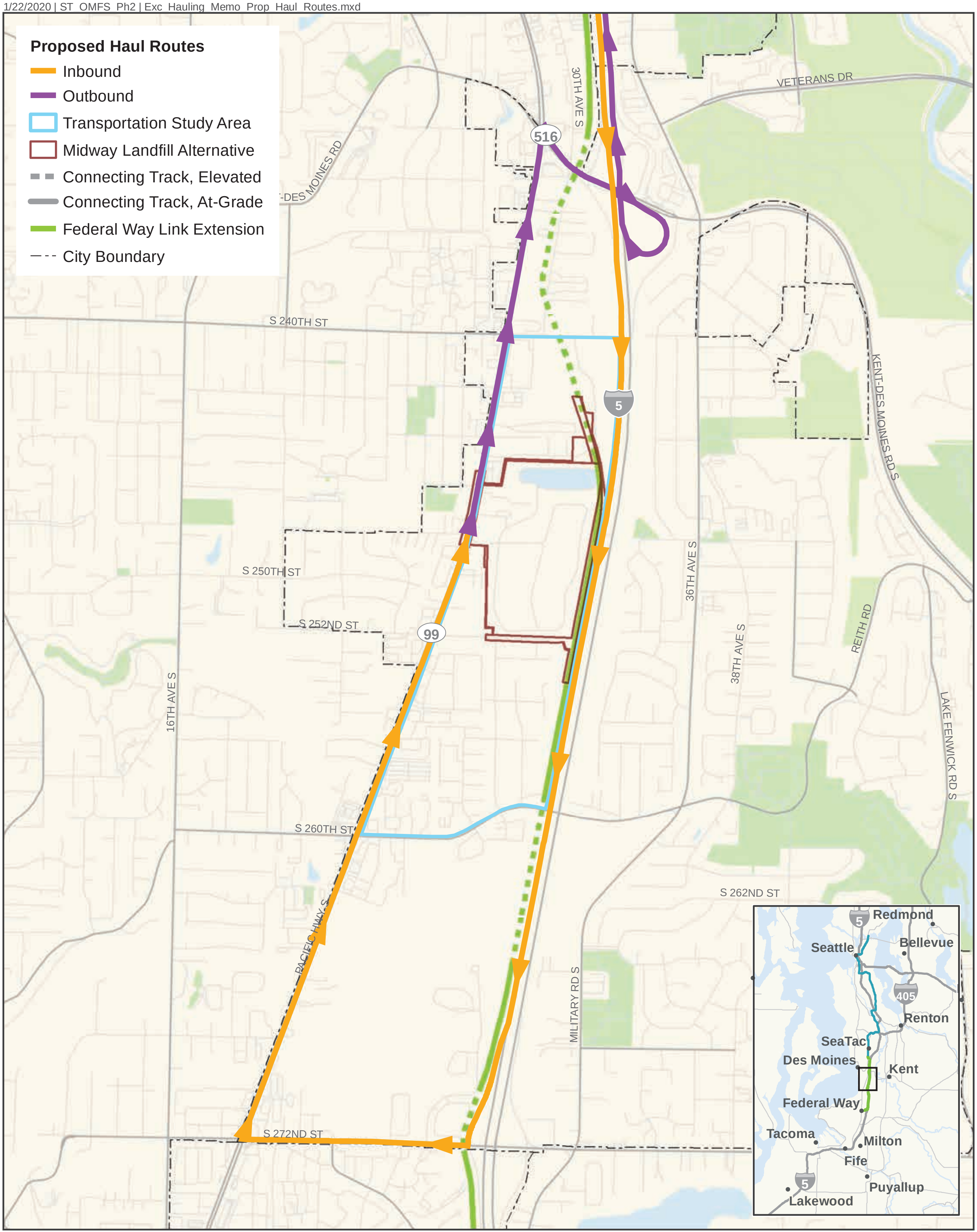
The PCEs shown in the table would be the same for exiting and entering the site during the peak hour. The highest-impact approach would be the Full Excavation approach, with 105 PCE.

As shown in Figures 3-2 and 3-3, Google Maps reports almost all sections of the haul routes operate at “good” or “fair” conditions during both peak periods (typical traffic on Wednesdays at 7 AM and 5 PM was used to represent the AM and PM peak periods, respectively). The exceptions are northbound SR 99 approaching Kent-Des Moines Road during the 8 AM time period and the eastbound segment of Kent-Des Moines Road at the northbound I-5 on-ramp, which operate at “poor” conditions during the AM peak period, as does the I-5 mainline. If 100 to 105 additional PCE vehicles join the backup congestion on the I-5 northbound ramp during peak hours, congestion on Kent-Des Moines Road and possibly onto SR 99 would likely occur. Dispersing the export associated with High Platform and Low Platform options over the shaft installation duration could avoid significant degradation of the operating conditions. Hybrid 2 may how some degradation of the operating conditions. Some example strategies to reduce impacts to local traffic could include: use multiple routes; limit truck activity during the peak traffic hours; and change the end point location to be south.

Given the good or fair operating conditions for other segments of the haul routes, it is assumed that the additional 105 hourly PCE trips for each route would not result in significant degradation to the operating conditions in these areas.

Trucks would enter and exit the site via SR 99. When trucks exit the facility and merge into traffic on SR 99, they would operate at slower speeds due to heavy loads. Returning trucks would also slow down to make the turn into the facility causing minor delays. In order to reduce potential impacts to mainline traffic on SR 99 at the access point, a short acceleration lane could be constructed to accommodate outbound trucks and a short deceleration lane could be constructed to accommodate inbound trucks.

1/22/2020 | ST OMFS Ph2 | Exc Hauling Memo Prop Haul Routes.mxd


Proposed Haul Routes
Inbound
Outbound
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
VETERANS DR
30TH AVE S
516
KENT-DES MOINES RD
S 240TH ST
5
KENT-DES MOINES RD S
36TH AVE S
S 250TH ST
S 252ND ST
99
38TH AVE S
REITH RD
16TH AVE S
LAKE FENWICK RD S
S 260TH ST
S 262ND ST
PACIFIC HWY S
MILITARY RD S
S 272ND ST
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

FIGURE 3-1

Proposed Haul Routes
Midway Landfill Alternative

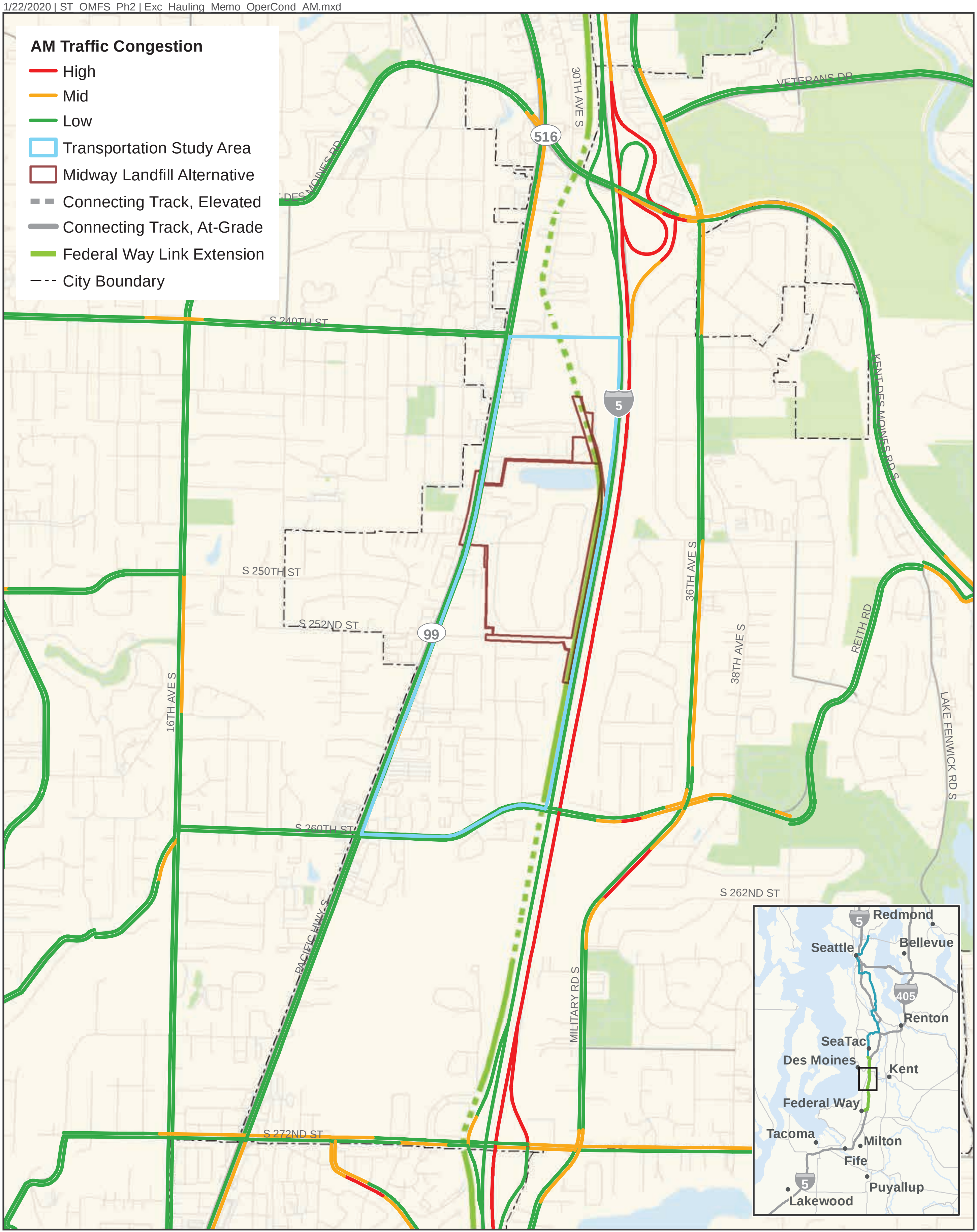
OMF South

N

0 0.25 0.5 Miles

Internal document for the purposes of informing the design and construction approach for the Midway Landfill Alternative

1/22/2020 | ST_OMFS_Ph2 | Exc_Hauling_Memo_OperCond_AM.mxd


AM Traffic Congestion
🟥 High
🟧 Mid
🟩 Low
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
516
30TH AVE S
VETERANS DR
DES MOINES RD
S 240TH ST
5
KENT DES MOINES RD S
S 250TH ST
S 252ND ST
99
36TH AVE S
38TH AVE S
REITH RD
16TH AVE S
LAKE FENWICK RD S
S 260TH ST
S 262ND ST
PACIFIC HWY S
MILITARY RD S
S 272ND ST
Redmond
Bellevue
Seattle
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

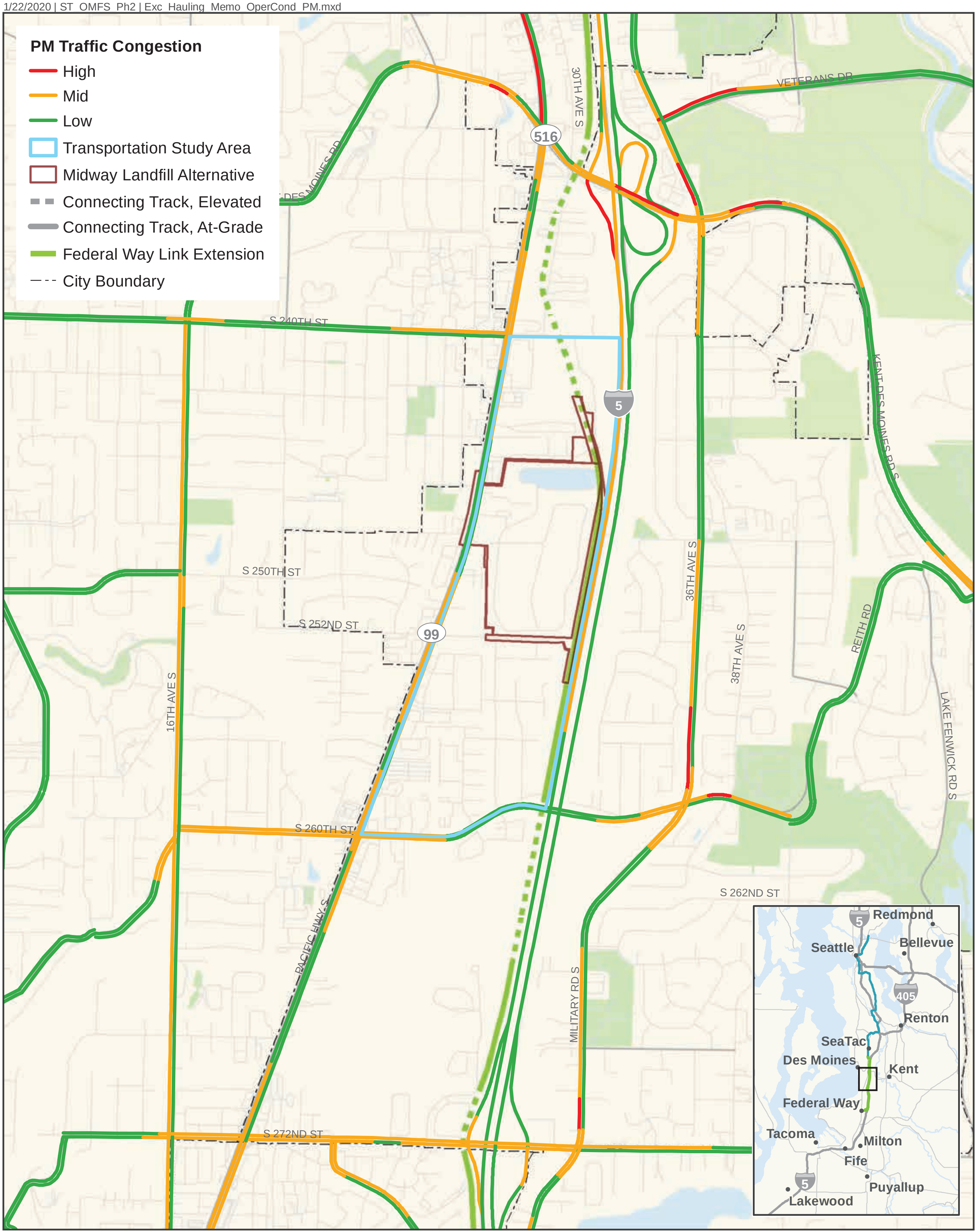
FIGURE 3-2
AM Operating Conditions
Midway Landfill Alternative

N

0 0.25 0.5 Miles

OMF South

Internal document for the purposes of informing the design and construction approach for the Midway Landfill Alternative


PM Traffic Congestion
🟥 High
🟧 Mid
🟩 Low
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
516
5
99
VETERANS DR
30TH AVE S
DES MOINES RD
S 240TH ST
S 250TH ST
S 252ND ST
16TH AVE S
S 260TH ST
PACIFIC HWY S
36TH AVE S
38TH AVE S
REITH RD
KENT DES MOINES RD S
LAKE FENWICK RD S
S 262ND ST
MILITARY RD S
S 272ND ST
Redmond
Bellevue
Seattle
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

FIGURE 3-3

PM Operating Conditions
Midway Landfill Alternative

N

0 0.25 0.5 Miles

OMF South

Internal document for the purposes of informing the design and construction approach for the Midway Landfill Alternative

4.0 Schedule

Preliminary, planning-level schedules were developed for the five landfill options as part of the landfill site engineering optimization. The schedules have been revised to include the results of the landfill preparation durations and are included as Figures 4-1 through 4-5. Table 4-1 provides a results summary.

TABLE 4-1

Landfill Preparation Schedule Summary

Construction Design Option	Landfill Preparation Component (years)	OMF South Completion	Contract Delivery Method
High Platform	2.8	Apr 2027	DB
Low Platform	3.2	Oct 2027	DB
Hybrid 1	3.2	Feb 2028	DBB/DB
Hybrid 2	2.7	Sept 2027	DBB/DB
Full Excavation	3.3	Dec 2028	DBB/DB

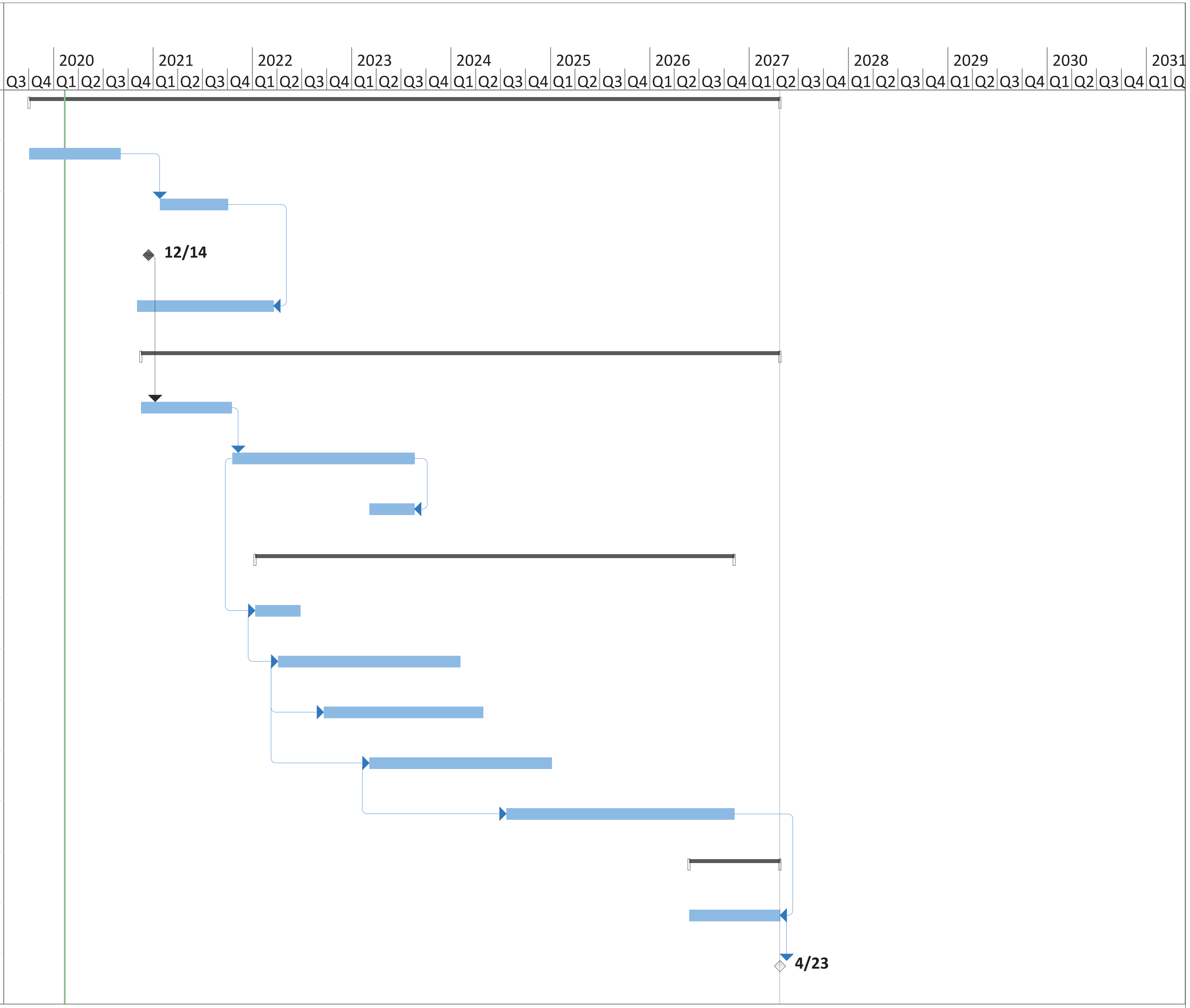
The schedule durations for the landfill preparation component in Table 4.1 generally consist of a combination of earthwork, landfill environmental controls, and shaft and slab installation activities, as applicable to each construction approach. These construction activities are generally overlapped as a result of the assumed construction phasing. Durations for the landfill preparation component of the overall construction schedule for each option will continue to be optimized as construction sequencing opportunities are further refined.

The preliminary schedule for each option assumes construction implementation through a design-bid-build (DBB) delivery for landfill preparation and design-build (DB) delivery for the OMF South building and track construction. Other schedule considerations pertaining to the landfill preparation are as follows:

1. The current target completion for the OMF South is 2026. None of the current Midway Landfill subsurface construction design options have a schedule that will meet this completion timeframe.
2. There may be an advantage in separating the landfill preparation construction from the OMF South construction. The landfill preparation could begin prior to completion of the OMF South design, which would provide an earlier construction start and result in earlier OMF South completion. An estimate of potential schedule benefit has not been prepared and is beyond the scope of this memorandum.

3. The construction contractor procurement process may require extension due to the complexity of the intermodal export and rail transport requirements. Establishing realistic bid pricing may require 6 months or more.
4. If improvements to an existing intermodal facility are required, or a new facility is required, then the schedule will be extended. It may be possible to have a reduced export rate initially, until intermodal facility construction is complete and full export can begin.
5. The schedule assumes construction phasing will provide enough flexibility and resiliency in the work to avoid delays due to changed conditions, such as encountered hazardous material.
6. The schedule assumes no significant environmental issues would be encountered that could stop the work, such as a landfill fire or contamination release.
7. The schedule assumes no significant rail transport disruptions that could stop the work.
8. The construction progress will be highly dependent on the construction contractor’s means and methods to plan and execute the work. Achievable performance requirements will need to be established in the construction contract.

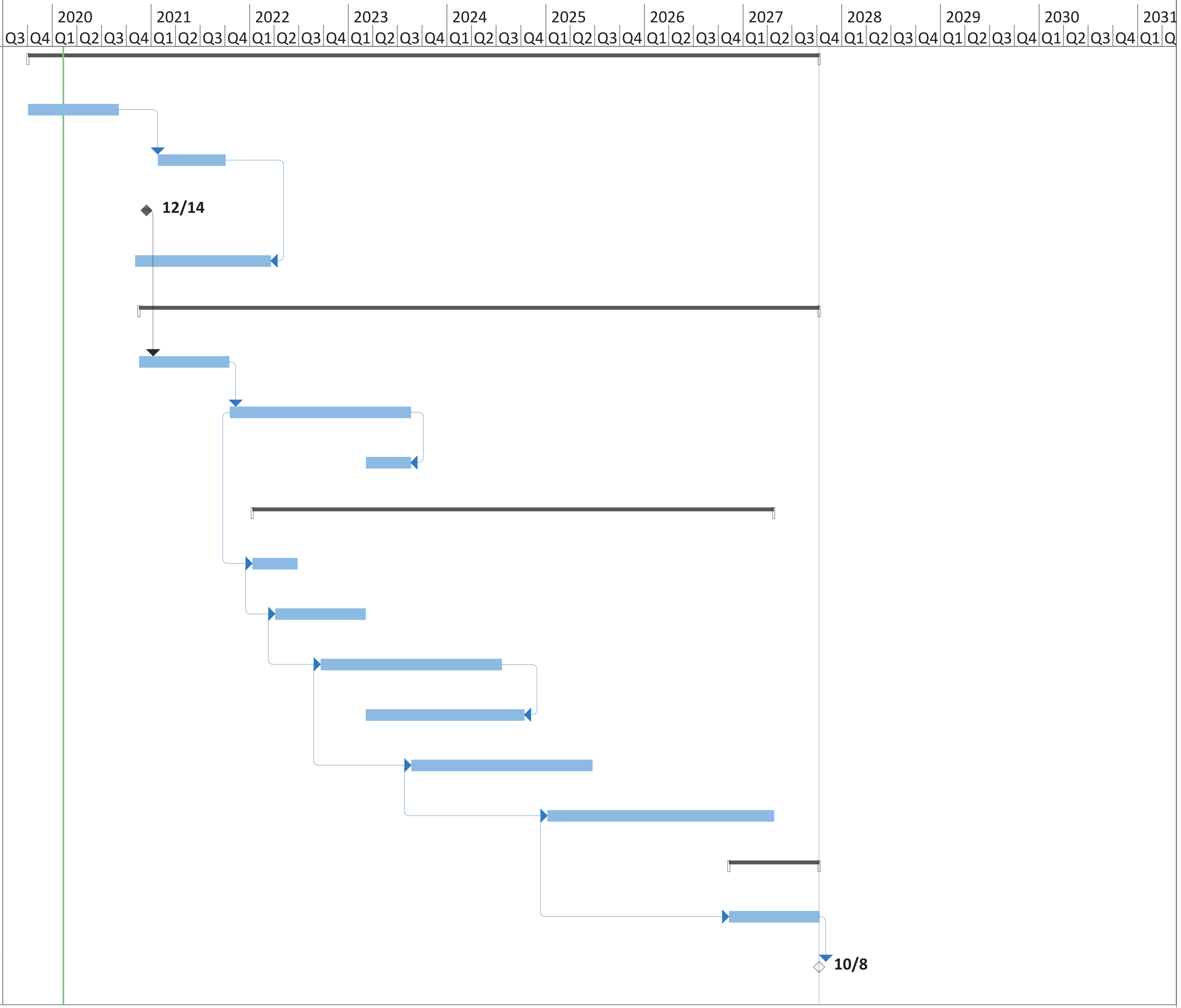
ID	Ta M	Task Name	Duration	Start	Finish
1		**OMFS Midway High Slab Option**	**1973 days**	**Wed 10/2/19**	**Fri 4/23/27**
2		Phase 2 - Draft Environmental Impact Study	12 mons	Wed 10/2/19	Tue 9/1/20
3		Phase 3 - Final Environmental Impact Study	9 mons	Mon 1/25/21	Fri 10/1/21
4		Board Confirms Preferred Alternative	0 days	Mon 12/14/20	Mon 12/14/20
5		Property Acquisition	18 mons	Mon 11/2/20	Fri 3/18/22
6		**DB Delivery Option**	**1680 days**	**Mon 11/16/20**	**Fri 4/23/27**
7		DB - Contractor Procurement	12 mons	Mon 11/16/20	Fri 10/15/21
8		Engineering Design for DB	24 mons	Mon 10/18/21	Fri 8/18/23
9		FWLE Change order for Guideway	6 mons	Mon 3/6/23	Fri 8/18/23
10		**Construction**	**1260 days**	**Mon 1/10/22**	**Fri 11/6/26**
11		Site Prep for Construction	6 mons	Mon 1/10/22	Fri 6/24/22
12		Drilled shaft construction	24 mons	Mon 4/4/22	Fri 2/2/24
13		Landfill membrane repair	21 mons	Mon 9/19/22	Fri 4/26/24
14		Slab Construction	24 mons	Mon 3/6/23	Fri 1/3/25
15		DB-Build OMF with Tracks	30 mons	Mon 7/22/24	Fri 11/6/26
16		**Testing and Commissioning**	**240 days**	**Mon 5/25/26**	**Fri 4/23/27**
17		Testing and Commissioning	12 mons	Mon 5/25/26	Fri 4/23/27
18		Begin Operation	0 mons	Fri 4/23/27	Fri 4/23/27



Project: A! Shedule
Date: Tue 2/11/20

Task	▬	Project Summary	▬	Inactive Milestone	◇	Manual Summary Rollup	▬	Deadline	⬇
Split	┈	External Tasks	▬	Inactive Summary	▬	Manual Summary	▬	Progress	▬
Milestone	◆	External Milestone	◆	Manual Task	▬	Start-only	[	Manual Progress	▬
Summary	▬	Inactive Task		Duration-only	▬	Finish-only	]		

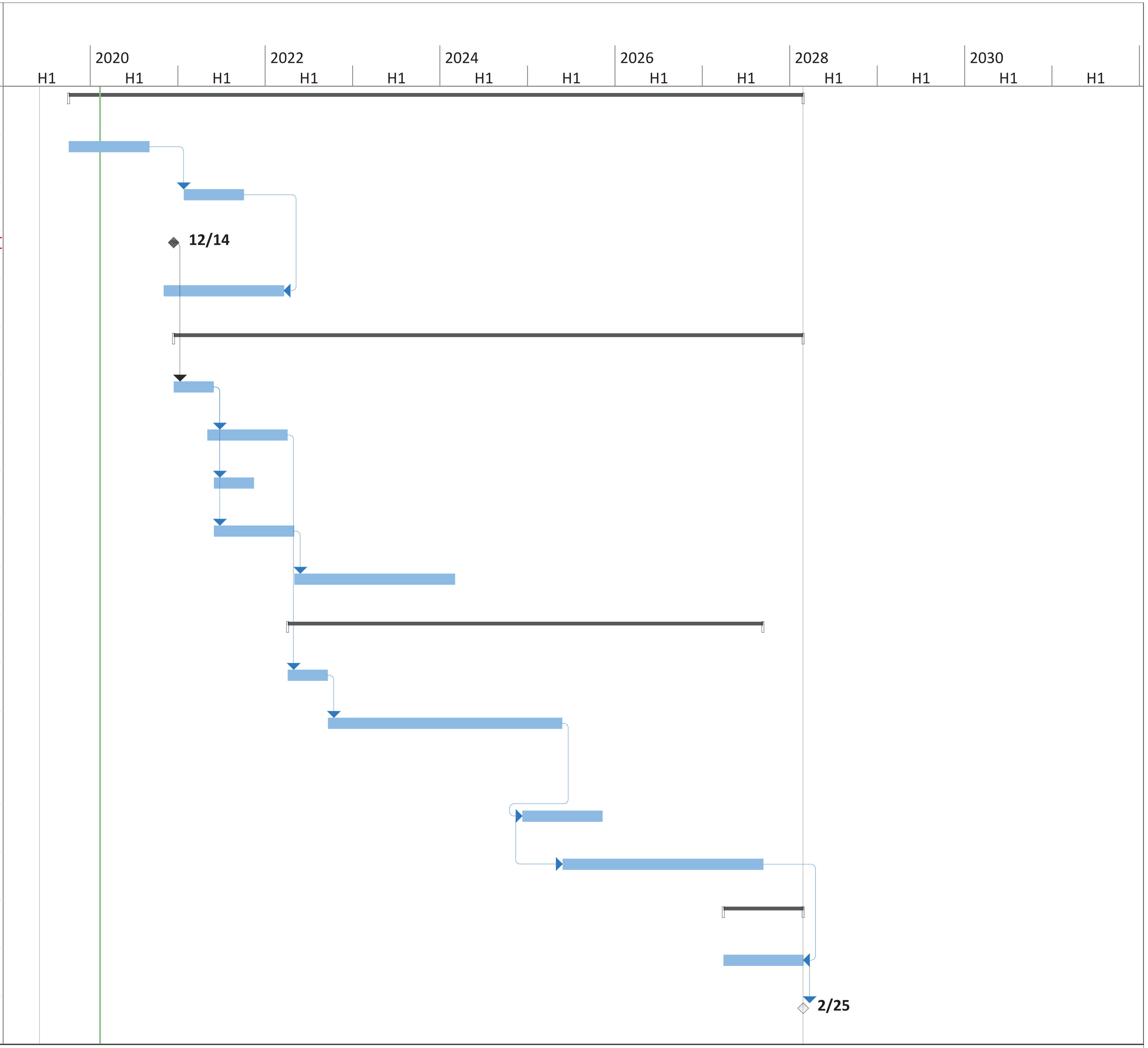
ID	Task Name	Duration	Start	Finish
1	**OMFS Midway Low Slab Option**	**2093 days**	**Wed 10/2/19**	**Fri 10/8/27**
2	Phase 2 - Draft Environmental Impact Study	12 mons	Wed 10/2/19	Tue 9/1/20
3	Phase 3 - Final Environmental Impact Study	9 mons	Mon 1/25/21	Fri 10/1/21
4	Board Confirms Preferred Alternative	0 days	Mon 12/14/20	Mon 12/14/20
5	Property Acquisition	18 mons	Mon 11/2/20	Fri 3/18/22
6	**DB Delivery Option**	**1800 days**	**Mon 11/16/20**	**Fri 10/8/27**
7	DB -Contractor procurement	12 mons	Mon 11/16/20	Fri 10/15/21
8	DB - Final Design	24 mons	Mon 10/18/21	Fri 8/18/23
9	FW Change Order	6 mons	Mon 3/6/23	Fri 8/18/23
10	**Construction**	**1380 days**	**Mon 1/10/22**	**Fri 4/23/27**
11	Site Prep for Construction	6 mons	Mon 1/10/22	Fri 6/24/22
12	Heavy Civil - landfill grading and leveling	12 mons	Mon 4/4/22	Fri 3/3/23
13	Drilled Shaft construction	24 mons	Mon 9/19/22	Fri 7/19/24
14	Landfill membrane repair	21 mons	Mon 3/6/23	Fri 10/11/24
15	Slab Construction	24 mons	Mon 8/21/23	Fri 6/20/25
16	Build OMF with Tracks	30 mons	Mon 1/6/25	Fri 4/23/27
17	**Testing and Commissioning**	**240 days**	**Mon 11/9/26**	**Fri 10/8/27**
18	Testing and Commissioning	12 mons	Mon 11/9/26	Fri 10/8/27
19	Begin Operation	0 mons	Fri 10/8/27	Fri 10/8/27



Project: A! Shedule
Date: Tue 2/11/20

Task	Project Summary	Inactive Milestone ◇	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone ◆	External Milestone ◆	Manual Task	Start-only [	Manual Progress
Summary	Inactive Task	Duration-only	Finish-only]	

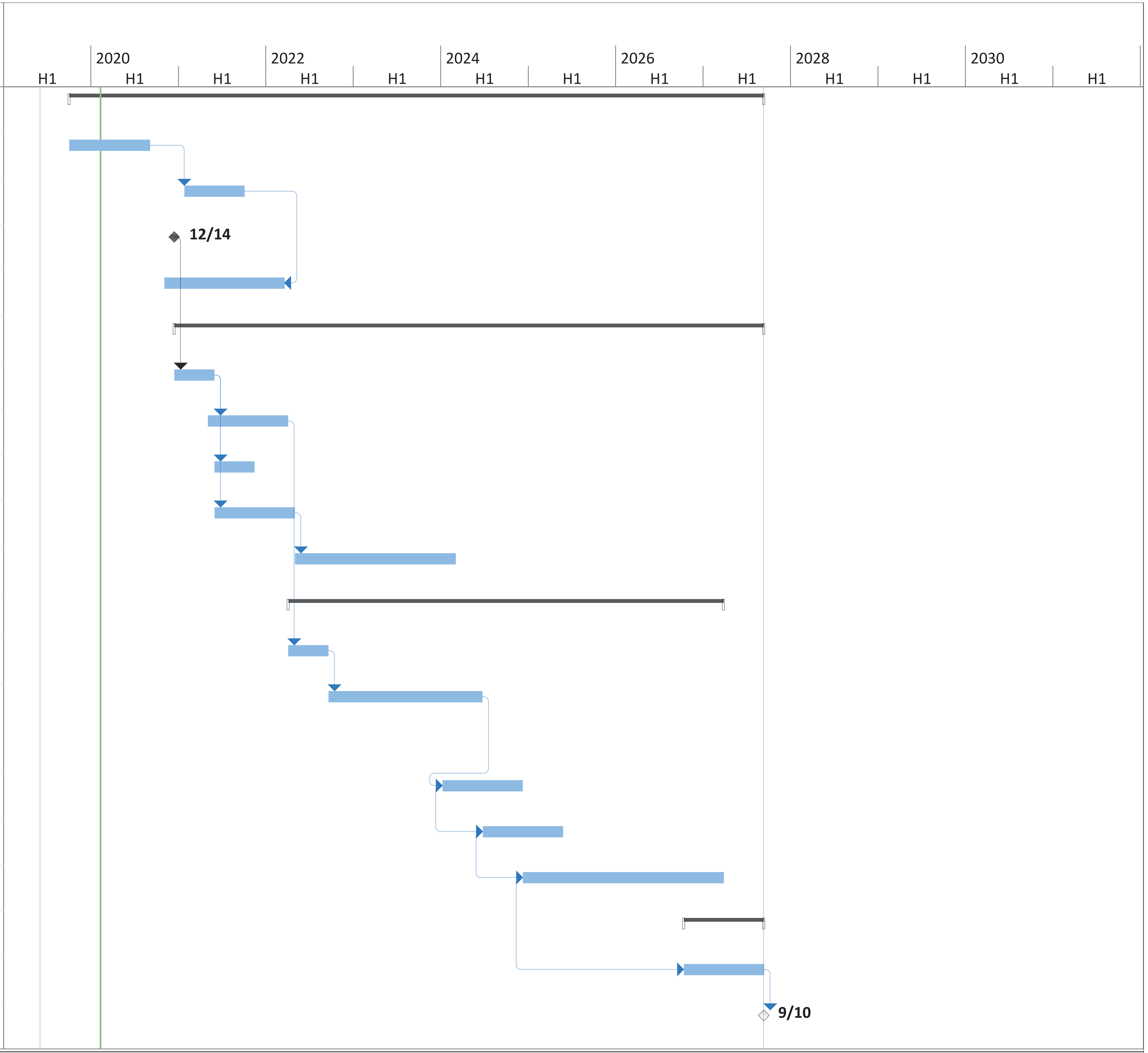
ID	Ta M	Task Name	Duration	Start	Finish
1		**OMFS Midway Hybrid #1 no-Slab Option**	**2193 days**	**Wed 10/2/19**	**Fri 2/25/28**
2		Phase 2 - Draft Environmental Impact Study	12 mons	Wed 10/2/19	Tue 9/1/20
3		Phase 3 - Final Environmental Impact Study	9 mons	Mon 1/25/21	Fri 10/1/21
4		Board Confirms Preferred Alternative	0 days	Mon 12/14/20	Mon 12/14/2
5		Property Acquisition	18 mons	Mon 11/2/20	Fri 3/18/22
6		**DBB/DB Delivery Option**	**1880 days**	**Mon 12/14/20**	**Fri 2/25/28**
7		Design and RFP Prep	6 mons	Mon 12/14/20	Fri 5/28/21
8		DBB - Contractor Procurement	12 mons	Mon 5/3/21	Fri 4/1/22
9		FWLE Change order for Guideway	6 mons	Mon 5/31/21	Fri 11/12/21
10		DB -Contractor procurement	12 mons	Mon 5/31/21	Fri 4/29/22
11		DB - Final Design	24 mons	Mon 5/2/22	Fri 3/1/24
12		**Construction**	**1420 days**	**Mon 4/4/22**	**Fri 9/10/27**
13		DBB- Site Prep for Construction	6 mons	Mon 4/4/22	Fri 9/16/22
14		DBB-Heavy Civil - landfill remove, haul, membrane, gas system	35 mons	Mon 9/19/22	Fri 5/23/25
15		DB - Pile Construction for Buildings	12 mons	Mon 12/9/24	Fri 11/7/25
16		DB-Build OMF with Tracks	30 mons	Mon 5/26/25	Fri 9/10/27
17		**Testing and Commissioning**	**240 days**	**Mon 3/29/27**	**Fri 2/25/28**
18		Testing and Commissioning	12 mons	Mon 3/29/27	Fri 2/25/28
19		Begin Operation	0 mons	Fri 2/25/28	Fri 2/25/28



Project: A! Shedule
Date: Tue 2/11/20

Task
Split
Milestone ◆
Summary
Project Summary
External Tasks
External Milestone ◆
Inactive Task
Inactive Milestone ◇
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only [
Finish-only]
Deadline ⬇
Progress
Manual Progress

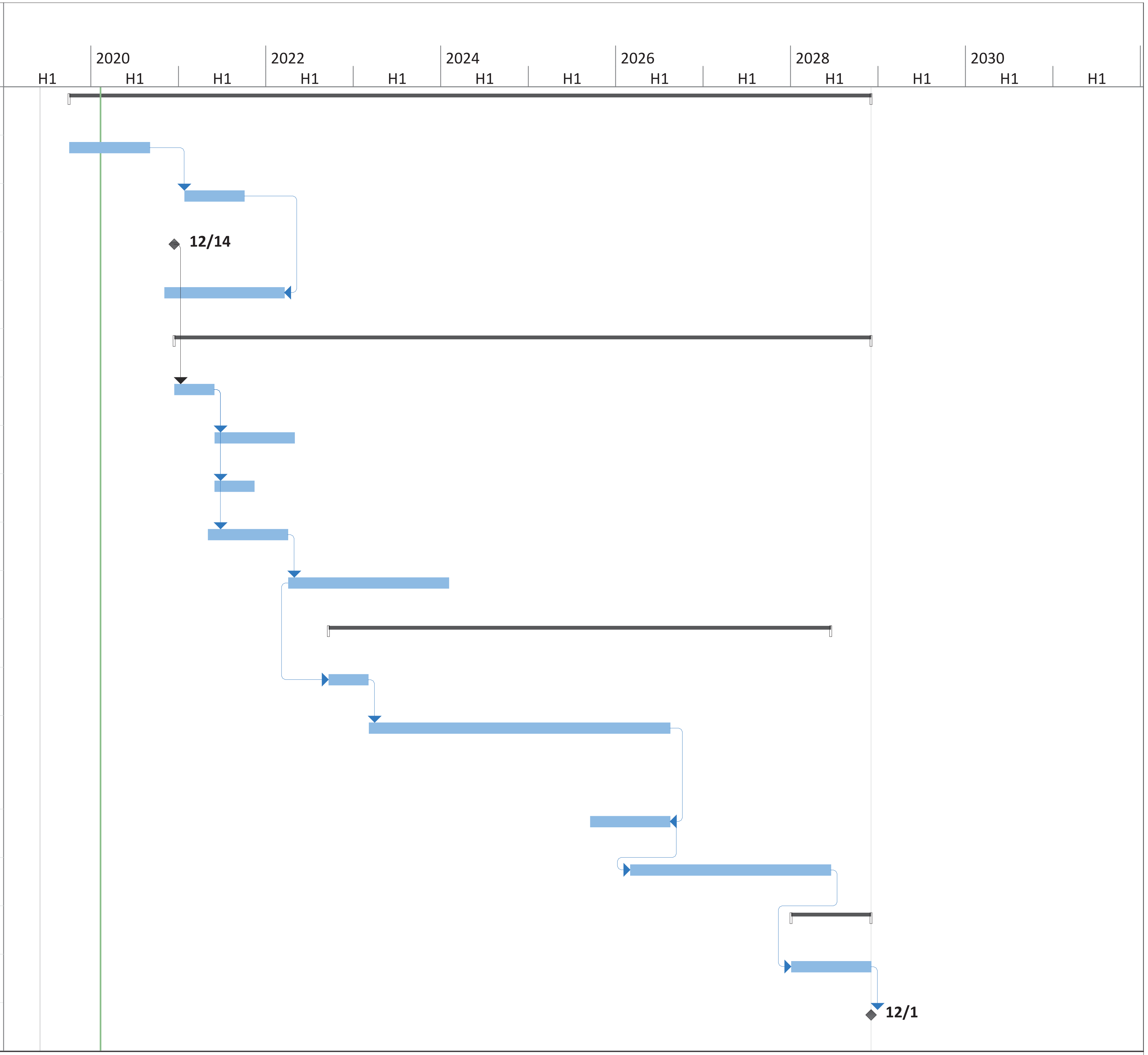
ID	Task Mode	Task Name	Duration	Start	Finish
1		**OMFS Midway Hybrid #2 with Slab Option**	**2073 days**	**Wed 10/2/19**	**Fri 9/10/27**
2		Phase 2 - Draft Environmental Impact Study	12 mons	Wed 10/2/19	Tue 9/1/20
3		Phase 3 - Final Environmental Impact Study	9 mons	Mon 1/25/21	Fri 10/1/21
4		Board Confirms Preferred Alternative	0 days	Mon 12/14/20	Mon 12/14/20
5		Property Acquisition	18 mons	Mon 11/2/20	Fri 3/18/22
6		**DBB/DB Delivery Option**	**1760 days**	**Mon 12/14/20**	**Fri 9/10/27**
7		Engineering Design for DBB	6 mons	Mon 12/14/20	Fri 5/28/21
8		DBB - Contractor Procurement	12 mons	Mon 5/3/21	Fri 4/1/22
9		FWLE Change order for Guideway	6 mons	Mon 5/31/21	Fri 11/12/21
10		DB -Contractor procurement	12 mons	Mon 5/31/21	Fri 4/29/22
11		DB- Final Design	24 mons	Mon 5/2/22	Fri 3/1/24
12		**Construction**	**1300 days**	**Mon 4/4/22**	**Fri 3/26/27**
13		DBB- Site Prep for Construction	6 mons	Mon 4/4/22	Fri 9/16/22
14		DBB-Heavy Civil - landfill remove, haul, membrane, gas system	23 mons	Mon 9/19/22	Fri 6/21/24
15		DBB - Slab on Grade	12 mons	Mon 1/8/24	Fri 12/6/24
16		DB - Pile Construction for Buildings	12 mons	Mon 6/24/24	Fri 5/23/25
17		DB-Build OMF with Tracks	30 mons	Mon 12/9/24	Fri 3/26/27
18		**Testing and Commissioning**	**240 days**	**Mon 10/12/26**	**Fri 9/10/27**
19		Testing and Commissioning	12 mons	Mon 10/12/26	Fri 9/10/27
20		Begin Operation	0 mons	Fri 9/10/27	Fri 9/10/27



Project: A! Shedule
Date: Tue 2/11/20

Task	▬	Project Summary	▬	Inactive Milestone	◇	Manual Summary Rollup	▬	Deadline	⬇
Split	┈	External Tasks	▬	Inactive Summary	▬	Manual Summary	▬	Progress	▬
Milestone	◆	External Milestone	◆	Manual Task	▬	Start-only	[	Manual Progress	▬
Summary	▬	Inactive Task		Duration-only	▬	Finish-only	]		

ID	Ta M	Task Name	Duration	Start	Finish
1		**OMFS Midway Full Excavation**	**2393 days**	**Wed 10/2/19**	**Fri 12/1/28**
2		Phase 2 - Draft Environmental Impact Study	12 mons	Wed 10/2/19	Tue 9/1/20
3		Phase 3 - Final Environmental Impact Study	9 mons	Mon 1/25/21	Fri 10/1/21
4		Board Confirms Preferred Alternative	0 days	Mon 12/14/20	Mon 12/14/20
5		Property Acquisition	18 mons	Mon 11/2/20	Fri 3/18/22
6		**DBB/DB Delivery Option**	**2080 days**	**Mon 12/14/20**	**Fri 12/1/28**
7		Engineering Design for DBB	6 mons	Mon 12/14/20	Fri 5/28/21
8		DBB - Contractor Procurement	12 mons	Mon 5/31/21	Fri 4/29/22
9		FWLE Change order for Guideway	6 mons	Mon 5/31/21	Fri 11/12/21
10		DB -Contractor procurement	12 mons	Mon 5/3/21	Fri 4/1/22
11		DB - Final Design	24 mons	Mon 4/4/22	Fri 2/2/24
12		**Construction**	**1500 days**	**Mon 9/19/22**	**Fri 6/16/28**
13		DBB- Site Prep for Construction	6 mons	Mon 9/19/22	Fri 3/3/23
14		DBB-Heavy Civil - landfill remove, haul, membrane, gas system	45 mons	Mon 3/6/23	Fri 8/14/26
15		DB - Pile/Foundation Construction for Build	12 mons	Mon 9/15/25	Fri 8/14/26
16		DB-Build OMF with Tracks	30 mons	Mon 3/2/26	Fri 6/16/28
17		**Testing and Commissioning**	**240 days**	**Mon 1/3/28**	**Fri 12/1/28**
18		Testing and Commissioning	12 mons	Mon 1/3/28	Fri 12/1/28
19		Begin Operation	0 mons	Fri 12/1/28	Fri 12/1/28



Project: A! Shedule
Date: Tue 2/11/20

Task	▬	Project Summary	▬	Inactive Milestone	◆	Manual Summary Rollup	▬	Deadline	⬇
Split	┄	External Tasks	▬	Inactive Summary	▬	Manual Summary	▬	Progress	▬
Milestone	◆	External Milestone	◆	Manual Task	▬	Start-only	[	Manual Progress	▬
Summary	▬	Inactive Task	▬	Duration-only	▬	Finish-only	]		

5.0 Preliminary Landfill Preparation Cost Estimate

The preliminary, planning-level, rough order of magnitude (ROM) cost estimate pertains to additional work associated with the landfill preparation of each landfill redevelopment approach, including drilled shafts and slab work, as applicable. The cost estimate was prepared to compare the relative cost of the five options. The estimated costs were factored into the landfill site engineering optimization cost estimates to deliver the final project. Table 5-1 provides a summary of landfill preparation and final project delivery costs (in 2019 dollars) for each option. Table 5-2 includes detailed landfill preparation costs.

TABLE 5-1
Landfill Preparation Cost Summary

Construction Design Option	Landfill Preparation Cost	Total Project Cost (in M)
High Platform	$765,090,000	$1,529
Low Platform	$717,280,000	$1,477
Hybrid 1	$550,210,000	$1,295
Hybrid 2	$672,875,000	$1,429
Full Excavation	$748,538,000	$1,512

The estimated landfill preparation costs do not include the following:

1. Costs for mobilization and other construction preparation because these costs are in OMF South construction cost estimates.
2. Possible construction costs associated with the intermodal facility.
3. Costs to adjust OMF South design to address compatibility with the FWLE or modify FWLE.
4. Cost escalation.
5. Design and construction management costs for the landfill preparation.

The Total Project Costs do not include costs associated with connection to the FWLE or modification requirements to FWLE.

TABLE 5-2

Detailed Landfill Preparation Costs

			High Structural Platform		Low Structural Platform		Hybrid 1		Hybrid 2		Full Excavation	
Item	**Unit**	**Unit Price**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**	**Quantity**	**Cost**
Excavation	CY	$5.00	100,000	$500,000	460,000	$2,300,000	2,900,000	$14,500,000	2,900,000	$14,500,000	5,300,000	$26,500,000
Export	TON	$10.00	135,000	$1,350,000	67,500	$680,000	3,105,000	$31,050,000	1,957,500	$19,580,000	3,915,000	$39,150,000
Rail Transport and Disposal	TON	$50.00	135,000	$6,750,000	67,500	$3,375,000	3,105,000	$155,250,000	1,957,500	$97,875,000	3,915,000	$195,750,000
Onsite Screening and Reuse (in-place)	CY	$15.00	0	$0	410,000	$6,150,000	600,000	$9,000,000	1,450,000	$21,750,000	2,400,000	$36,000,000
Import (in-place)	CY	$25.00	0	$0	0	$0	1,320,000	$33,000,000	300,000	$7,500,000	1,920,000	$48,000,000
Wastewater Management (surface water)	GAL	$0.15	1,200,000	$180,000	1,200,000	$180,000	1,200,000	$180,000	1,200,000	$180,000	1,200,000	$180,000
Wastewater Management (dewatering)	GAL	$0.15	0	$0	0	$0	0	$0	0	$0	2,118,506	$318,000
Dynamic Compaction	WK	$40,000	0	$0	0	$0	70	$2,800,000	70	$2,800,000	0	$0
Wet Season ESC	YR	$50,000	0	$0	0	$0	2	$100,000	1	$50,000	3	$150,000
Temporary LFG System	LS	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000
Permanent LFG System	LS	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000	1	$2,000,000
Site Grading	AC	$100,000	0	$0	55	$5,500,000	0	$0	0	$0	0	$0
Concrete Shafts and Slabs	LS		1	$345,630,000	1	$312,075,000	0	$0	1	$143,600,000	0	$0
LFG Flare Relocation	LS	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000
Capping System[1]	AC	$500,000	52	$26,000,000	52	$26,000,000	52	$26,000,000	52	$26,000,000	52	$26,000,000
GW Monitoring System	LS	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000	1	$1,000,000
Subtotal				**$386,410,000**		**$362,260,000**		**$277,880,000**		**$339,835,000**		**$378,048,000**
Contractor Markup (OH, Prof, General) (20%)				$77,280,000		$72,450,000		$55,580,000		$67,970,000		$75,610,000
Contingency (50%)				$231,850,000		$217,360,000		$166,730,000		$203,900,000		$226,830,000
Tax (10%)				$69,550,000		$65,210,000		$50,020,000		$61,170,000		$68,050,000
Total				**$765,090,000**		**$717,280,000**		**$550,210,000**		**$672,875,000**		**$748,538,000**

[1] Capping system costs include stormwater management and other general construction aspects associated with landfill closure.

6.0 Compatibility with the Known Status of FWLE Construction

If constructed at Midway Landfill, the OMF South will connect to the mainline of the FWLE. The current FWLE mainline design is not at an elevation and grade to allow direct connections to the proposed OMF South lead tracks. The five OMF South landfill options have been designed with the yard at elevations 365 feet (Hybrid 1, Hybrid 2, and Full Excavation), 380 feet (Low Platform), and 408 feet (High Platform). The FWLE will follow the general grade of I-5, while the OMF South will be flat.

There are currently five proposed track connections between the FWLE and the OMF South. To minimize the extent of mainline modification, a third track is proposed running alongside the mainline at an elevation closer to the selected OMF South elevation for compatibility with the yard-connecting tracks. The third track would have a connection to the mainline at the north and south ends only. The connection track would have No. 10 turnouts and be designed for 25 miles per hour. The connecting tracks and yard lead tracks would require a design variance for all vertical curve lengths. There are independent vertical track designs for each of the three OMF South elevation options.

Based on the current FWLE mainline design, irrespective of the construction option selected, the FWLE mainline will need to be modified to enable the connection of OMF South lead track turnouts at the required grade of 2% or less (DCM Rev 5). The extent of mainline modification varies based on the OMF South site elevation, as shown in Table 6-1 below.

TABLE 6-1
Track Summary

	Low Yard Elevation (365')	Medium Yard Elevation (380')	High Yard Elevation (408')
Northern Mainline Modifications*	Up to approximate 8' rise in elevated mainline over 3,200'.	Up to approximate 8' rise in elevated mainline over 3,200'.	Up to approximate 8' rise in elevated mainline over 3,200'.
Southern Mainline Modifications*	Up to approximate 10' lowering of at-grade mainline over 1,900'.	Up to approximate 5' lowering of at-grade mainline over 1,900'. Potential to avoid southern mainline modifications through further optimization.	Up to approximate 5' lowering of at-grade mainline over 1,900'. Potential to reduce southern mainline modifications through further optimization.
Connecting/Third Track**	At-grade connecting track. Steep grades (~6%) and significant cut toward south end. Vertical curve length design variance required.	At-grade connecting track. Moderate grades. Vertical curve length design variance required.	Elevated connecting track. Moderate grades. Vertical curve length design variance required.
Lead Tracks	At-grade lead tracks. North lead track has steep grades (~6%). Vertical curve length design variance required.	At-grade lead tracks. Moderate grades. Vertical curve length design variance required.	Elevated lead tracks connect elevated connecting track to high yard platform. Moderate grades. Vertical curve length design variance required.
Constructability	More complex. Requires deep cut of existing landfill.	Least complex.	More complex. Elevated lead tracks connect elevated connecting track to high yard platform. Complex elevated construction.
Cost	$$$$	$$$	$$$$
Schedule	Potential longer duration.	Medium duration.	Potential longer duration.

*Mainline modifications could be significantly reduced with design variance, allowing turnouts to be placed on greater than 2% grade.

**Connecting track minimizes mainline modifications but limits mainline connections to two locations. Further potential to eliminate third track to reduce lead track lengths and mainline modifications, with some operational impact.

7.0 Potential Settlement

The five options to redevelop the Midway Landfill as the OMF South will have different performance implications pertaining to potential future settlement. Site settlement will have a significant negative impact on the OMF South operation due to light rail tolerances.

Landfilled material will continue to consolidate over time due to the compressive nature of the material, overburden weight, and biodegradation of the material. Settlement will likely be differential, or uneven, throughout a landfill as a result of variable refuse thickness and heterogenus composition of the material. The differential settlement can negatively impact the integrity of building foundations, utilities, roadways, and trackways. The settlement evaluation provided by the Preliminary Geotechnical Engineering Services Report Revised, by GeoEngineers, estimates that the current landfill could have differential settlements ranging from 2 to 12 inches over the next 10 to 15 years.

The five options provide alternative designs to mitigate potential settlement as follows.

High Platform: This option will be designed to support the OMF South buildings and track on drilled shafts into competent native ground below the landfill.

Low Platform: This option will be designed to support the OMF South buildings and track on drilled shafts into competent native ground below the landfill. The option shortens the height of drilled shafts, further increasing stability.

Hybrid 1: This option removes overburden material, which will help offset the compressive loading of the OMF South on the refuse below. The option also removes a portion of the refuse mass below the facility. This will reduce the amount of degradable material. Dynamic compaction of the remaining refuse material will be intended to further compress the material and reduce future settlement. The competent backfill material thickness will help reduce differential settlement of the refuse below, creating a more uniform settlement result. Buildings will be supported on shafts drilled into the competent native ground below the landfill and the track will be supported on improved subgrade. The remaining refuse under the yard areas will have settlement implications due to material degradation and consolidation, potentially requiring operational adjustments to the yard ballast material supporting the tracks and at yard area interfaces with areas not subject to settlement.

Hybrid 2: This option removes overburden material, which will help offset the compressive loading of the OMF South on the refuse below. The option also removes a portion of the refuse mass below the facility. This will reduce the amount of degradable material. Dynamic compaction of the remaining refuse material will be intended to further compress the material and reduce future settlement. The competent backfill material thickness will help reduce differential settlement of the refuse below, creating a more uniform settlement result. Buildings will be supported on shafts drilled into the competent native ground below the landfill and the track supported on an on-grade concrete slab over improved subgrade. The remaining refuse under the yard areas will have settlement implications due to material degradation and consolidation. The provision of an on-grade concrete slab in the yard areas will further mitigate differential impacts; however, impacts may become more pronounced at slab joints and interfaces.

Full Excavation: This option removes the degradable material from the refuse mass and backfills the OMF South subgrade with competent material. Building and track will be supported by the backfilled subgrade. The option should eliminate settlement due to degradation. The depth of fill and irregularity of the large quantity of reused competent landfill material provides potential for long-term consolidation settlement.

Based on the settlement tolerance guidance from Sound Transit, all five options to redevelop the Midway Landfill will be designed to meet the long-term settlement of 1 inch over a period of 50 years, using the data analysis from planned geotechnical borings at the site. The High Platform and Low Platform options and the building portions of Hybrid 1 and Hybrid 2 options will be designed on drilled shafts to prevent settlement greater than 1 inch over a period of 50 years. The deep dynamic compaction associated with the track portions of Hybrid 1 and Hybrid 2 options is expected to have a design specification that will result in waste material compaction such that the long-term settlement of the compacted waste and overlying granular backfill would be less than 1 inch over a period of 50 years. For the Full Excavation option, the granular backfill will require compaction such that the long-term settlement would be less than 1 inch over a period of 50 years.

8.0 Conclusions and Next Steps

This interim memorandum is a high-level discussion of landfill preparation considerations pertaining to the potential redevelopment of the Midway Landfill as the OMF South. The evaluation is presented as possible approaches to the work to better inform decision-making. Assumptions and influencing factors will be dependent on construction contractor means and methods and other project factors.

A construction option evaluation matrix was developed for the five landfill options based on the evaluation sections above. The matrix is included as Table 8-1 and provides a Low (RED), Medium (YELLOW), High (GREEN) rating relative to each construction approach and category. The intent of the matrix is to provide a visual assessment of which subsurface construction design options may stand out as being potentially the most viable for further evaluation in Sound Transit's forthcoming Draft EIS.

Further consideration for the redevelopment of the Midway Landfill site as the OMF South is expected to include confirmation of more assumptions, consideration of upcoming landfill geotechnical and environmental site investigations, and constructability review of the landfill preparation options by a qualified construction contractor.

8.1 Confirm Assumptions

The evaluation of Midway Landfill redevelopment will continue in accordance with Task 9.3.1.16 – Engineering, Solid Waste Engineering, and Task 9.8 – Detailed Evaluation of Landfill Site Reuse. As these tasks are advanced, engineering and regulatory assumptions within this memorandum will continue to be refined to provide a more accurate understanding of the potential options.

Some assumptions are dependent upon construction contractor means and methods for planning and executing the work and will continue to have some uncertainty associated with them until an eventual construction contract is awarded.

8.2 Landfill Investigations

Additional geotechnical borings are being planned at the landfill. These borings may provide some insight into:

1. Depth of clean cover soil,
2. Landfill density,
3. Landfill depth,
4. Percentage of reusable material recoverable through screening,

TABLE 8-1

Subsurface Construction Design Options Evaluation Matrix[1]

Subsurface Construction Design Options	**OMF South Settlement Mitigation**	**Environmental Protection**	**Ease of Material Disposal**	**Ease of Construction Phasing**	**Low Traffic Impacts**	**FWLE Compatibility**	**Least Schedule Impacts**	**Least Additional Cost[2]**
Methods	Assessment of the option's ability to reduce future risk of settlement. High (Green) = Mitigation based on structural design, Medium (Yellow) = Mitigation susceptible to remaining refuse and/or reuse material, Low (Red) = Minimal mitigation	Assessment based on reduced risk of exposure to environmental hazards. High (Green) = Minimal contaminants handling and exposure, Medium (Yellow) = Significant onsite contaminants handling and exposure, Low (Red) = Significant onsite and offsite contaminants handling and exposure	Assessment of amount of material requiring offsite export and disposal. High (Green) = Less than 500,000 tons, Medium (Yellow) = Between 500,000 tons to 2,500,000 tons, Low (Red) = More than 2,500,000 tons	Assessment of construction complexity. High (Green) = Some excavation without screening and reuse, Medium (Yellow) = Moderate excavation depth with screening and reuse, Low (Red) = Deep excavation with screening and reuse	Assessment of traffic impacts based on PCEs. High (Green) = Less than 50 PCEs, Medium (Yellow) = Between 51 and 90 PCEs, Low (Red) = Greater than 90 PCEs.	Assessment of complexity for connection to FWLE. High (Green) = Most compatible with FWLE, Medium (Yellow) = Moderately compatible with FWLE, Low (Red) = Least compatible with FWLE	Ability to best meet the original 2026 scheduled facility opening. High (Green) = Opening within 1 year of 2026 target, Medium (Yellow) = Opening within 2 years of 2026 target, Low (Red) = Opening later than 2 years of 2026 target	Assessment of order of magnitude landfill preparation cost. High (Green) = Less than $500 million, Medium (Yellow) = Between $500 million and $700 million, Low (Red) = Greater than $700 million
High Structural Platform with No Excavation	🟩 Designed as elevated platform on shafts founded in competent material	🟩 Minimally invasive into the landfill, elevated platform with reduced landfill gas exposure	🟩 Less than 200,000 tons of export to a landfill	🟩 Least amount of landfill excavation	🟩 Passenger car equivalency would not significantly degrade operating conditions	🟥 OMF lead tracks need to be elevated , increased complexity and cost	🟩 Exceeds target 2026 opening by approximately <1 year	🟥 Over $700 million in landfill preparation costs
Low Structural Platform with Some Excavation	🟩 Designed as elevated platform on shafts founded in competent material	🟨 Significant refuse handling, facility interface with landfill surface	🟩 Less than 100,000 tons of export to a landfill	🟩 Limited work area, low depth of excavation, material screening not required	🟩 Passenger car equivalency would not significantly degrade operating conditions	🟩 At grade connection, moderate grades, least complexity and cost	🟩 Exceeds target 2026 opening by approximately <1 year	🟥 Over $700 million in landfill preparation costs
Hybrid 1: Excavation with Ground Improvements (Buildings on Drilled Shafts)	🟨 Refuse remains in the subgrade, settlement mitigation, reuse material	🟥 Significant refuse handling and export, facility interface with landfill surface	🟥 Approximately 3 million tons of export to a landfill	🟨 Limited work area, moderate depth of excavation	🟥 Passenger car equivalency would degrade northbound operating conditions	🟨 At grade connection, steep grades, increased complexity and cost	🟨 Exceeds target 2026 opening by approximately <2 year	🟨 Over $500 million in landfill preparation costs
Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shafts)	🟨 Refuse remains in the subgrade, settlement mitigation, reuse material, slab added to mitigate differential settlement	🟥 Significant refuse handling and export, facility interface with landfill surface	🟨 Approximately 2 million tons of export to a landfill	🟨 Limited work area, moderate depth of excavation	🟨 Passenger car equivalency would somewhat degrade northbound operating conditions	🟨 At grade connection, steep grades, increased complexity and cost	🟩 Exceeds target 2026 opening by approximately <1 year	🟨 Over $600 million in landfill preparation costs
Full Excavation and Backfill with Competent Soils	🟨 Deep fill, reuse, and import material	🟥 Significant refuse and wastewater handling and export, facility interface with landfill surface, reduced landfill gas generation	🟥 Approximately 4 million tons of export to a landfill	🟥 Limited work area, greatest depth of excavation	🟥 Passenger car equivalency would degrade northbound operating conditions	🟨 At grade connection, steep grades, increased complexity and cost	🟨 Exceeds target 2026 opening by approximately <2 year	🟥 Over $700 million in landfill preparation costs

[1] Relative comparison between subsurface construction design options at the Midway Landfill. The comparison is not inclusive of other potential OMF South sites.

[2] Cost comparisons do not include costs associated with FWLE connection or modifications required to FWLE.

5. Potential for irregular or hazardous material, and
6. Depth to groundwater.

LFG will also be assessed with regard to human health risk. The temporary penetrations resulting from the geotechnical investigation, LFG probes and wells, and LFG flare inlet will be sampled for methane and contaminants of concern. These data will be used in comparison with historical data to develop a better understanding of current contamination levels within the landfill.

8.3 Constructability Review

A qualified earthwork contractor will evaluate the five options and assumptions to provide a contractor means and methods perspective for planning and executing the work. The industry constructability insight will assist in confirming or refining the assumptions to develop a comprehensive understanding of the requirements associated with each approach.

8.4 Final Landfill Preparation Memorandum

Information pertaining to landfill site reuse beyond the preparation of this memorandum will be documented in a Conceptual Landfill Site Reuse Plan, planned for delivery to Sound Transit in June 2020. The plan will cover the options Sound Transit determines to carry forward for documentation in the project's Draft EIS. The plan will document the evaluation process and discuss the potential property transaction, permitting, schedule, design, risk, health and safety, unknowns, and other considerations that will continue to be developed under Task 9.8 – Detailed Evaluation of Landfill Site Reuse.

9.0 References

GeoEngineers, May 2019, Preliminary Geotechnical Engineering Services Report Revised, prepared for the City of Kent.

HDR, November 2019, Midway Landfill Site Engineering Optimization Report, prepared for Sound Transit.

King County Solid Waste Division, November 2019, 2019 Comprehensive Solid Waste Management Plan.

Sound Transit, June 2018, Design Criteria Manual – Revision 5.

Operations and Maintenance Facility South

Appendix D3: Conceptual Landfill Site Reuse Plan

Federal Transit Administration

SOUNDTRANSIT

September 2020

OMF SOUTH

Conceptual Landfill Site Reuse Plan

SOUNDTRANSIT

CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

SOUNDTRANSIT

OMF SOUTH

Conceptual Landfill Site Reuse Plan

Prepared for:
Sound Transit

Prepared by:
HDR Engineering, Inc.

September 30, 2020

Table of Contents

Acronyms and Abbreviations iii
Units iv
1.0 Introduction **1**
1.1 Project Description 1
1.2 Purpose 1
1.3 Midway Landfill Background 2
1.4 OMF South Background 5
2.0 Landfill Site Reuse Evaluation **7**
2.1 Landfill Redevelopment Feasibility 7
2.2 Regulatory Requirements 9
2.3 Experiences at Other Landfill/Contaminated Sites 12
2.4 Human Health Risk Assessment 15
2.5 Landfill Site Engineering and Optimization 18
2.6 Landfill Preparation Requirements 20
2.6.1 Three Landfill Subsurface Construction Design Options 20
2.6.2 Construction Evaluation 24
2.6.3 Traffic Analysis 36
2.6.4 Compatibility with the Known Status of FWLE Construction 42
2.6.5 Potential Long-Term Settlement 43
3.0 Summary **45**
3.1 Ground Settlement 45
3.2 Human Health and Safety 46
3.3 Regulatory 46
3.4 Risks to Cost and Schedule 46
3.5 Conclusions 47
4.0 References **49**

Tables

Table 2-1. Other Landfill/Contaminated Site Redevelopments 13
Table 2-2. Regional Disposal Capacity 31
Table 2-3. Landfill Preparation Material Requirements 35
Table 2-4. Maximum Landfill Preparation Daily Hauling Requirements 36
Table 2-5. Passenger Car Equivalency for Each Approach 37
Table 2-6. Track Summary 43
Table 3-1. Landfill Preparation Evaluation 48

Figures

Figure 1-1. Existing Landfill Cap Section 4
Figure 1-2. OMF South Conceptual Site Layout 6
Figure 2-1. Low Structural Platform with Some Excavation 21
Figure 2-2. Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shafts) 22
Figure 2-3. Full Excavation and Backfill with Competent Soils 23
Figure 2-4. Low Platform Shaft Layout 26
Figure 2-5. Hybrid 2 Shaft Layout 27
Figure 2-6. Slab and Shaft Concepts 28
Figure 2-7. Proposed Haul Routes 39
Figure 2-8. AM Operating Conditions 40
Figure 2-9.PM Operating Conditions 41

Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe Railroad
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CAP	Cleanup Action Plan
COC	contaminant of concern
COI	contaminant of interest
COPC	contaminant of potential concern
CUP	Conditional Use Permit
DA	Development Agreement
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FWLE	Federal Way Link Extension
HDPE	high density polyethylene
HHRA	Human Health Risk Assessment
I-5	Interstate 5
LFG	landfill gas
LRV	light rail vehicle
MATA	Memphis Area Transit Authority
MOW	Maintenance of Way
MTCA	Model Toxics Control Act
NEPA	National Environmental Policy Act
NPL	National Priorities List
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
PCE	passenger car equivalency
RCRA	Resource Conservation and Recovery Act

RCW	Revised Code of Washington
ROD	Record of Decision
ROW	right-of-way
SPU	Seattle Public Utilities
SR	State Route
UP	Union Pacific Railroad
VOC	volatile organic compound
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

Units

cy	cubic yard
day/wk	days per week
hr/day	hours per day
lb/cf	pounds per cubic foot
ton/cy	tons per cubic yard
wk/yr	weeks per year

1.0 Introduction

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility (OMF) to meet agency needs for an expanded fleet of light rail vehicles (LRVs) identified in *Sound Transit 3: The Regional Transit System Plan for Central Puget Sound*. The Sound Transit Operations and Maintenance Facility South (OMF South) project would be used to store, maintain, and deploy about 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way (MOW) building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking; operations staff offices; maintenance staff offices; dispatcher work stations; an employee report room; and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

OMF South would need to have tracks connecting to an operating light rail mainline, which in southern King County is the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by site alternative.

Three site alternatives for the proposed project are being evaluated in the Draft Environmental Impact Statement: one in Kent and two in Federal Way. These alternatives are named the Midway Landfill Alternative, South 336th Street Alternative, and South 344th Street Alternative, respectively. This plan is focused on the Midway Landfill Alternative.

1.2 Purpose

The Midway Landfill is currently being evaluated as one of three site alternatives in the Draft Environmental Impact Statement for the OMF South project.

The subsurface development of OMF South under the Midway Landfill Alternative will require unique design considerations for remedial environmental controls and to protect the facility against settlement. Landfill-specific design considerations are not required at the other OMF South site alternatives. Three landfill subsurface construction design options (options) are currently being explored for the Midway Landfill Alternative, as described in Section 2.6.

Previously, the Interim Midway Landfill Preparation Memorandum (Sound Transit 2020b) completed in February 2020 studied five options:

1. High Platform – High Structural Platform with No Excavation
2. Low Platform – Low Structural Platform with Some Excavation
3. Hybrid 1 – Excavation with Ground Improvements (Buildings on Drilled Shafts)
4. Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
5. Full Excavation – Full Excavation and Backfill with Competent Soils

The five options identified in the Interim Midway Landfill Preparation Memorandum have been reduced to three options that address a reasonable and broad range of options for further study in this plan:

1. Low Platform – Low Structural Platform with Some Excavation
2. Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
3. Full Excavation – Full Excavation and Backfill with Competent Soils

With the exception of cost, schedule, and legal considerations, this plan provides a comprehensive summary of the landfill-specific assessments performed to date in consideration of the Midway Landfill Alternative for the OMF South site. The assessments include regulatory considerations and permitting; landfill preparation requirements; functional design options, including settlement mitigation; operational health and safety; and remaining risks and unknowns. Cost and schedule of the three design options for the Midway Landfill, as well as legal considerations, will be assessed as part of a future process and included in the Basis of Design. Cost and schedule risks for the three design options are discussed in this plan.

This plan advances the findings of the Interim Midway Landfill Preparation Memorandum (Sound Transit 2020b) and summarizes other landfill-specific assessment deliverables to inform the Sound Transit decision-making process during the siting evaluation.

1.3 Midway Landfill Background

The Midway Landfill is a Superfund site owned by the City of Seattle and managed by Seattle Public Utilities (SPU). It is regulated by the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) under an existing Consent Decree and Record of Decision (ROD).

As discussed in the Consent Decree, the Midway Landfill was originally a gravel pit, which was operated from 1945 to 1968. SPU began landfill operations at the site in 1966 primarily to accept demolition-type wastes. Landfill operations continued until 1983, when the facility was closed. Approximately 3 million cubic yards (cy) of solid waste, reported to include primarily demolition materials and wood waste, were deposited at the unlined landfill facility. Refuse depths in some areas are up to 130 feet.

Concerns for negative impacts to human health and the environment were identified in 1983 by SPU (when the landfill was closed). Environmental testing indicated landfill gas (LFG) outside the landfill’s boundary, and organic and inorganic contaminants were found in groundwater.

An active LFG management system was installed in 1985, and in 1986 the Midway Landfill was placed on the National Priorities List (NPL) due to the groundwater contamination. Listing the site on the NPL provided the EPA with responsible oversight of the facility. Pursuant to the Model Toxics Control Act (MTCA), SPU entered into a Consent Decree with Ecology in 1990 to initiate cleanup work.

A final remedy for the site was identified in a ROD by EPA, with Ecology’s concurrence, on September 6, 2000. The identified remedy’s aim was to ensure that refuse containment is effective and maintained, groundwater quality is restored beyond the landfill boundary, and no residential exposure to landfill groundwater occurs until standards have been met.

SPU completed landfill closure construction in 1992; however, since the ROD was not signed at that time, construction completion was not officially recognized until September 21, 2000.

SPU has continued to manage and maintain the site with regular environmental reporting, including required Five-Year Review Reports by the EPA and Ecology completed in years 2005, 2010, and 2015.

The Midway Landfill is approximately 60 acres in size with buried refuse on approximately 45 of those acres. The site is situated west of Interstate 5 (I-5) and east of Highway 99 (Pacific Highway South, or State Route [SR] 99) and bounded by residences on the north and south. Some commercial areas are located between SR 99 and the landfill. Based on a February 2007 reuse planning report (City of Seattle 2007) for the Midway Landfill, the landfill reuse potential was summarized as follows:

- Four acres of the site have no refuse and minimal remedy components. These acres front SR 99 and have potential for unrestricted uses in the near term.
- Seven acres have shallow (approximately 50 to 60 feet deep) refuse and have minimal surface remedy components. These acres could potentially be used for surface uses such as a parking lot or active recreation in the future.
- Fourteen acres house the site’s LFG flare station and stormwater retention pond, and these will need to remain and be operational into the foreseeable future.
- Nine acres comprise the Washington State Department of Transportation (WSDOT) right-of-way (ROW) that will be used in the future for an I-5 roadway widening for the SR 509 project. Some volume of solid waste is presumed buried on the western edge of this ROW.

- Thirty-seven acres have waste that is moderately or deeply (up to and greater than 90 feet deep) located and have extensive surface remedy components. Alternate land uses in the future may be possible in the long term.

The general fill topography of the landfill provides an elevated, irregular surface that is sloped to drain to steeper side slopes. Components and facilities at the site generally include:

- Landfill Cap: Layers from bottom to top include a 12-inch-thick layer of low permeability (1 x 10^{-7} centimeters per second) soil/clay material, a 50-mil-high density polyethylene (HDPE) geomembrane, drainage geonet, geotextile, a 12-inch-thick drainage layer, and a minimum 12-inch-thick topsoil layer. See Figure 1-1 for the landfill cap section.

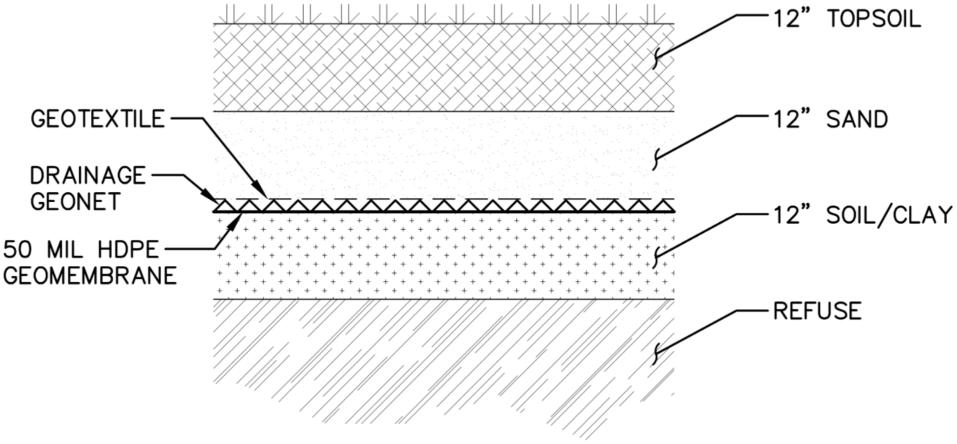


Figure 1-1. Existing Landfill Cap Section

- Landfill Surface Filling and Grading: 2 to 14 feet of soil cover over the refuse.
- The landfill cap is maintained in good condition but continues to experience differential settlement.
- Stormwater Detention: A 3-acre, 60-mil HDPE geomembrane-lined stormwater detention pond to collect landfill runoff and contributions from other areas/facilities. The pond base is below the groundwater level and has a permanent dewatering system. The pond has a discharge line to a downstream system.
- LFG System: LFG is routed to the on-site LFG flare station through header pipes.
    - 87 LFG extraction wells (56 on site and 31 off site). The off-site extraction wells have since been abandoned.
    - 70 off-site LFG monitoring probes (approximately 35 probes have been abandoned).

- Groundwater Monitoring System: The system currently includes wells for water level measurements (68 wells) and groundwater chemistry monitoring (15 wells).

1.4 OMF South Background

OMF South will store, maintain, and deploy a fleet of LRVs. OMF South will service the south and central corridor as the system wide fleet expands to more than 400 total LRVs to serve future expansion and growth in system wide ridership.

The site for the proposed OMF South needs to have the capacity to store and maintain over 144 LRVs. OMF South would contain light rail storage tracks as well as buildings, parking, storage areas, internal roads, landscaping, fencing, setbacks, stormwater facilities, electric transmission lines, and other utilities. OMF South also includes a 5-acre area for maintenance and yard storage, which includes vehicles, equipment, and a 30,000-square-foot building. OMF South needs to have tracks connecting to a light rail line. For the Midway Landfill Alternative, that light rail line is the FWLE.

A more complete description of OMF South physical and functional requirements is available in the Conceptual Basis of Design Report (Sound Transit 2020a). The conceptual site layout of the OMF South facility at the Midway Landfill is shown in Figure 1-2.

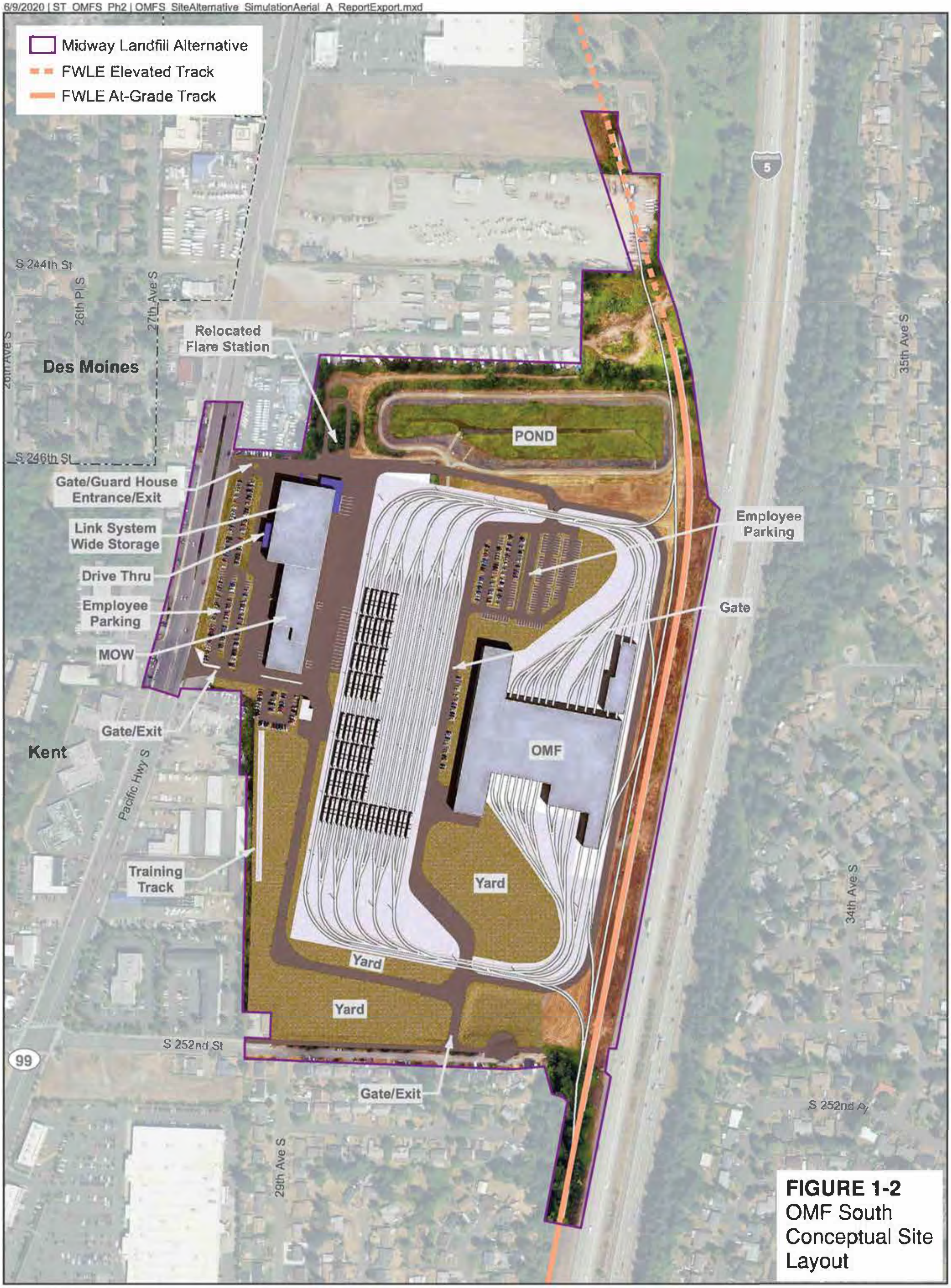

Midway Landfill Alternative
FWLE Elevated Track
FWLE At-Grade Track
5
S 244th St
26th Pl S
27th Ave S
26th Ave S
Des Moines
Relocated Flare Station
POND
S 246th St
Gate/Guard House Entrance/Exit
Link System Wide Storage
Drive Thru
Employee Parking
MOW
Employee Parking
Gate
35th Ave S
OMF
Gate/Exit
Kent
Pacific Hwy S
Training Track
Yard
Yard
Yard
34th Ave S
S 252nd St
99
Gate/Exit
S 252nd Pl
29th Ave S

FIGURE 1-2
OMF South Conceptual Site Layout

2.0 Landfill Site Reuse Evaluation

The landfill site reuse evaluation provides initial reuse analyses to gain an improved understanding of the potential impacts of undertaking the construction of OMF South at the Midway Landfill. The evaluation focuses on the following primary elements:

1. Landfill redevelopment feasibility,
2. Regulatory requirements,
3. Experiences at other landfill/contaminated sites,
4. Human health risk assessment,
5. Landfill site engineering and optimization, and
6. Landfill preparation requirements

2.1 Landfill Redevelopment Feasibility

The landfill redevelopment feasibility assessment introduced preliminary technical and regulatory considerations of locating OMF South on a closed landfill site and identified benefits, challenges, and risks associated with this kind of development. The assessment provided a brief background on the typical landfill life cycle and the characteristics of an older, closed landfill. The Midway Landfill was assessed based on available documents to understand the physical nature of the site and the currently imposed environmental and regulatory requirements.

A high-level review of early OMF South conceptual layouts was applied to the site. Considerations for redevelopment design and constructability were discussed, followed by some considerations for site operation and long-term maintenance requirements and potential future Sound Transit employee safety and health considerations. The study also included potential schedule impacts and a review of other facilities that have been redeveloped at landfills or otherwise contaminated sites. Cost considerations were not a component of this early study.

The study was documented in the OMFS Landfill Evaluation Report (Sound Transit 2019a). Following is a brief summary of the findings:

- Based on the evaluation conducted during the study, no criteria had been identified that would eliminate the Midway Landfill with certainty from further consideration for OMF South. Preliminary research into redevelopment projects at Superfund and/or state-led contaminated sites – in particular, other landfill sites – indicated that design and construction of a facility on a closed landfill could be a viable alternative. The fact that the site is a former landfill under state and federal regulatory oversight should not preclude it from continued consideration.

- Preliminary discussions with the property owner and regulators, review of regulatory requirements, and development of assumptions around anticipated site improvements at that time had not identified any major impacts to the design or construction schedule to preclude the OMF South project from being developed on the closed landfill. Potential landfill-related permitting dynamics and site preparation (in advance of construction) would likely be required but could be possible within the overall project schedule provided that they are considered proactively as part of overall design and construction strategy.
- More detailed research into both successful and challenging redevelopment examples at similar sites may provide information that could help inform the design process. It could also circumvent potential challenges previously faced by other landfill and contaminated site redevelopment projects around the country. This research would provide greater insight on cost implications, constructability, geotechnical considerations, and worker health and safety concerns, during both construction and operation.
- A land use attorney with Superfund-related experience should be consulted by Sound Transit to fully understand the retained and transferred liabilities associated with a potential agreement for use of the site. Prior to construction, Sound Transit may consider working with SPU and the governing agencies to proactively establish procedures for evaluating conditions during and after construction to demonstrate that redevelopment activities have resulted in no new impacts at the site.
- Development of OMF South on a closed landfill would require specific design approaches, construction technologies, and modifications to existing environmental controls. For example, the redevelopment conceptual designs for the Midway Landfill at the time of the study would construct OMF South on a reinforced concrete pile-supported platform (Phase 1, High Platform option). The platform would be elevated over the landfill to avoid landfill settlement impacts to OMF South and lessen impacts to the landfill remedial systems. Proactive communication with property owner and regulators, development of a contextual design approach consistent with the regulatory requirements, and efficient construction sequencing would be required to reduce impacts to the design and construction schedule for the development on a closed landfill relative to the overall OMF South project.
- Initial review of employee health and safety considerations indicates there would be limited exposure possibilities to contaminated groundwater and LFG. It will be critical for landfill redevelopment to maintain the existing environmental controls (i.e., LFG

collection system) to limit exposure pathways. Inclusion of additional preventative measures such as building foundation barriers, active and passive ventilation, and continuous methane monitoring in interior workspaces would likely be included in future facility design in addition to the remedial systems associated with the closed landfill. (More details on human health and safety are discuss in Section 2.4 of this plan.)

2.2 Regulatory Requirements

As identified in Section 1.2, the Midway Landfill Alternative possesses unique regulatory considerations due to the environmental liabilities associated with the landfill and its status as a Superfund site.

The Midway Landfill Site is listed as a federal Superfund Site under the National Priorities List. Under a cooperative agreement between EPA and Ecology, and as provided in the ROD, Ecology is the designated lead regulatory agency overseeing the Site and performance of the selected remedial action. The ROD, 5-year reviews, and the recently adopted Cleanup Action Plan Amendment No. 1 (for the FWLE project) identify the Applicable or Relevant and Appropriate Requirements (ARARs), which are the regulatory programs applicable to the former landfill and Site that any cleanup action must demonstrate compliance with under MTCA and the Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA).

The primary basis of action under the ROD is groundwater contamination above federal drinking water standards. Original contaminants of concern (COCs) include 1,2-dichloroethane, vinyl chloride, and manganese. During the 2010 to 2015 5-year review period, 1,4-dioxane was detected above MTCA Method B levels and is also considered a potential COC. The OMFS Landfill Evaluation Report (Sound Transit 2019a) provides additional details pertaining to current COCs and required cleanup levels at Midway Landfill.

An established protective remedy is in place at the site, which is reviewed every 5 years during the EPA’s standard 5-year review process. The intent of the remedy required by the ROD, in accordance with the requirements of CERCLA of 1980, is to protect human health and the environment, specifically:

- To ensure containment is effective and working. Though not explicitly stated in the ROD, containment refers to containment of the waste by a landfill cap, prevention of surface water infiltration through the landfill cap, and containment of LFG through the LFG extraction system.
- To ensure containment will be maintained when and if major changes are approved by Ecology in operation of the site.
- To return groundwater to drinking water standards and state cleanup standards downgradient of the landfill boundary.

- To ensure no residential exposure to groundwater until groundwater cleanup standards have been met.

Institutional controls require that operation and maintenance of the containment and monitoring systems must continue if the ownership or control of the property should change.

Significant changes to the existing remedies implemented at the landfill would need to be approved by Ecology, in coordination with EPA. Any potential changes would need to maintain the integrity of the remedy and required under the ROD and the Consent Decree. Major changes to the approved remedy could have the potential of reopening of the ROD and resulting in additional administrative and project scheduling challenges.

For the FWLE project, Ecology, in consultation with EPA, issued a Cleanup Action Plan Amendment (CAP Amendment) to describe the cleanup activities required at the site as part of the project. Ecology simultaneously entered into Consent Decrees with SPU (Consent Decree Amendment) and Sound Transit (Prospective Purchaser Consent Decree) to require compliance with the CAP Amendment and address other issues under MTCA. A similar sequence of activities, i.e., CAP Amendment and Consent Decrees, may be applicable for the OMF South project, pending further coordination with Ecology and EPA.

Regulatory coordination with major project stakeholders has already initiated on the potential for siting OMF South on the Midway Landfill. The OMF South project has begun coordinating with EPA and Ecology.

In 2018, Sound Transit met independently with representatives of both EPA and Ecology to discuss the potential development of OMF South at the Midway Landfill. As the lead regulatory agency for Midway Landfill, Ecology will have review and approval authority for any planned operational changes at the site. Based on the discussions in that meeting, if EPA approves the project under Superfund, the development process for Midway Landfill may be exempt from the requirement of the National Environmental Policy Act (NEPA). In addition, the existing ROD may not need to be reopened, if during the course of OMF South construction, the integrity of the existing, in-place remedies are maintained. It should be noted that a NEPA process for the project may be required by the Federal Highway Administration (FHWA) for airspace crossing of WSDOT land or other reasons outside the scope of this landfill evaluation.

In October 2019, Sound Transit and the broader project team, including SPU, met with Ecology to provide the regulators with an update of the OMF South project and redevelopment strategies being considered for Midway Landfill and to discuss the regulatory path forward if the project were advanced at the site. At the time, five subsurface construction options were being considered, as discussed in Section 2.5. Detailed information on the five options is available in the Midway Landfill Site Engineering Optimization Report (Sound Transit 2019b).

General feedback received by Sound Transit from Ecology pertaining to the redevelopment of Midway Landfill as OMF South was as follows.

- Removal and replacement of the landfill cap is feasible provided the project can demonstrate the ability to control the site and mitigate risks associated with construction methodologies consistent with the existing ROD and Consent Decree. Methodologies must be protective of human health and the environment.
- Ecology would be supportive of the redevelopment and provide resources to try to facilitate Sound Transit's schedule; however, no regulatory review durations were expressed.
- Ecology would allow reuse of solid waste on site.
- Ecology was accepting of the subsurface construction approaches presented provided they are implemented in a protective manner.
- The regulatory process was expected to be similar to the Midway Landfill work associated with FWLE, which required an amendment to the CAP and simultaneous Consent Decrees.

The Seattle-King County Department of Public Health will need to be provided the opportunity to review requested operational changes at the site.

From a project management perspective, regulatory coordination could be assessed as most significant for the Midway Landfill Alternative in its potential to impact project delivery. Significant schedule impacts come from incorporating the timelines associated with development of the legal documents, including CAP and ROD Amendments and Consent Decrees, into the OMF South project schedule. The main timing issue with the additional environmental agreements and approvals relates to the inability of the project to begin ground-disturbing activities on site to prepare for construction of the OMF building prior to agency adoption of the CAP and/or ROD Amendments, judicial entry of the Consent Decrees, and finalization of other agreements. Timing for adoption of the CAP and/or ROD Amendments, entry of the Consent Decrees, and finalization of other agreements is currently estimated to be approximately 1 year if led by Ecology, and approximately 2 years if led by EPA, starting after Preferred Alternative identification for the project in 2021. Ecology is currently anticipated as the lead agency. Construction is anticipated to begin in 2023 with operations beginning in the late 2020s.

If the Midway Landfill Alternative is advanced, ongoing and effective coordination with Ecology and EPA will be needed to ensure that the regulatory agencies are informed about the proposed design and construction approach and are prepared to approve the proposed environmental controls to be implemented during construction and at facility completion through CAP and/or ROD Amendments. Feedback will be needed from these agencies to determine what regulatory requirements will be prompted by the proposed approaches and to identify if there is an approach that may be preferable from a regulatory standpoint. Additional outcomes will be to determine a realistic approval process, approval requirements, and project milestone schedule.

A key objective of this communication will be to maintain the work within the existing regulatory framework (i.e., ROD). Additionally, acceptable construction approaches will need confirmation to determine landfill preparation impacts to the schedule and cost of the project. Current assumptions pertaining to landfill preparation requirements are discussed in Section 2.6.

Furthermore, to operate a future OMF within the City of Kent, Sound Transit would also need to develop and execute a Transit Way Agreement with the City of Kent to grant Sound Transit the right to own, operate, and maintain transit facilities in the public ROW within the City of Kent. And lastly, Sound Transit would need to negotiate and execute a Development Agreement (DA) with the City of Kent or apply for and receive a Conditional Use Permit (CUP) to establish land use and permit the OMF South construction. A DA, or CUP, would outline applicable city code requirements and development standards and would allow code departures and any required project mitigation in addition to any mutually agreed-upon enhancement partnerships related to multimodal access or otherwise. The City of Kent permitting requirements are not unlike the requirements of the other two site alternatives in Federal Way.

2.3 Experiences at Other Landfill/Contaminated Sites

Potential similar sites were researched on a limited basis to attempt to gain an understanding of the experiences of others and lessons learned that could inform and improve the OMF South design and operation if constructed at the Midway Landfill. The research could also provide insights on regulatory considerations, construction technologies, assessments related to public/employee health and safety, and monitoring. A similar site was generally considered a redeveloped contaminated site with an emphasis on rail transit and landfills.

The initial review of other landfill/contaminated sites that were redeveloped was performed as part of the OMFS Landfill Evaluation Report (Sound Transit 2019a). The report reviewed readily available internet data and found 22 example projects across the United States with some similarity to the OMF South project being developed at Midway Landfill. Most of the readily available data were limited in general to project overviews and status summaries of the redevelopment efforts. Specific details on regulatory challenges, permitting requirements, constructability considerations, and overarching health and safety concerns (both during construction and after redevelopment) were limited. Many of the redeveloped sites reviewed were relatively new, and long-term redevelopment-related studies (e.g., settlement issues, contamination migration, worker health and safety impacts, etc.) were not readily available.

The list was reduced to 16 representative developments, as shown in Table 2-1, more closely matching the Midway Landfill site, specifically on a closed landfill or former Superfund site.

TABLE 2-1

Other Landfill/Contaminated Site Redevelopments

Site Description	Location	Redevelopment
Munisport Landfill Superfund Site	North Miami, Florida	Two 25-story towers of luxury condominiums and several commercial businesses
Ringwood Mines/Landfill Superfund Site	Ringwood, New Jersey	Businesses, an industrial refuse disposal area, a municipal recycling center, the Ringwood Borough garage, a state park, and 50 private homes
Conrail Rail Yard Superfund Site	Elkhart, Indiana	Rail yard and associated maintenance facilities
Operating Industries, Inc. Landfill Superfund Site	Monterey Park, California	Commercial and retail operations
PJP Landfill Superfund Site	Jersey City, New Jersey	Prologis distribution center and structural supports for the Pulaski Skyway
Syosset Landfill Superfund Site	Oyster Bay, New York	Salt storage, storage, parking, sanitation vehicle refueling facility
Rossman Landfill	Oregon City, Oregon	Golf course, Discount Tire Store, and Home Depot (additional commercial development in the planning stages)
Cobb's Quarry Landfill	Beaverton, Oregon	Single- and multi-family homes
Northwest 58th Street Landfill Superfund Site	Hialeah, Florida	Numerous municipal-related office and operational facilities
Ogden Railroad Yard Superfund Site	Ogden, Utah	Museums, art galleries, shops, restaurants, and commuter rail line infrastructure
Western Pacific Railyard Superfund Site	Oroville, Washington	Maintenance shop, active rail line, and public drinking water well
Kentwood Landfill Superfund Site	Kentwood, Michigan	Two-story, 46,000 square foot public library facility
Santa Clara Landfill	Santa Clara, California	240-acre mixed use complex (commercial and residential)
Contaminated Site	St. Paul, Minnesota	Green Line Light Rail Transit OMF
Contaminated Site	St. Paul, Minnesota	Southwest Light Rail Transit Rail Support Facility
South Park Landfill	Seattle, Washington	Seattle South Transfer Station

Sound Transit contacted the facility owners to collect information related to their past landfill redevelopment experience. Seven of the redevelopments responded and were interviewed about their contaminated site redevelopment experience to obtain additional points of reference to better understand the advantages and disadvantages of reusing a landfill site. Sound Transit was also interested in better understanding possible long-term health impacts tied to reusing the former landfill sites and whether any special studies were required during the planning and permitting of landfill site redevelopment.

The information collected demonstrated that numerous landfill/contaminated sites have been successfully redeveloped. Several sites have also been redeveloped to support transportation infrastructure expansion, including projects where light rail and other transit infrastructure was installed. However, none of the site redevelopments significantly reflected the combined Midway Landfill site characteristics and the operational requirements of the OMF South project. For example, a rail facility developed on a stable, but contaminated, site will not require the same settlement considerations as if developed on a landfill.

There was general consensus from respondents regarding certain aspects of landfill site reuse, specifically that permitting processes were longer than for typical site development, given the requirements for coordination, review, and approval of contaminated site reuse.

None of the respondents reported knowledge of any human health-related concerns from working at or living within the redevelopment communities.

In addition to the OMFS Landfill Evaluation Report (Sound Transit 2019a), three other facility redevelopments were researched: a transit park-and-ride at McCollum Park in Snohomish County, Washington, a bus operations and maintenance facility in Memphis, Tennessee, and a mixed-use commercial/residential development in Everett, Washington.

The park-and-ride lot was of interest because it was locally known for settlement issues. In researching the site, the lot was constructed on the Emander Landfill. The landfill stopped receiving waste in 1967, and the waste mass was approximately 20 feet deep. Information was not readily available online as to any design and construction mitigation being performed at the site prior to lot construction. The site was not considered relevant to the OMF South project beyond emphasizing that settlement is expected to occur at former landfill sites.

The bus operations and maintenance facility is owned by the Memphis Area Transit Authority (MATA) and constructed on the Bellevue Landfill, with waste material 20 to 30 feet thick. Landfilling stopped in 1977, followed by facility construction in 1979. The site has experienced ongoing settlement requiring significant facility improvements to keep the facility operational. The buildings were constructed on piles, which has created large differential settlement at the building interfaces with the remaining unmitigated site infrastructure (i.e. the buildings have remained at the general installed elevation and the rest of the site has settled and pulled away from the buildings). LFG generation has also been an issue at the facility with ignitions and explosions during construction. Neither settlement nor LFG were properly mitigated during facility design and construction. No site-wide stabilization measures were instituted, and only LFG sensors and fans were installed in the buildings to account for methane generation. This site is relevant to the OMF South project as an example of the importance of engineered mitigation measures that are required for successful construction on landfills.

The mixed-use commercial/residential development is at the Everett Landfill and includes two adjacent properties. The project is in the planning stages and is expected to include construction of up to 900,000 square feet of mixed commercial use; 200,000 square feet of hotel space; and up to 1,400 residential units. The plan was approved by the Everett City Council on May 1, 2019.

The project will need to address ground settlement, human health and safety, regulatory, and legal risks similarly identified for the OMF South project if constructed at Midway Landfill. The current planned subsurface construction approach for the site is a temporary surcharge placed over the refuse area to further consolidate the material and reduce future settlement. Buildings will be constructed on piles. Construction requirements are expected to include:

- Environmental controls and health and safety requirements to be implemented during excavation including stormwater management, dust and odor control and waste handling;
- Landfill cap requirements that prevent infiltration into contained waste and prevent direct contact with waste;
- Installation and maintenance of an active LFG collection system below the cap that prevents LFG from entering enclosed spaces where it can be an explosive risk;
- Pile foundation requirements that protect underlying groundwater from migration of landfill leachate;
- Operational requirements for the existing leachate collection system to prevent leachate from entering the river; and
- Surface water management requirements to prevent infiltration into underlying waste and to prevent erosion of the surface materials.

The Everett Landfill redevelopment has not been completed but continues to advance. If Midway Landfill is selected as the preferred site for the OMF South, the Everett Landfill project could provide further information on the process and mitigation that will be required for landfill redevelopment.

2.4 Human Health Risk Assessment

A Midway Landfill Human Health Risk Assessment (HHRA) (Sound Transit 2020c) was performed for the OMF South project. The HHRA evaluated potential chronic health risks to Sound Transit personnel who work at the future site should it be selected for OMF South and waste be maintained on site. Non-toxicological hazards, including acute, physical risks associated with constructing and operating OMF South over a waste mass, were also discussed.

At the time of the HHRA, five landfill subsurface construction design options were being considered. In order to streamline the exposure assessment step of the HHRA and the non-toxicological hazards evaluation, the five subgrade construction design options were grouped into three future development concepts for OMF South based on the potential exposures associated with each construction design option. Human health risks were evaluated for the development concept that represents the worst-case exposures scenario based on current site conditions and potentially complete routes of exposure. The three concepts are described as follows.

Concept 1: OMF South built on an elevated structural platform. This concept includes an elevated platform constructed on shafts or pilings that are installed through the landfill cap and the underlying waste material. The landfill cap will be restored at penetrations and the gas system and other environmental controls will be preserved. This concept represents the High Platform option.

Concept 2: OMF South built on a slab on the surface of the landfill following full excavation and removal of underlying landfill waste. This concept includes removal of the landfill cap and underlying solid waste, screening and reuse of contaminated, but competent, soils contained in the landfill as fill, reconstruction of the landfill cap, reconstruction of environmental controls, and construction of a slab foundation. This concept represents the Full Excavation option.

Concept 3: This concept is a combination of Concepts 1 and 2 and will include removal of the landfill cap, partial removal of underlying solid waste, screening and reuse of contaminated, but competent, soils contained in the excavated portion of the landfill as fill, reconstruction of the landfill cap, reconstruction of environmental controls, and construction of the OMF South on a combination of slab foundation and an elevated platform on shafts or pilings. This concept represents the Low Platform, Hybrid 1, and Hybrid 2 options.

Based on evaluation of the historic available site data and supporting documents, the groundwater and LFG methane datasets were determined to be of sufficient quality and reliability for use in this risk assessment. However, based on the data evaluation for this HHRA, it was determined that the LFG data for volatile organic compounds (VOCs) and toxic inorganic gases were not representative of current, or future, site conditions, as they were collected more than 25 years ago from the LFG extraction system and, thus, do not accurately represent concentrations of volatile gases to which future workers may be exposed. In addition, data collected from the LFG extraction system do not provide an appropriate measure of the concentrations that workers may be exposed to at OMF South. Below is the summary of findings from the HHRA. The HHRA should be reviewed in its entirety for a complete understanding of the exposure and toxicological assessments and non-toxicological hazards evaluation. Due to the lack of recent LFG VOC data, an April 2020 sampling event was performed as discussed below.

The HHRA found that occupational exposures to VOCs in groundwater and to methane in LFG are not expected to result in adverse chronic health effects for any OMF South worker.

However, the potential risk of adverse chronic health effects associated with occupational exposures to contaminants of interest (COIs) in LFG could not be characterized due to a lack of representative data. In order to quantify occupational risk at OMF South, post-construction sampling of VOCs and toxic inorganic gases is needed (e.g., sub-slab soil gas and/or indoor air sampling) to provide an appropriate measure of the concentrations that workers may be exposed to at OMF South. Appropriate engineered protections for occupational exposures will need to be developed based on the final selected OMF South subsurface construction design option.

The non-toxicological hazards (methane explosion risk, seismic considerations, and hazards associated with construction activities) evaluated for the Midway Landfill can largely be managed through appropriate engineered protections, health and safety protocols, construction design standards, and site control and environmental protection plans. Risk management approaches for non-toxicological hazards will need to be developed based on the final selected OMF South subsurface construction design option.

Subsequent to the HHRA development, a limited, one round of select LFG sampling was performed in April 2020. The sampling and results were discussed in a Midway Landfill Human Health Risk Assessment Addendum (Sound Transit 2020d) to the HHRA and are summarized below.

The LFG analysis included samples collected directly from the LFG extraction system: one combined sample from the manifold to the flare inlet and eight from individual LFG extraction wells. In addition, two opportunistic air grab samples were collected in areas where the landfill cap had been breached during a geotechnical investigation. The intent of the LFG investigation was to provide Sound Transit with information about the types and concentrations of VOCs and inorganic gases found in LFG at the Midway Landfill under current site conditions.

Data limitations that impact the interpretation and application of these data in site characterization and risk assessment were identified during the data evaluation process. These limitations include a relatively small number of LFG sample locations within a large area (>60 acres), potential selection bias, temporal limitations associated with a one-time sampling event, limited understanding of the underlying waste type and conditions and applied vacuum pressure and resulting radius of influence for sampled wells, and limitations of using VOC concentrations found in the LFG extraction system to quantify occupation exposures and risk at OMF South.

The April 2020 LFG extraction system sample results indicate that several VOCs remain in LFG at the site; however, the VOCs with the highest concentrations in 2020 (benzene, ethylbenzene, and hydrogen sulfide) have decreased substantially since 1988, but continue to exceed one or more regulatory screening level.

VOC results from the manifold and extraction wells and from co-located wells demonstrate that concentrations can vary significantly by depth and by location throughout the landfill footprint. The sampled extraction wells with the highest concentrations of benzene, ethylbenzene, and hydrogen sulfide include those north of the planned OMF South main building (GW-42S and GW-42D) and within the east side of the planned OMF South main building (GW-48S and GW-48D).

The April 2020 LFG sampling event did not provide any new information that would result in a change in the current conceptual site model. The primary source of contaminants of potential concern (COPCs) at the site, chemical release mechanisms and environmental transport processes, and potentially complete routes of exposure for specific occupations at OMF South remain the same as those presented in the HHRA.

As discussed above and in the HHRA, samples collected directly from the LFG extraction system are not representative of VOC concentrations in subsurface gas that could pose an unacceptable risk to indoor air quality. The LFG extraction system samples should not be used to quantify occupational exposures and resulting risk. As a result, the April 2020 pre-construction sampling results were not used to identify subsurface soil gas COPCs.

However, because hydrogen sulfide was detected at relatively high concentrations in LFG samples during the April 2020 sampling event, a toxicity profile for hydrogen sulfide is included in the HHRA Addendum. Overall, the HHRA findings and conclusions have not changed by inclusion of the Midway Landfill Human Health Risk Assessment Addendum.

As stated in the HHRA findings, the migration of LFG through the subsurface to indoor and ambient air is currently controlled by the LFG extraction system and the landfill cap. Continued operation and maintenance of all components of the remedy is required if any portion of the property is sold, leased, transferred, or otherwise conveyed. As a result, it is expected that future development of OMF South at the Midway Landfill, if refuse remains, would include an LFG system and landfill cap and other engineered protections to mitigate and monitor vapor intrusion of LFG (including methane) to indoor air.

2.5 Landfill Site Engineering and Optimization

In Phase 1 of siting OMF South, high-level redevelopment concepts for the Midway Landfill Alternative were generated. As the Midway Landfill Alternative was advanced to Phase 2 in the evaluation process, additional engineering and site optimization was performed to more realistically evaluate the alternative. This effort is captured in the Midway Landfill Site Engineering Optimization Report (Sound Transit 2019b) and the Conceptual Basis of Design Report (Sound Transit 2020a).

The Midway Landfill Site Engineering Optimization Report summarized the development of a preferred site layout and five potential subsurface construction design options. The landfill design optimization included two workshops focused on ground-settlement solutions.

The first workshop introduced the Phase 1 Midway Landfill Alternative OMF South concepts and Sound Transit's operational and maintenance criteria (Sound Transit 2018) for the facility to a broad stakeholder group which included representatives from Sound Transit, SPU, City of Seattle, City of Kent, City of Federal Way, WSDOT, and various consultants . Based on this information, the workshop developed a range of concepts that could potentially improve the Phase 1 designs and mitigate settlement risk.

Sound Transit advanced OMF South design options based on the first workshop and presented the results to the same group of stakeholders in a second workshop. The second workshop reviewed the first workshop proposed settlement solutions and Sound Transit's evaluation process. Sound Transit presented initial Phase 2 design concepts for further discussion.

At the conclusion of the second workshop, the cross sections for the initial design concepts were modified resulting in the following five potential subsurface construction design options.

- High Platform – High Structural Platform with No Excavation
- Low Platform – Low Structural Platform with Some Excavation
- Hybrid 1 – Excavation with Ground Improvements (Buildings on Drilled Shafts)
- Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
- Full Excavation – Full Excavation and Backfill with Competent Soils

The five options would generally share the same horizontal OMF South layout. The design options were further refined through the 10% design process, as discussed in the Conceptual Basis of Design Report (Sound Transit 2020a) and the landfill preparation assessment captured in the Interim Midway Landfill Preparation Memorandum (Sound Transit 2020b). The assessment of Alternatives Evaluation Matrix developed for the Interim Midway Landfill Preparation Memorandum resulted in the five options being reduced to three options that address a reasonable and broad range of options for further study, which are discussed in Section 2.6.

The 10% design process primarily advanced the OMF South site layout and optimum site grading to connect to FWLE mainline as well as track design for lead tracks for all three design options. The structural design of shafts and slabs was advanced based on updated design loads, design criteria on settlement, and geotechnical data. Additional geotechnical data were also used to determine the maximum depth of landfill material to remain in place and be deep dynamic compacted to meet settlement criteria for the Hybrid 2 option. The original geotechnical data were supported by additional geotechnical investigations as detailed in the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e).

2.6 Landfill Preparation Requirements

The Interim Midway Landfill Preparation Memorandum (Sound Transit 2020b) was prepared to assess the landfill preparations required to implement the five potential subsurface construction design options at Midway Landfill that were developed during the landfill optimization process.

Since the development of the Interim Midway Landfill Preparation Memorandum, geotechnical technical investigations have been performed at Midway Landfill to further define evaluation assumptions, the design has been advanced to approximately 10% design, and a landfill preparation constructability review was conducted. The geotechnical investigation and 10% design efforts are documented in the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e) and Conceptual Basis of Design Report (Sound Transit 2020a), respectively.

This section generally follows the organization of the Interim Midway Landfill Preparation Memorandum, with the exception of the original five potential subsurface construction design options being reduced to three. The current three potential subsurface construction design options being considered include:

- Low Platform – Low Structural Platform with Some Excavation
- Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
- Full Excavation – Full Excavation and Backfill with Competent Soils

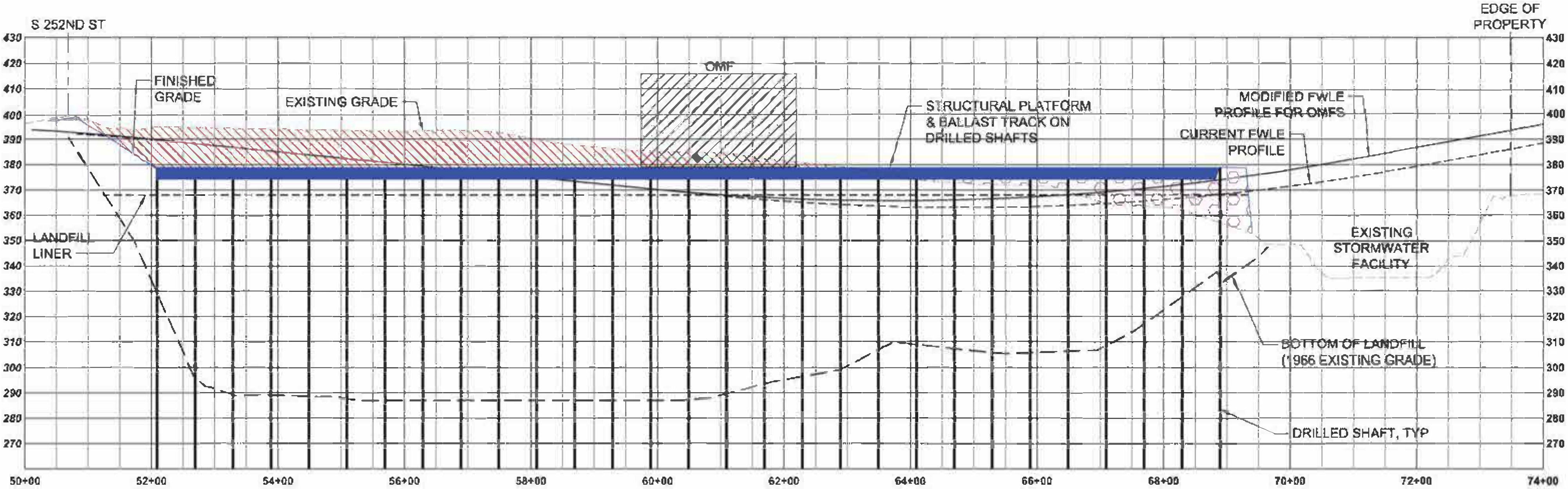
The High Platform – High Structural Platform with No Excavation was eliminated in preference of the Low Platform option based on the Low Platform elevation compatibility for the connection to the FWLE main line. The Hybrid 1 – Excavation with Ground Improvements (Buildings on Drilled Shafts) was eliminated due to similarities to Hybrid 2 and a preference for the Hybrid 2 slab on grade for the tracks.

2.6.1 Three Landfill Subsurface Construction Design Options

Each of the three OMF South subsurface construction design options at Midway Landfill generally has the same horizontal layout and surface features as shown in Figure 1-2. The three options primarily vary in subgrade and foundation concepts. The three options are shown in Figures 2-1 through 2-3. The options are consistent with those described in the Conceptual Basis of Design Report. The report should be reviewed for more detail pertaining to the OMF South project and the design of each construction option.

1

LOW STRUCTURAL PLATFORM WITH SOME EXCAVATION



S 252ND ST
EDGE OF PROPERTY
FINISHED GRADE
EXISTING GRADE
OMF
STRUCTURAL PLATFORM & BALLAST TRACK ON DRILLED SHAFTS
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
LANDFILL LINER
EXISTING STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
DRILLED SHAFT, TYP
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Low Platform (380 TOR, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	1.01	0.16		
Borrow Fill				
Screen (40% reusable)	0.85	0.51		0.34
Total		0.67	0.00	0.34

▨ EXCAVATE

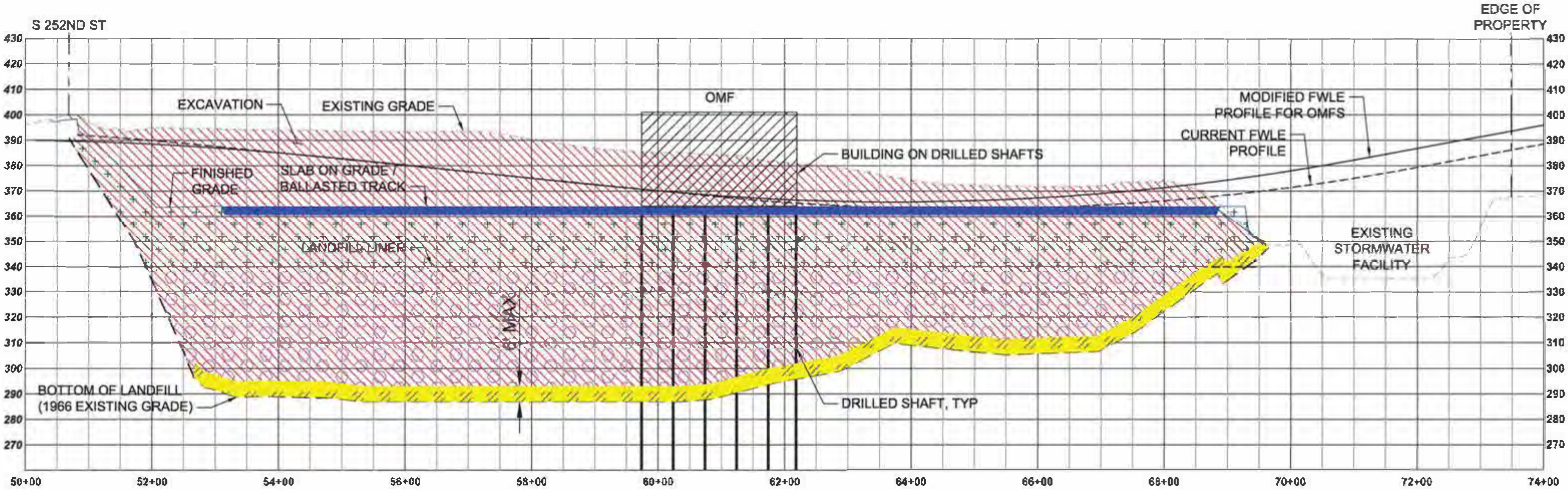
○ BACKFILL WITH REUSED MATERIAL / IMPORTED MATERIAL

Assumptions:

-40% of excavated material is reusable onsite based on 30% to 50% range recommended in Geotechnical Report
-Rough grading targeting 1' below finished grade
-Depth from bottom of structural platform to top of rail = 69"
-Total embedment depth of 10' diameter drilled shaft varies from 120' to 215' depending on the depth of landfill
-Includes 0.3 million CY of excavation for drilled shafts

FIGURE 2-1

2 HYBRID 2: EXCAVATION WITH GROUND IMPROVEMENTS (SLAB ON GRADE FOR TRACKS AND BUILDINGS ON PILES)


S 252ND ST
EDGE OF PROPERTY
EXCAVATION
EXISTING GRADE
OMF
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
BUILDING ON DRILLED SHAFTS
FINISHED GRADE
SLAB ON GRADE / BALLASTED TRACK
LANDFILL LINER
EXISTING STORMWATER FACILITY
6' MAX
BOTTOM OF LANDFILL (1966 EXISTING GRADE)
DRILLED SHAFT, TYP
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Hybrid (365 TOR, 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	4.27			
Borrow Fill			1.24	
Screen (40% reusable)	4.27	2.56		1.71
Total		2.56	1.24	1.71

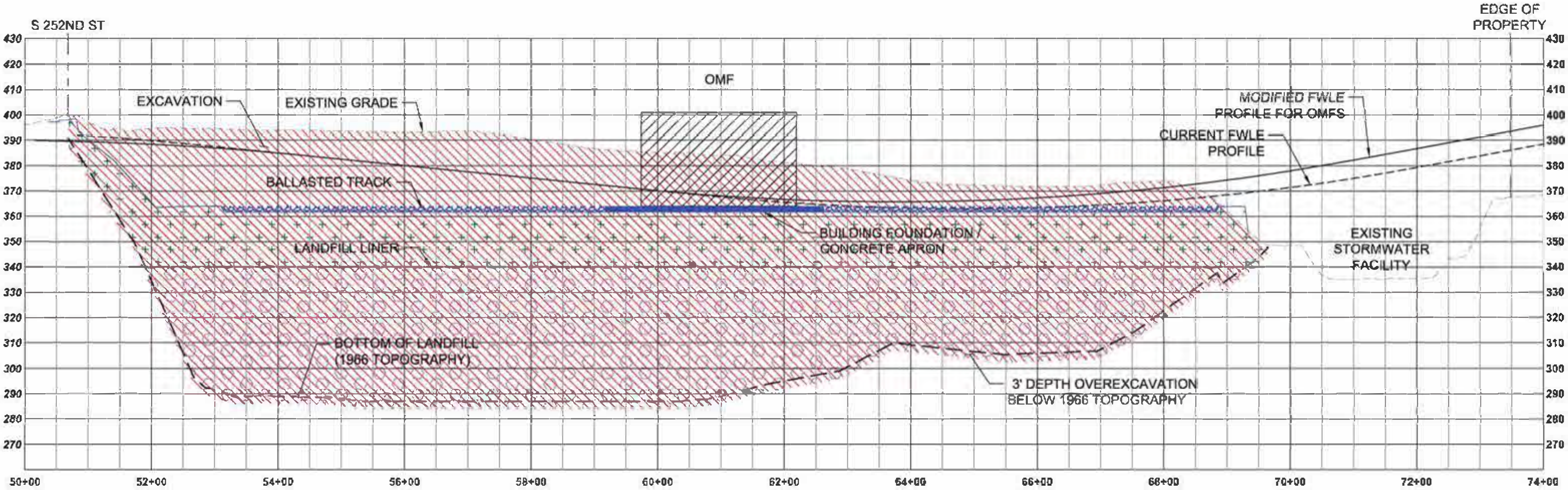
▨	EXCAVATE
▨	EXCAVATE & BACKFILL WITH IMPORTED MATERIAL
▨	EXCAVATE & BACKFILL WITH REUSE MATERIAL
▨	DEEP DYNAMIC COMPACTION

Assumptions:

-40% of excavated material is reusable onsite based on 30% to 50% range recommended in Geotechnical Report
-Rough grading targeting 1' below finished grade
-Depth from bottom of concrete slab to top of rail = 39"
-Maximum depth of deep dynamic compaction = 6' (depth reduced from 40 feet to 6 feet based on geotechnical recommendation to meet 0.75" settlement over 50 years)
-Includes 0.05 million CY of excavation for drilled shafts

FIGURE 2-2

3 FULL EXCAVATION & BACKFILL WITH COMPETENT SOILS


S 252ND ST
EDGE OF PROPERTY
OMF
EXCAVATION
EXISTING GRADE
MODIFIED FWLE PROFILE FOR OMFS
CURRENT FWLE PROFILE
BALLASTED TRACK
BUILDING FOUNDATION / CONCRETE APRON
LANDFILL LINER
EXISTING STORMWATER FACILITY
BOTTOM OF LANDFILL (1966 TOPOGRAPHY)
3' DEPTH OVEREXCAVATION BELOW 1966 TOPOGRAPHY
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
50+00
52+00
54+00
56+00
58+00
60+00
62+00
64+00
66+00
68+00
70+00
72+00
74+00

Full Excavation (365 TOR 356 MOW FFE)				
	(Millions of Cubic Yards in Place)			
	Total	Haul	Import	Reuse
Excavation	4.87	0.20		
Borrow Fill			1.69	
Screen (40% reusable)	4.67	2.80		1.87
Total		3.00	1.69	1.87

▨ EXCAVATE

▨ EXCAVATE & BACKFILL WITH IMPORTED MATERIAL

▨ EXCAVATE & BACKFILL WITH REUSED MATERIAL

Assumptions:

-40% of excavated material is reusable onsite based on 30% to 50% range recommended in Geotechnical Report
-3' depth of overexcavated material assumed to be unsuitable for reuse onsite
-Rough grading targeting 1' below finished grade
-Depth from bottom of ballast material to top of rail = 27"
-Depth of overexcavation = 3' below 1966 survey

FIGURE 2-3

2.6.2 Construction Evaluation

The construction evaluation is a high-level discussion of landfill subsurface construction design options pertaining to the Midway Landfill Alternative for the OMF South Draft Environmental Impact Statement. The discussion is based on operations and maintenance requirements, available information, and reasonable assumptions intended to develop a planning-level comparison among the three design options. If the Midway Landfill Alternative advances, assumptions will be further refined to create a more detailed assessment of landfill preparation requirements.

The discussion presents possible subsurface construction approaches for the three design options to develop planning-level estimates of earthwork and structural requirements and inform the traffic analysis. Assumptions and influencing factors may vary depending on construction contractor means and methods and regulatory requirements.

2.6.2.1 Earthwork Process

Materials anticipated to be encountered during landfill excavation include clean cover soil, landfill cap geosynthetic materials, and refuse material. Clean cover soil can be temporarily stored on site for reuse during OMF South construction. Landfill cap geosynthetics and refuse material excavated will require one of the following:

1. Export and disposal off site,
2. Relocation on site, or
3. On-site material screening to retain competent soils for reuse on site and export of deleterious materials for disposal off site.

According to the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e), the average unit weight within the refuse ranged from 50 to 90 pounds per cubic foot (lb/cf), or 1.01 tons per cubic yard (ton/cy). For calculation purposes, the evaluation used an average in-place unit weight of refuse of 75 lb/cf. The loosening of material during the excavation process is assumed to result in a lower average material density; however, it is assumed that 30 tons of export material per container will be achievable, equivalent to a loose density of 51.5 lb/cf, or 0.7 ton/cy. The recommendations also concluded that a typical soil column at the Midway landfill could be composed of between 50 and 70 percent waste, which would correspond to between 30 and 50 percent soil that could be considered for reuse. For calculation purposes, the evaluation used an average excavated material screening reuse of 40 percent, with the remaining 60 percent of material exported for disposal.

The reusable material will be contaminated and require environmental controls during handling to avoid contamination of clean material and surface water. The reuse of the material will require oversight by a geotechnical engineer to ensure proper mixing and placement for acceptable soil stability. During placement, some initially classified reuse material may be deemed unsuitable and require disposal off site.

The Low Platform option reuses excavated material without screening. This approach is intended to balance cut and fill quantities and reduce export requirements. Drilling tailings are assumed to require export. The reused material is not required to be structurally competent, since the Low Platform option relies on drilled shafts for support.

Even though there is a quantity of clean cover material on the site, the amount is unknown. Based on the high-level nature of this evaluation and the proportionately larger quantity of refuse material, the entire excavation quantity calculated and shown on Figures 2-1 through 2-3 is assumed to be refuse. A quantity of clean cover material has not been distinguished from the bulk quantities.

Active excavation and hauling are assumed to be 12 hours per day (hr/day), 6 days per week (day/wk). The actual workday may be 16 hours with two shifts. Due to general inefficiencies, breaks, fueling and maintenance, irregularities at the start and finish of shifts, and other potential operational impacts, 12 hours of active hauling was assumed to be the average.

Excavation into refuse is assumed to be permitted only between May 1 and September 30, which excludes wet season construction. This results in a construction season of approximately 22 weeks each year. The construction season is assumed to be limited to reduce the amount of precipitation that may contact refuse and become contaminated water that could potentially infiltrate into the open area of the landfill, further contributing to contaminated groundwater that exists at the site. It is assumed that regulatory agencies will prohibit or restrict open landfill excavation during the wet season to protect against groundwater contamination. Shaft installation and other work could be performed during the wet season provided the work area maintains environmental protections.

Due to the irregular nature of the material typically found within a landfill, there will be the potential to encounter unexpected subsurface conditions during the excavation process. It is assumed that the construction contractor will be required to have resources available to manage irregular materials encountered during bulk excavation and redirect the work effort without delays to the project timeline. The large available work area of the total site work area supports the reasonableness of this assumption.

2.6.2.2 Drilled Shaft and Slab Installation

The landfill preparation includes two preliminary structural options; the Low Platform and Hybrid 2 options. These two subsurface construction design options include drilled shaft and slab elements, as discussed in Section 2.5.

The Low Platform option consists of precast, prestressed void slabs supported on approximately 700 drilled shafts. The drilled shafts are 10 feet in diameter, distributed on a 35-foot by 70-foot grid under the buildings, track, and drainage vault area as shown in Figure 2-4.

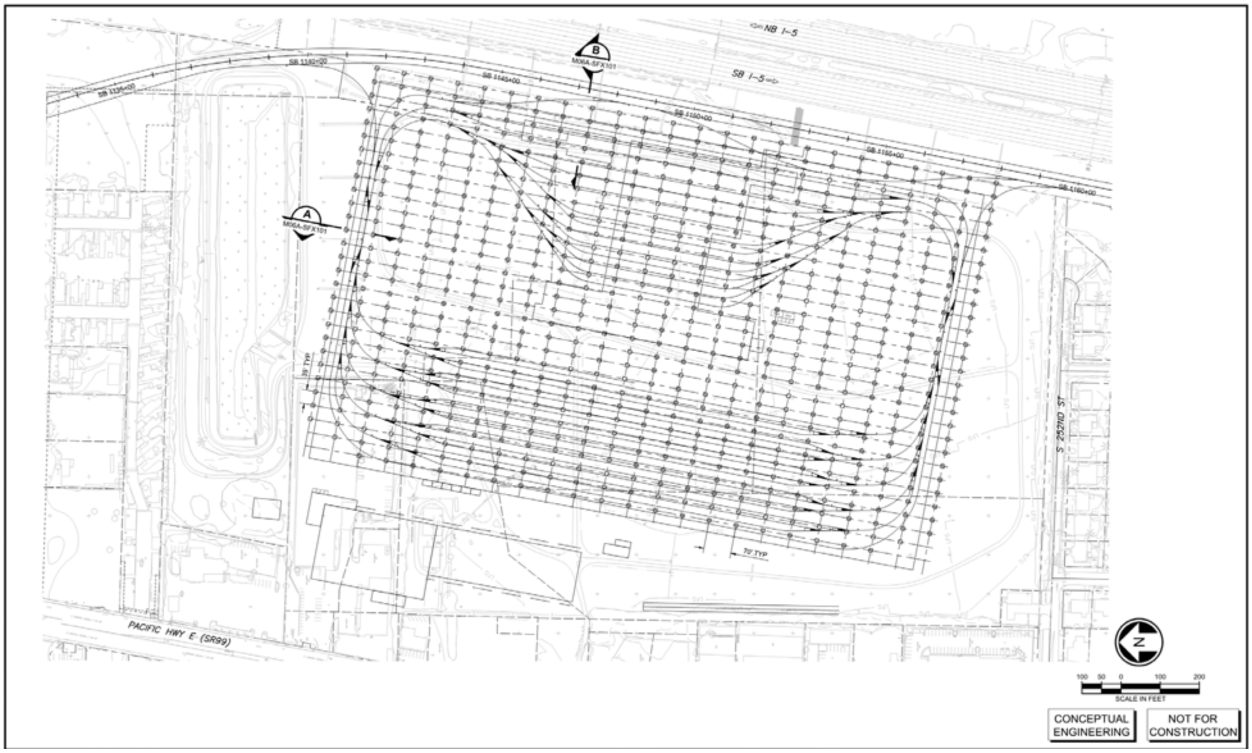


Figure 2-4. Low Platform Shaft Layout

The shafts are enclosed in steel casings due to the composition of the landfill material, as evaluated from the geotechnical boring samples performed for the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e). The grid spacing has changed from the previous 100-foot by 100-foot grid assumed during the landfill optimization process. The refined spacing was a result of advancing the OMF South design estimates for facility loads and landfill characteristics. The slab on top of the shaft was designed using WSDOT standard precast prestressed void slabs, with approximate 6-inch-thick cast-in-place concrete on top of the void slabs, to optimize the design as well as to accommodate underground utilities and drainage. The change in shaft and slab quantity is a result of design progression.

Shaft installation generally consists of excavation, placing a reinforcement cage, and pouring concrete that is embedded through the landfill and into native, competent material. Average shaft lengths range between approximate 130 feet and 180 feet from finished grade depending on the location within the landfill and associated depth to competent material. It is assumed each shaft will require 4 days for installation.

The Hybrid 2 option consists of the same shaft and slab design below buildings (approximately 105 shafts) as the Low Platform option and a cast-in-place reinforced concrete waffle plate slab structure for the track area. The Hybrid 2 shaft layout is shown in Figure 2-5. The top slab in the track yard is 1 foot thick with webs below the slab. The cross section of each web is 18 inches wide and 30 inches tall. Slab and shaft concepts are shown in Figure 2-6. The waffle plate slab structure is casted directly on the compacted soil foundation without shafts and supports the entire operation and maintenance yard, except the buildings are supported on shaft foundations.

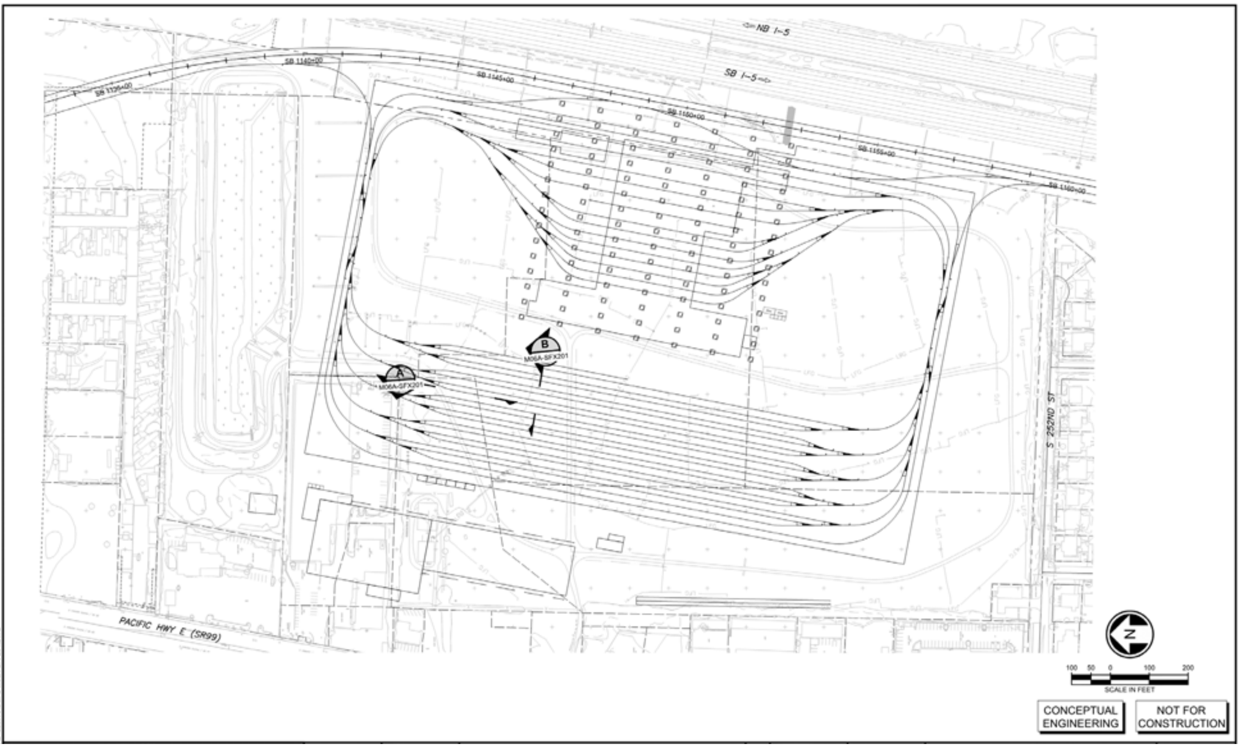

NB I-5
SB I-5
SB 1135+00
SB 1140+00
SB 1145+00
SB 1150+00
SB 1155+00
SB 1160+00
A
M06A-SFX201
B
M06A-SFX201
S 252ND ST
PACIFIC HWY E (SR99)
N
100 50 0 100 200
SCALE IN FEET
CONCEPTUAL ENGINEERING
NOT FOR CONSTRUCTION

Figure 2-5. Hybrid 2 Shaft Layout

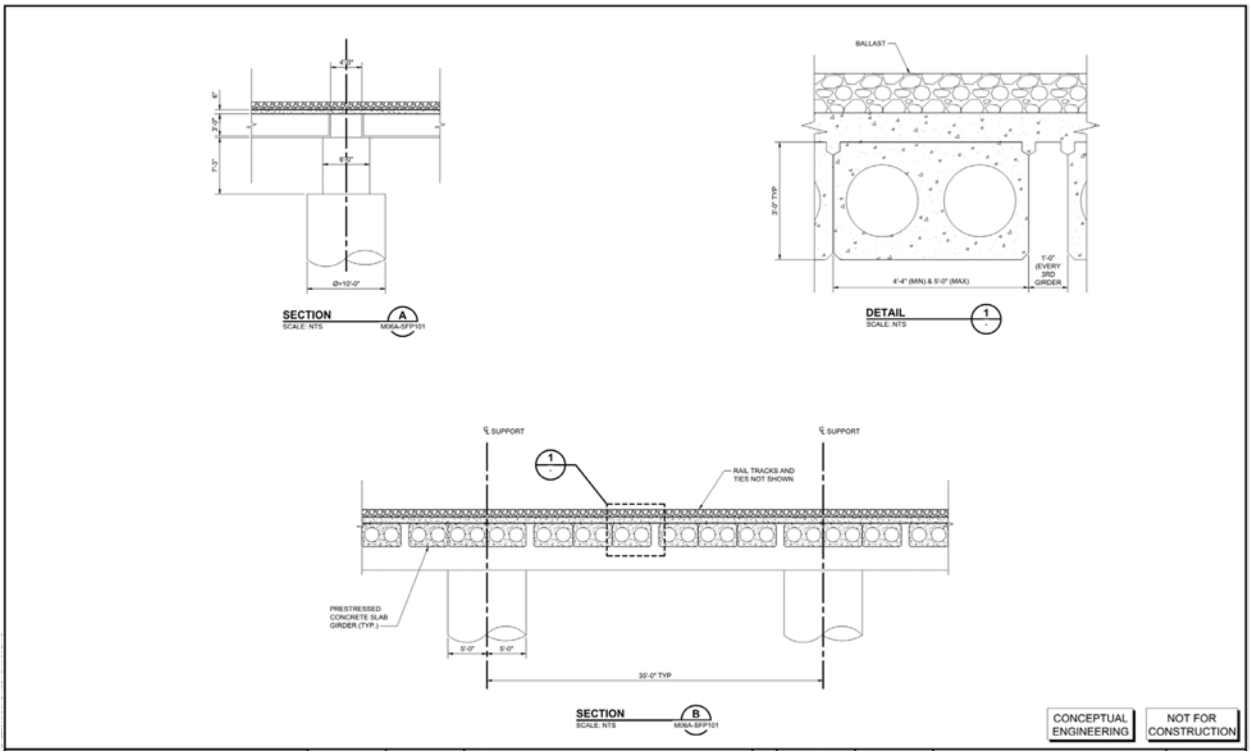

4'-0"
6"
3'-0"
7'-3"
6'-0"
Ø=10'-0"
SECTION
SCALE: NTS
A
M06A-SFP101
BALLAST
3'-0" TYP
4'-4" (MIN) & 5'-0" (MAX)
1'-0" (EVERY 3RD GIRDER
DETAIL
SCALE: NTS
1
℄ SUPPORT
℄ SUPPORT
1
RAIL TRACKS AND TIES NOT SHOWN
PRESTRESSED CONCRETE SLAB GIRDER (TYP.)
5'-0"
5'-0"
35'-0" TYP
SECTION
SCALE: NTS
B
M06A-SFP101
CONCEPTUAL ENGINEERING
NOT FOR CONSTRUCTION

Figure 2-6. Slab and Shaft Concepts

Shaft and slab installation are assumed to occur in coordination with the earthwork process, with similar material hauling hours and work season. The work will be phased in with the earthwork, with shafts installed in exposed refuse areas prior to landfill cap installation and clean backfill. Shafts through refuse will need to be booted (watertight and airtight connection of the landfill cap geomembrane to the shaft) through the replacement landfill cap to create a sealed system. Slab installation should be permitted to occur during the wet season, since this work will be performed in a completed landfill capped area without exposed refuse. Drilled shaft installation may be permitted during the wet season based on a small and controllable work area pertaining to the individual shafts.

Refuse exhumed during drilling has been included in the earthwork quantities. The drilling process is assumed to be prohibitive to material screening and reuse of the exhumed material, requiring export for disposal. Concrete import is accounted for as an import quantity associated with the shafts and slabs.

Though Hybrid 2 includes drilled shafts under the building, these shafts would likely be removed from the design in favor of localized over excavation to competent soils below the building. The Midway Landfill Site Engineering Optimization Report (Sound Transit 2019b) assumed that a 40-foot thickness of refuse could remain in-place with deep dynamic compaction while still achieving the settlement tolerance required for the OMF South. The recent OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e) indicates that the thickness of refuse left in-place would need to be a maximum of 6 feet, as shown in Figure 2-2, still requiring deep dynamic compaction. The smaller quantity of refuse likely warrants its removal rather than the installation of full-length drilled shafts. Removing the refuse will reduce project costs and avoid introducing shaft installation activities to the construction. Leaving the 6 feet of refuse in place with deep dynamic compaction is also not an option below buildings due to the more stringent settlement criteria.

2.6.2.3 Environment Considerations during Construction

As stated above, wet season construction is assumed to be prohibited during landfill preparation due to the greater potential to generate contaminated groundwater through penetrations through the existing landfill cap. This restriction results in a May 1 to September 30 work window each year for contaminated earthwork activities. Other earthwork activities performed within the wet season, if conducted, would likely result in low productivity and efficiencies due to limitations in the workability of the material and inclement weather shutdowns.

In general, the exposed refuse area of the work site is assumed to be limited to 5 acres in size. A specific allowable exposed refuse area size has yet to be established with the regulators. The 5-acre area was assumed as a reasonable size to perform work while managing environmental protection and preservation of the landfill environmental controls. It is assumed that a construction contractor will be able to secure (cover refuse and manage stormwater) a 5-acre exposed area at the end of each day and in anticipation of inclement weather. The construction contractor will also need to control dust on dry and windy days. Precipitation and surface water run-on will need to be managed in the exposed refuse area to avoid water contamination and infiltration into the landfill that could result in further contamination of groundwater. Water collected within the open refuse area will need to be hauled off site and disposed of as wastewater. It is assumed that some inclement weather will occur during dry season construction, which will increase the schedule duration by 5 percent.

It is also assumed that a 5-acre open refuse area can be managed without negatively impacting the active LFG system at the landfill. The LFG collection and conveyance system will be required to remain active during construction to prevent off-site migration of LFG. During the construction, the LFG system will need to be continuously reconfigured to maintain effectiveness. Portions of the system will need to be demolished and replaced as the work progresses through the site. Additionally, the system will need to be managed to prevent air intrusion from the open refuse area that could contribute to a landfill fire.

The application of a 5-acre open refuse area limitation will be more manageable for the Low Platform option based on the maximum refuse excavation and fill depth of approximately 15 feet, allowing that option to utilize the entire 5-arce area for work activities. The Hybrid 2 and Full Excavation options have significant excavation depth requirements of up to and in excess of 110 feet. If the horizontal footprint of the open refuse area is limited to 5 acres, the available work area within the excavation, or excavation floor, will be reduced in size based on depth and the space consumed by the side slopes required for a stable excavation. Side slopes are assumed to range from 1:1 (horizontal to vertical) to 2:1. To maintain an effective work area size for these two options, it is likely that the excavation within thick refuse will need to progress in lifts (i.e., 30 feet deep), progressively excavating the entire landfill surface down one lift at a time. Excavation in lifts would still require the 5-acre open refuse area limitation, which could be achieved through the installation of a temporary landfill cap phased behind the progressing lift excavation.

If material screening will take place for on-site reuse of contaminated, competent backfill material, 5 acres may not be an adequate exposed refuse work area to accommodate continuous excavation, vehicle loading, screening, stockpiling, and backfill of material. The depth of excavation and layback of slopes will also factor into area requirements. It may be possible to use a non-open refuse area on the site for material processing and handling; however, the area would have to be set up to manage the contamination and protect clean areas.

If more than 5 acres of open refuse area is allowed, concurrent construction activities will have more available space; however, work progression may not directly result in a decrease in schedule requirements. If the rate of onsite excavation can increase, available trucking and road capacity and the capacity of the export receiving facility may then become limiting factors, as discussed in Sections 2.6.2.4 and 2.6.3.

Note that reuse of the screened material on site will be subject to regulatory approval. Environmental regulators may require any exhumed refuse to be disposed of at a permitted facility meeting current standards without the option to reuse on site. The FWLE project has been allowed to reuse refuse material on site; however, the quality of that material is better understood, and the scale of that work is significantly smaller than that proposed for OMF South.

The hauling of contaminated material will be in fully enclosed intermodal containers. If material is determined to be hazardous, hauling requirements will need to be verified based on the material.

Vehicles and equipment driving through a contaminated area will likely need to cross a wheel wash as they exit the area to clean the tires and avoid tracking contaminated material elsewhere on site and off site.

Each of the three options will result in refuse retained on site, which will require the preservation, or reinstallation, of a permanent landfill cap system, LFG system, and groundwater monitoring system. The Full Excavation approach may be able to remove

LFG-generating material through screening; however, contaminated soil may still result in contaminated soil vapor that will need management.

2.6.2.4 Disposal Considerations

Excavated material exported from the landfill will require disposal at a regulated facility, assumed to be a Subtitle D landfill in accordance with the Resource Conservation and Recovery Act (RCRA). The material testing performed during the development of the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e) indicated that the primary contaminants in the refuse material sampled are petroleum hydrocarbons and that, in general, there were no chemicals present at concentrations posing significant exposure threats. However, there were some chemical concentrations that slightly exceeded MTCA Method A levels. The age of the landfill, and possible less stringent acceptance criteria, presents a risk that there will be material quantities classified as hazardous requiring disposal at a more expensive Subtitle C landfill; however, since the facility was operated as an MSW landfill, it is assumed that the majority of material encountered will be accepted at a currently permitted MSW Subtitle D landfill.

Within the Pacific Northwest, it is expected that three solid waste firms have the available landfill capacity for the disposal of the material quantities required, specifically for the Hybrid 2 and Full Excavation options. Export disposal quantities are discussed in Section 2.6.2.7. With material reuse on site, the Hybrid 2 and Full Excavation options will require 2.6 million and 3 million tons of disposal export, respectively.

The firms are Republic Services, Waste Management, and Waste Connections. The three firms each operate a regional Subtitle D landfill that is accessible by rail. Table 2-2 is based on the King County 2019 Comprehensive Solid Waste Management Plan (King County Solid Waste Division 2019) and provides information on each landfill.

TABLE 2-2
Regional Disposal Capacity

Landfill	Location	Owner	Permitted Capacity (tons)	Remaining Capacity (tons, 2016)
Roosevelt Regional Landfill	Klickitat County, WA	Republic Services	244,600,000	120,000,000
Columbia Ridge Landfill and Recycling Center	Gilliam County, OR	Waste Management	345,275,000	329,000,000
Finley Buttes Regional Landfill	Morrow County, OR	Waste Connections	158,9000,000	131,000,000

The travel distance to these landfills warrants container shipment by rail. Trucks leaving the Midway Landfill will need to go to an intermodal facility for container offload onto trains. At the facility, the trucks will be reloaded with empty containers.

A number of intermodal facilities exist in the Seattle area that are owned by either a solid waste firm or a railroad. The two primary railroads are Burlington Northern Santa Fe Railroad (BNSF) and Union Pacific Railroad (UP).

Based on the hauling scenario discussed in Section 2.6.2.6, the intermodal facility is expected to handle an export truck arriving every 2.5 minutes on average. It is assumed that one or multiple existing intermodal facilities in South Seattle will be able to accommodate the exported quantities from the Midway Landfill. This may or may not be possible for the Hybrid 2 and Full Excavation options considering the large quantity and schedule requirements, and a project-specific intermodal facility may be required or, at a minimum, an existing facility may require expansion. It is also assumed that the rail service provider can meet the train capacity requirements.

Based on an intermodal facility located in Seattle, the travel distance will be 20 miles one way, requiring an assumed 40 minutes each direction. The queue, unload, and load time required at the intermodal facility is assumed to be 10 minutes.

Weighing of containers is assumed to occur at the intermodal facility or disposal landfill.

It is expected that the export disposal will be contracted through the construction contractor, with the solid waste firm as a subcontractor. The railroad component is expected to be a second-tier subcontractor through the solid waste firm. Due to the complexity of the solid waste handling and disposal component of the project, including the potential intermodal facility construct aspect, the bidding for this service under all the options is expected to require at least 6 months.

2.6.2.5 Construction Phasing and Material Reuse

As discussed in Section 2.6.2.3, construction phasing will be required to maintain the environmental controls at the landfill. A limited portion of the landfill will be allowed to be exposed at one time. Within this exposed refuse area, a number of activities are expected to occur simultaneously, depending on the construction approach, with each activity in sequence after the preceding activity and the preceding activity moving on to the next area. The exposed refuse area would be able to advance once the landfill cap, temporary or permanent, is reinstalled in the previous work area. Activities may include different combinations of the following.

1. Disassembly/removal and temporary reinstallation of the LFG system
2. Removal of the landfill cap system
3. Excavation of refuse material
4. Screening of refuse material
5. Export of screened unsuitable material

6. Dynamic compaction of the subgrade (if applicable)
7. Mixing, placement, and compaction of screened competent reuse material
8. Drilled shaft installation (if applicable)
9. Import and installation of competent material
10. Installation of permanent landfill cap system and LFG system
11. Slab installation (if applicable)

The assumed 5-acre open refuse area will be very limiting for the space demands and to maintain efficiencies. Phasing will be further complicated with greater excavation depth requirements and the space consumption from layback slopes. There may be some relief if the area can be increased and truck load-out and screening can be performed outside the open refuse area; however, this will create additional contamination areas to manage.

The phased nature of the work allows the construction contractor to be able to respond to changed conditions by moving to another portion of the site, as needed, without greatly impacting schedule. This also provides the opportunity to effectively plan and execute preparatory and sequential work.

Also, the landfill preparation work can be performed concurrently with portions of the OMF South building and track construction. The OMF South building and track construction can begin in areas that have achieved final grade or completion of the slab work. Phasing of OMF South construction will be dependent on the excavation and backfill approach (i.e., excavation in lifts). While it’s too early in the project to get into detailed construction phase planning, those plans will be required by regulatory agencies prior to approval of ground disturbing work.

2.6.2.6 Truck Trips – Export and Import

Disposal Export

Excavated material for export off site is assumed to be loaded into 20-foot intermodal containers on waiting trucks. The intermodal containers will be limited to a capacity of 30 tons due to roadway load restrictions set by local agencies and WSDOT. The containers will be transported off site for direct load onto railcars at an intermodal facility.

The 5-acre open refuse area is assumed to be able to accommodate four active truck load-out locations, with an on-site load time of 10 minutes each. The number of load-out stations will depend on construction contractor means and methods to perform the work. Four stations were assumed as a possible number based on space limitations and competing work activities.

Based on the discussion of intermodal facilities, total round-trip time for a truck will be 100 minutes. Each load station at the Midway Landfill will be able to accommodate up to 10 circulating trucks, for a total of 40 export trucks operating during peak time.

Based on a 12-hour workday, each truck is assumed to make seven trips per day. At 40 operating trucks, this equates to 280 truck trips per day. This is an approximate value that does not account for irregularity at the beginning and end of the day.

Disposal export quantity estimates are shown in Table 2-3 in Section 2.6.2.7.

Soil Import

Importing soil for backfill will need to be performed separately from the export operation for excavated refuse. There is not expected to be an opportunity to gain efficiency from export trucks returning to the site with imported soil. The export trucks will use intermodal containers. The intermodal containers are used for transfer to and from the trains and are not suited for dumping import soil on site if the containers were loaded with clean import soil on the return trip. Import trucks will need to be dump trucks with trailers with an assumed capacity of 20 cy. Import material is assumed to arrive in a loose density equivalent to 130 percent of the volume of in-place fill.

The total round-trip time for import trucks is assumed to be 100 minutes. This assumption is based on a hypothetical material supply location in Maple Valley, Washington. When on site, trucks will dump either in the fill area or at a stockpile location.

The demand for import material will be reduced based on assumptions pertaining to excavation screening and reusable material and a lower final site elevation than the existing condition. The total amount of import trucks is assumed to be equally distributed throughout the export duration.

Soil import quantity estimates are shown in Table 2-3 in Section 2.6.2.7.

Concrete Import

Concrete import for shafts and slabs is assumed to arrive in 9 cy truckloads. The import is assumed to be equally distributed throughout the shaft and slab installation period. Concrete will be locally sourced from an unknown location and is expected to be imported following the same site-access requirements as other import and export operations.

Concrete import quantity estimates are shown in Table 2-3 in Section 2.6.2.7.

2.6.2.7 Results

The assumptions discussed above are summarized below.

Assumptions:

1. Average in-place refuse density is 75 lb/cf, or 1.01 ton/cy.
2. Average export density is 51.5 lb/cf, or 0.70 ton/cy, minimum.
3. 40 percent by volume reusable excavated material.
4. Average import soil density ratio is 1.3 in-place/loose.

5. Active excavation is 12 hr/day, 6 day/wk, 22 weeks per year (wk/yr).
6. Exposed refuse area is 5 acres.
7. Inclement weather will increase the project duration by 5 percent.
8. A 5-acre area can load four export trucks at a time.
9. Each export truck is on site for 10 minutes.
10. Export truck travel distance is 20 miles each way.
11. Export truck trip time each direction is 40 minutes.
12. Export truck time at the off-site facility is 10 minutes.
13. Total export truck trip time is 100 minutes per load.
14. Circulating export trucks operating per load area is 10.
15. Total export trucks operating is 40.
16. Export trips per day per truck is seven.
17. Export truck trips per day is 280.
18. Export truck capacity is 30 tons
19. Soil import truck capacity is 20 cy.
20. Concrete import truck capacity is 9 cy.

Applying these assumptions and the quantities developed during the 10% design to the three landfill subsurface construction design options results in the landfill preparation requirements summarized in Table 2-3 and Table 2-4.

TABLE 2-3
Landfill Preparation Material Requirements

Construction Design Option	In-Place Excavation (cy)	Excavation (ton)	Material Export (ton)	In-Place Fill (cy)	In-Place Reuse (cy)	In-Place Import (cy)	Concrete Import (cy)
Low Platform	1,010,000	1,023,000	678,000	340,000	340,000	0	531,000
Hybrid 2	4,270,000	4,323,000	2,592,000	2,890,000	1,710,000	1,180,000	165,000
Full Excavation	4,870,000	4,931,000	2,956,500	3,510,000	1,950,000	1,560,000	0

The in-place excavation volume was converted to excavation tonnage to be consistent with the industry approach to material export and disposal. In-place volume remains applicable to the assessment for import materials. The in-place reuse volume directly applies reuse at 40 percent of the in-place excavation volume and does not account for volume differences between screened reuse and export material.

TABLE 2-4
Landfill Preparation Daily Hauling Requirements

Construction Design Option	Export Truck Trips per Day	Soil Import Truck Trips per Day	Concrete Import Truck Trips per Day	Total Truck Trips per Day
Low Platform	20	0	51	71
Hybrid 2	280	237	47	564
Full Excavation	280	274	0	554

Concrete import truck trips are equally dispersed over the general schedule durations for shaft and slab installation. Export and soil import truck trips for the Low Platform option are also dispersed over the general schedule durations for shaft and slab installation. Export and soil import truck trips for the Hybrid 2 and Full Excavation options have been equally dispersed over the assumed landfill preparation period, dry season hauling only.

Truck trips include only bulk earthwork and concrete. Other vehicle trips (i.e., landfill closure system materials and concrete reinforcement) have not been evaluated. Complete construction traffic will be evaluated as part of the Draft Environmental Impact Statement.

2.6.3 Traffic Analysis

2.6.3.1 Truck Haul Routes

Access to and from the site for inbound and outbound trucks is assumed to be via right turns. No left turns into or out of the site are assumed. Left turns would increase the likelihood of on-site or off-site queueing of vehicles, causing congestion. Outbound trucks exiting the site would travel north on SR 99 and access I-5 via Kent-Des Moines Road (SR 516). Inbound trucks would travel on I-5, exiting at S 272nd Street. The inbound trucks would travel westbound on S 272nd Street to SR 99, where they would turn north and travel to the site. Excavation export is assumed to be to the north to reach an intermodal facility. Trucks importing material would follow the same routes in the vicinity of the site, although the origin for import concrete and soil material is unknown.

Assumed construction haul routes to the north are shown on Figure 2-4. Actual traffic routes will need to be established for the construction through coordination with the local jurisdiction permit process.

2.6.3.2 Level of Service Considerations

Trucks would traverse the haul routes during the entirety of the assumed 12-hour daily hauling period, including both directions during AM and PM peak. As described in Section 2.6.2.6, the maximum number of export trucks operating at the site is 40, each performing 7 round trips per day, for a total of 280 daily truck trips. With 280 truck trips during the daily construction period, the average number of truck trips per hour is 23-24. Trucks are assumed to be accessing the site at uniform intervals throughout the daily hauling period, with some potential for irregularity or bunching at the beginning and end of the day. Import trucks for the Hybrid 2 and Full Excavation options represent truck trips similar to the maximum assumed export truck trips. Given that the daily truck trip volume is estimated to increase by about 284 and 274 trips per day to facilitate importing material for the Hybrid 2 and Full Excavation options, respectively, it is estimated that 24 additional trucks would be operating at the site each hour, for a total of about 48 truck trips per hour. The Low Platform construction option includes import of concrete but would require fewer truck trips than the other two options. The Low Platform option would have a total of approximately 6 trucks per hour.

Given their size and slower operating speeds, trucks were assigned a passenger car equivalency (PCE) value of 2.5 for this evaluation. Additionally, each round trip includes an outbound and inbound segment, resulting in a total of 700 PCE daily trips in the study area associated with export activity (280 truck trips x 2.5 PCE) for the Hybrid 2 and Full Excavation options. Import activity for the Hybrid 2 option would be worst case and result in approximately 710 PCE daily trips in the study area (284 truck trips x 2.5 PCE).

To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the day and are based on the ability of the yard and the receiving facility to process the trucks. These assumptions are outlined in Section 2.6 of this plan. The 2.5 PCE factor is applied to the truck volume to give planners information about the number of new trips that would need to be accommodated along the truck routes. Below, Table 2-5 outlines the number of peak hour trucks and associated PCEs for each construction scenario.

TABLE 2-5

Passenger Car Equivalency for Each Approach

Construction Design Option	Daily			Hourly			Hourly PCE		
	Export	Import	Total	Export	Import	Total	Export	Import	Total
Low Platform	20	51	71	2	5	7	5	13	18
Hybrid 2	280	284	564	24	24	48	60	60	120
Full Excavation	280	274	554	24	24	48	60	60	120

The PCEs shown in the table would be the same for exiting and entering the site during the peak hour. The highest-impact approach would be the Hybrid 2 and Full Excavation options, with 120 PCE.

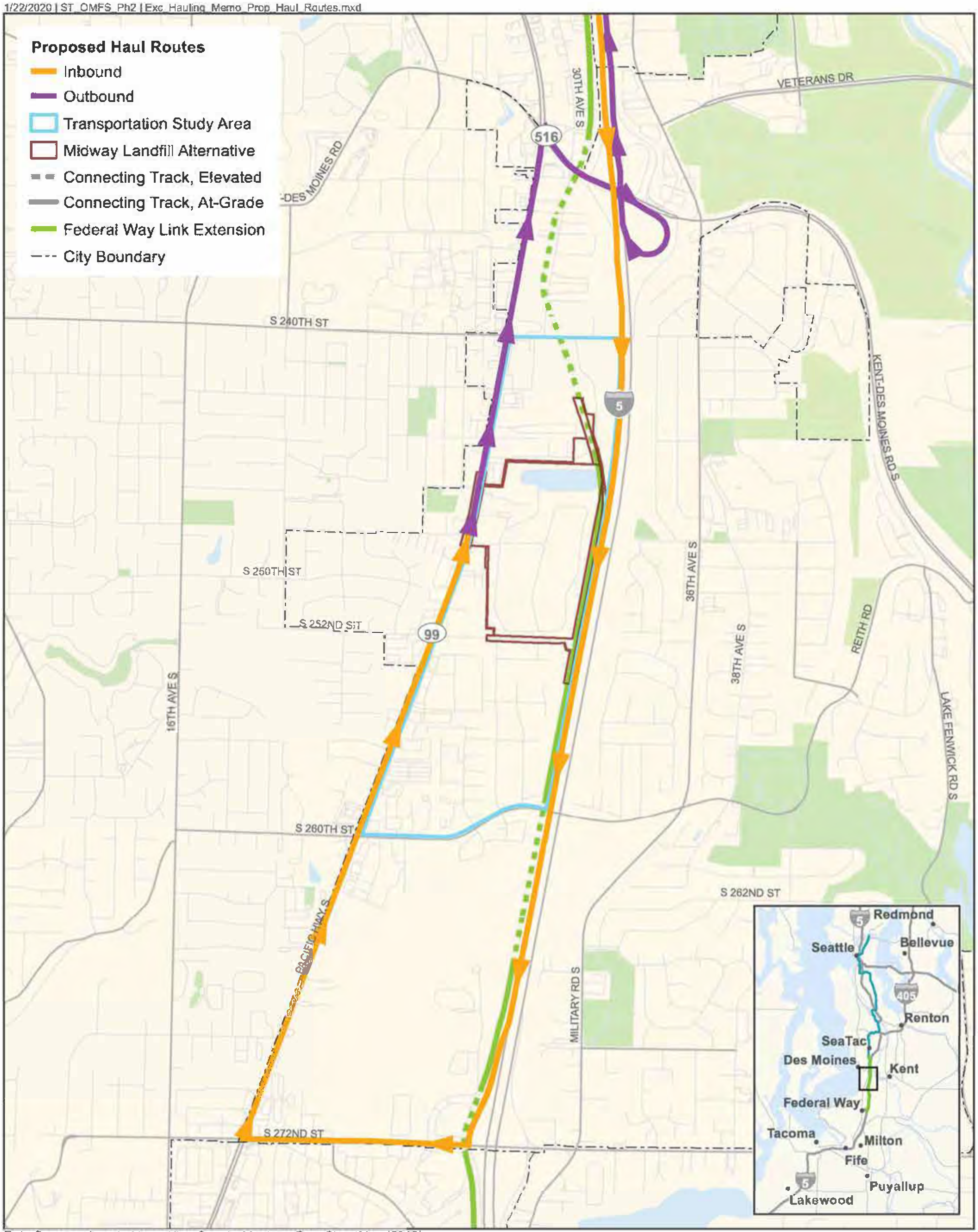
As shown in Figures 2-5 and 2-6, Google Maps (January 2020) reports almost all sections of the haul routes operate at “good” or “fair” conditions during both peak periods (typical traffic on Wednesdays at 7 a.m. and 5 p.m. was used to represent the AM and PM peak periods, respectively). The exceptions are northbound SR 99 approaching Kent-Des Moines Road during the 8 a.m. time period and the eastbound segment of Kent-Des Moines Road at the northbound

I-5 on-ramp, which operate at “poor” conditions during the AM peak period, as does the I-5 mainline. If 120 additional PCE vehicles of either the Hybrid 2 or Full Excavation options join the backup congestion on the I-5 northbound ramp during peak hours, congestion on Kent-Des Moines Road and possibly SR 99 would likely occur. Some example strategies to reduce impacts to local traffic could include using multiple routes, limiting truck activity during the peak traffic hours, and changing the end point location to be south.

If one or more end point hauling locations can be to the south, traffic impacts could be reduced through provision of direct access to I-5 southbound from the site. A potential haul route may be able to be developed north of the existing stormwater pond, which would allow for site access under the elevated FWLE guideway and to I-5. Access would also be subject to WSDOT and FHWA approval.

Given the good or fair operating conditions for other segments of the haul routes, it is assumed that the additional 120 hourly PCE trips for each route would not result in significant degradation to the operating conditions in these areas.

Trucks would enter and exit the site via SR 99. When trucks exit the facility and merge into traffic on SR 99, they would operate at slower speeds due to heavy loads. Returning trucks would also slow down to make the turn into the facility, causing minor delays. In order to reduce potential impacts to mainline traffic on SR 99 at the access point, a short acceleration lane could be constructed to accommodate outbound trucks and a short deceleration lane could be constructed to accommodate inbound trucks.


Proposed Haul Routes
Inbound
Outbound
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
VETERANS DR
30TH AVE S
516
KENT-DES MOINES RD
S 240TH ST
5
KENT-DES MOINES RD S
S 250TH ST
S 252ND ST
99
36TH AVE S
38TH AVE S
REITH RD
16TH AVE S
LAKE FENWICK RD S
S 260TH ST
S 262ND ST
PACIFIC HWY S
MILITARY RD S
S 272ND ST
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

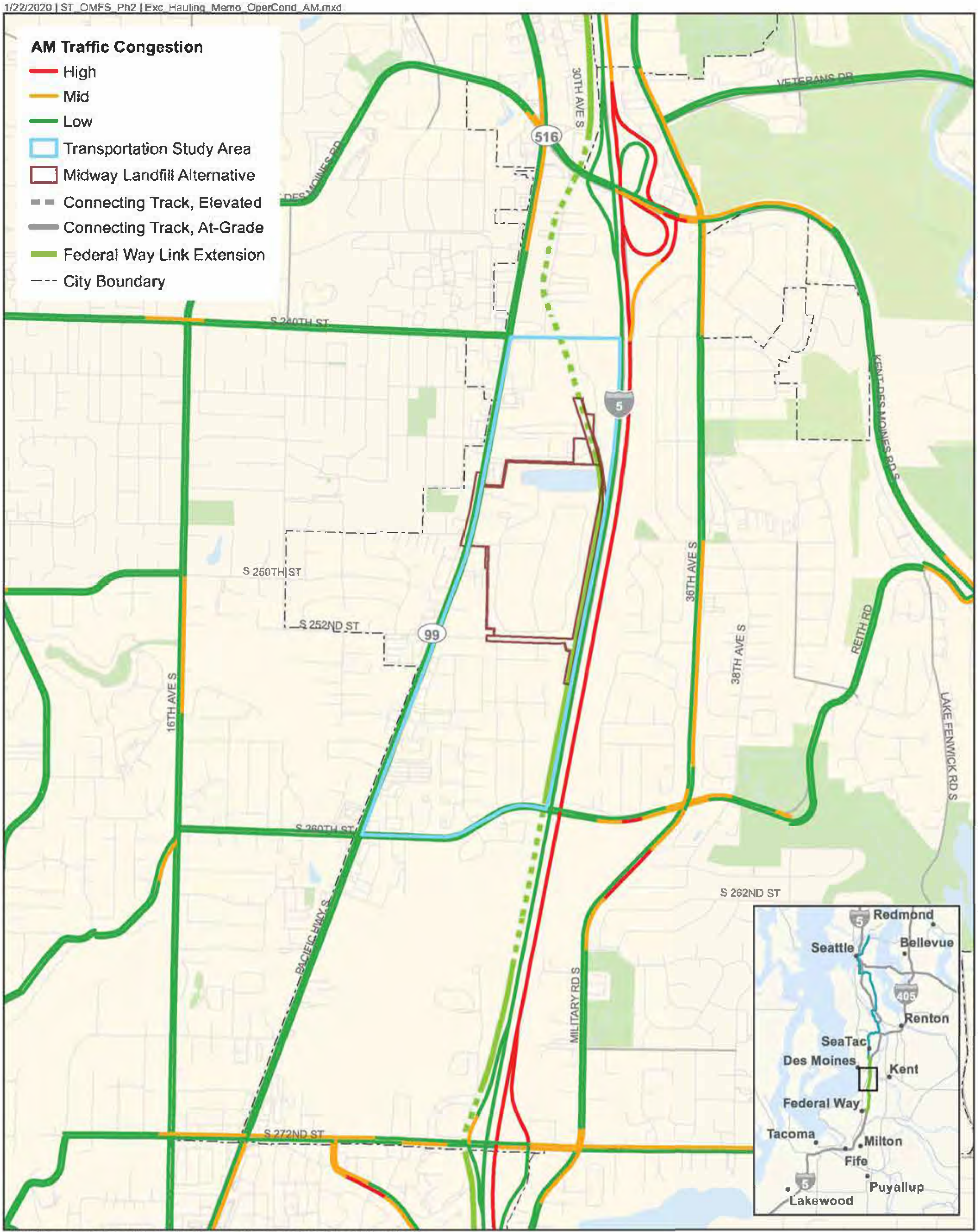
Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

FIGURE 2-7
Proposed Haul Routes
Midway Landfill Alternative

OMF South

N
0
0.25
0.5 Miles

1/22/2020 | ST_OMFS_Ph2 | Exc_Hauling_Memo_OperCond_AM.mxd


AM Traffic Congestion
🟥 High
🟧 Mid
🟩 Low
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
VETERANS DR
30TH AVE S
516
DES MOINES RD
S 240TH ST
5
KENT DES MOINES RD S
S 250TH ST
S 252ND ST
99
36TH AVE S
38TH AVE S
REITH RD
LAKE FENWICK RD S
16TH AVE S
S 260TH ST
S 262ND ST
PACIFIC HWY S
MILITARY RD S
S 272ND ST
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

FIGURE 2-8
AM Operating Conditions
Midway Landfill Alternative

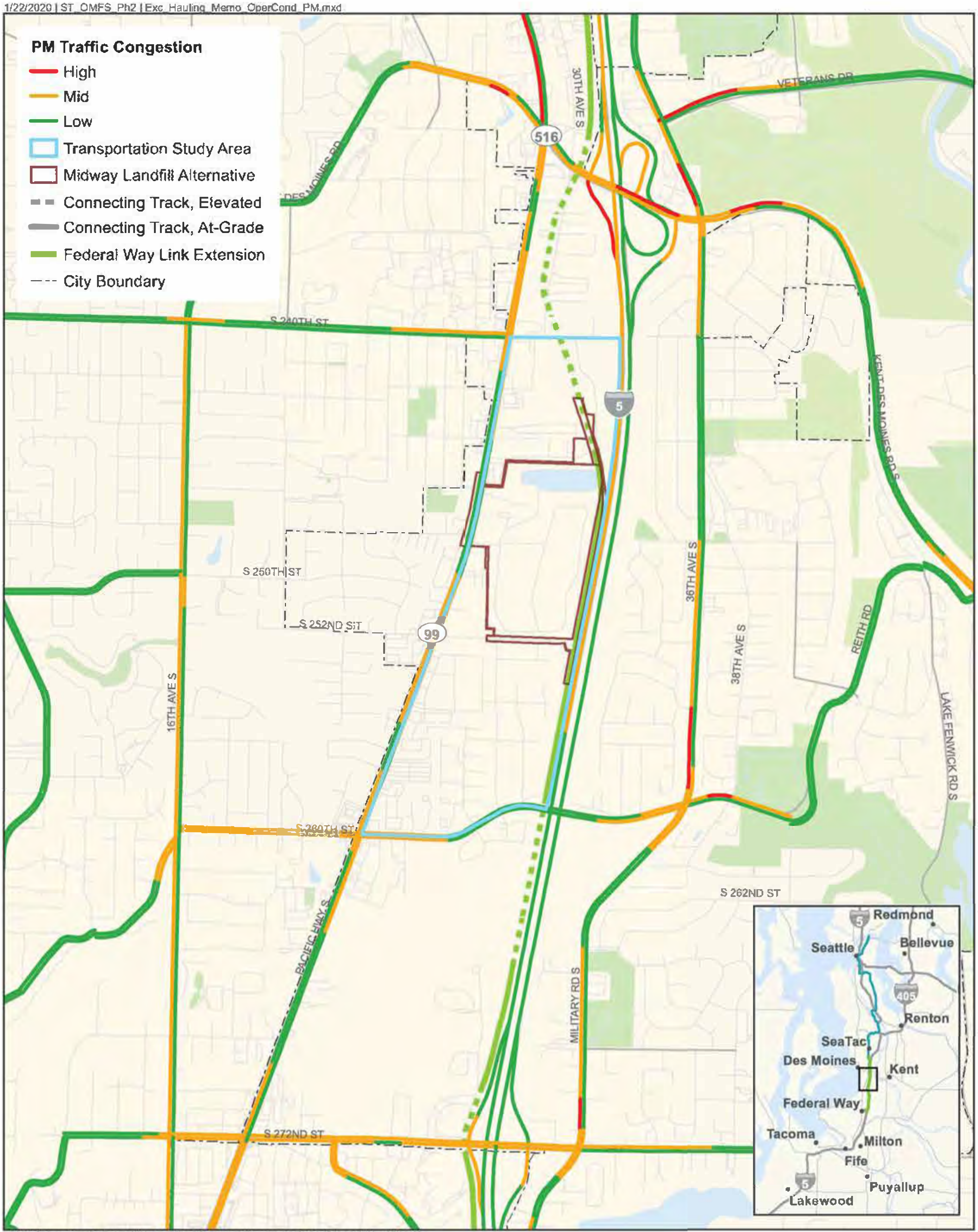
OMF South

N

0 0.25 0.5 Miles

Internal document for the purposes of informing the design and construction approach for the Midway Landfill Alternative

1/22/2020 | ST_OMFS_Ph2 | Exc_Hauling_Memo_OperCond_PM.mxd


PM Traffic Congestion
High
Mid
Low
Transportation Study Area
Midway Landfill Alternative
Connecting Track, Elevated
Connecting Track, At-Grade
Federal Way Link Extension
City Boundary
30TH AVE S
516
VETERANS DR
DES MOINES RD
S 240TH ST
5
KENT DES MOINES RD S
38TH AVE S
S 250TH ST
S 252ND ST
99
38TH AVE S
REITH RD
LAKE FENWICK RD S
16TH AVE S
S 260TH ST
S 262ND ST
PACIFIC HWY S
MILITARY RD S
S 272ND ST
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood
N
0
0.25
0.5 Miles

Data Sources: Google Maps, King County, Mapbox, OpenStreetMap (2019).

FIGURE 2-9
PM Operating Conditions
Midway Landfill Alternative

OMF South

Internal document for the purposes of informing the design and construction approach for the Midway Landfill Alternative

2.6.4 Compatibility with the Known Status of FWLE Construction

If constructed at Midway Landfill, OMF South will connect to the mainline of the FWLE. The current FWLE mainline design is not at an elevation and grade to allow direct connections to the proposed OMF South lead tracks. The three OMF South Midway Landfill design options have been developed, with the yard at elevations 365 feet (Hybrid 2 and Full Excavation) and 380 feet (Low Platform). The FWLE will follow the general grade of I-5, while OMF South will be flat.

There are currently five proposed track connections between the FWLE and OMF South. To minimize the extent of mainline modification, a third track is proposed running alongside the mainline at an elevation closer to the selected OMF South elevation for compatibility with the yard-connecting tracks. The third track would have a connection to the mainline at the north and south ends only. The connection track would have No. 10 turnouts and be designed for 25 miles per hour. The connecting tracks and yard lead tracks would require a design variance for all vertical curve lengths. There are independent vertical track designs for the two OMF South elevation options.

Based on the current FWLE mainline design, irrespective of the construction option selected, the FWLE mainline will need to be modified to enable the connection of OMF South lead track turnouts at the required grade of 2 percent or less (Sound Transit 2018). The extent of mainline modification varies based on the OMF South site elevation, as shown in Table 2-6 below.

As of September 2020, FWLE project has accepted a change order to modify the profile to accommodate future lead track connections from OMF South at the landfill site that will meet the needs of either yard elevation of 365 feet or 380 feet.

TABLE 2-6
Track Summary

	Low Yard Elevation (365')	Medium Yard Elevation (380')
Northern Mainline Modifications*	Up to approximate 8' rise in elevated mainline over 3,200'.	Up to approximate 8' rise in elevated mainline over 3,200'.
Southern Mainline Modifications*	Up to approximate 10' lowering of at-grade mainline over 1,900'.	Up to approximate 5' lowering of at-grade mainline over 1,900'. Potential to avoid southern mainline modifications through further optimization.
Connecting/Third Track**	At-grade connecting track. Steep grades (~6%) and significant cut toward south end. Vertical curve length design variance required.	At-grade connecting track. Moderate grades. Vertical curve length design variance required.
Lead Tracks	At-grade lead tracks. North lead track has steep grades (~6%). Vertical curve length design variance required.	At-grade lead tracks. Moderate grades. Vertical curve length design variance required.
Constructability	More complex. Requires deep cut of existing landfill.	Least complex.
Cost	$$$$	$$$
Schedule	Potential longer duration.	Medium duration.

2.6.5 Potential Long-Term Settlement

The three subsurface construction design options to redevelop the Midway Landfill as OMF South will have different performance implications pertaining to potential future settlement. Without modification to the existing landfill, site settlement will have a significant negative impact on OMF South operation due to facility tolerances. The settlement design criteria for the OMF South evaluation is a maximum differential settlement of 0.75 inches over 100 feet and a maximum total settlement of 1 inch over a 50-year period. Settlement is considered over the long-term as major structural facilities for Link are to be designed for a 100-year design life, and buildings (including the OMF) are designed for continued operation over a minimum design life of 50 years. Each design option has been evaluated to determine the ability to meet this criteria which is consistent with the WSDOT Geotechnical Design Manual.

Landfilled material will continue to consolidate over time due to the compressive nature of the material, overburden weight, and biodegradation of the material. Settlement will likely be differential, or uneven, throughout a landfill as a result of variable refuse thickness and heterogeneous composition of the material. Without mitigation, settlement can negatively impact the integrity of building foundations, utilities, roadways, and trackways. The settlement evaluation provided by the OMFS Preliminary Geotechnical Recommendations (Sound Transit 2020e), estimates that the current landfill could have total settlements ranging from 1 to over 50 inches over the next 50 years.

The three options provide alternative designs to mitigate potential settlement as follows.

Low Platform: This option will be designed to support the OMF South buildings and track on a shaft-supported platform. The drilled shafts will be embedded in glacial soil encountered below the existing landfill. Long-term settlement impacts to the platform are not anticipated.

Hybrid 2: This option removes a majority of the landfill material, and the remaining portion of the landfill will be compacted with deep dynamic compaction ground improvement. The dynamic compaction ground improvement will reduce the compressibility of the remaining landfill material. To achieve the total and differential settlement design criteria, only 6 feet of compacted refuse will remain, which is a substantial change from the Midway Landfill Site Engineering Optimization Report (Sound Transit 2019b), which had a 40-foot refuse thickness remaining on site. The dynamic compaction of the remaining 6 feet of refuse material will compress the material and reduce post-construction total and differential settlement to achieve the design criteria. The competent backfill material placed and compacted over the remaining dynamically compacted refuse will reduce differential settlement experience at the ground surface, creating a more uniform settlement result. Buildings will be supported on shaft-supported platforms embedded in glacial soil consistent with the Low Platform option. The track will be supported on an on-grade concrete slab over the improved subgrade. The provision of an on-grade concrete slab in the yard areas will further mitigate differential impacts; however, impacts may become more pronounced at slab joints and interfaces.

Full Excavation: This option removes the degradable material from the refuse mass and backfills the OMF South subgrade with competent compacted granular material. Buildings and track will be supported by the backfilled subgrade. The option will eliminate settlement due to subgrade material degradation. Long-term settlements are not anticipated.

Based on the settlement tolerance guidance from Sound Transit, these three options to redevelop the Midway Landfill will be designed to meet the long-term maximum total and differential settlement design requirements.

3.0 Summary

This conceptual landfill site reuse plan is a high-level discussion of landfill preparation considerations pertaining to the potential redevelopment of the Midway Landfill as OMF South. The evaluation is presented as three possible subsurface construction design options to mitigate the landfill characteristics of the site.

- Low Platform – Low Structural Platform with Some Excavation
- Hybrid 2 – Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shaft)
- Full Excavation – Full Excavation and Backfill with Competent Soils

The three options were analyzed conceptually to inform decision-making as to whether redevelopment of the Midway Landfill is a viable option for OMF South and, if so, which subsurface construction option stands out as the preferred approach.

Sound Transit has identified four major risks that are unique to the Midway Landfill Alternative based on the site’s prior use as a disposal facility and classification as a Superfund site. These four risks are ground settlement, human health and safety, legal, and regulatory. Three of these risks (ground settlement, human health and safety, and regulatory) risks have been discussed and expanded upon in this plan to include risks to the cost and schedule for OMF South construction. Legal risks will be addressed under separate cover. The results are summarized below.

3.1 Ground Settlement

The conceptual design for each option has effectively mitigated the potential settlement risk; however, the Hybrid 2 option maintains more risk than the Low Platform and Full Excavation options. OMF South will be subject to the settlement of the remaining refuse associated with the Hybrid 2 option, and due to the irregular bottom surface of the landfill, there will be uncertainty as to whether the maximum refuse thickness has been achieved in all areas. Additionally, the small proportion of material to remain in place in comparison with the overall excavation quantity for Hybrid 2, and the required deep dynamic compaction to treat the material, likely does not provide a benefit that would outweigh the potential settlement risk.

The Low Platform and Full Excavation are preferred options to mitigate settlement.

3.2 Human Health and Safety

Human health and safety risk can be categorized as short-term and long-term. The short-term risk is related to OMF South construction, while the long-term risk would be for the operation of the facility into the foreseeable future.

The design of each option can effectively mitigate human health and safety risks; however, there are different risks associated with each option. The Low Platform option has the least short-term risk due to having the least amount of landfill disturbance in comparison with the other two options. The Low Platform option does have the most significant long-term risk because it leaves the largest amount of refuse material at the site and will continue to generate the most LFG.

The Hybrid 2 and Full Excavation options will handle and process significantly more refuse during construction than the Low Platform option, which increases the short-term risk associated with these two options to both construction workers and the public. The two options will have lower long-term risk due to having less contaminated material at the site and significantly less LFG generation potential. The Hybrid 2 option has the potential to generate more LFG than the Full Excavation option; however, the amount will likely be low.

3.3 Regulatory

The regulatory risks are similar for the three options. As identified above, there is a risk to the schedule based on the time required to get Ecology and/or EPA approval of the project relative to the ROD/CAP for the site, together with related agreements and permits, which is currently assumed to require 1 to 2 years.

The Hybrid 2 and Full Excavation options have greater short-term risks associated with construction and the regulatory uncertainties for refuse exposure, reuse, and work windows. The Low Platform option will have more long-term risk due to more ongoing cleanup management obligations throughout the life of the facility, and a greater risk to human health and the environment in the long-term due to the larger, unstable waste mass remaining in place.

3.4 Risks to Cost and Schedule

The high-level landfill preparation evaluation includes many unknowns that create risk that can significantly impact project cost and schedule. Some select items are discussed below.

- In-place material density is assumed to be 75 lb/cf. An increase in density will result in more truck trips based on a limit of 30 tons per truck trip and a longer export duration, increasing both schedule and cost. A decrease in density may require a larger container type to maintain the capacity of 30 tons per trip and would decrease the export duration, reducing schedule and cost. The Hybrid 2 and Full Excavation options are most at risk due to the large earthwork material quantities associated with these options.

- Material reuse is estimated at 40 percent. A decrease in reuse quantity will increase export and import requirements, increasing cost and extending the schedule. The opposite will occur for an increase in reusable material. The Hybrid 2 and Full Excavation options are most at risk due to the large earthwork material quantities associated with these options.
- Material export and disposal assumes a regulated Subtitle D landfill can accept the material. If a significant portion of the material is classified as hazardous requiring Subtitle C landfill disposal, costs will increase and disposal facility availability will become a concern. The Hybrid 2 and Full Excavation options are most at risk due to the large earthwork material quantities associated with these options.
- Intermodal facility availability for long-haul export of material is a risk. Available capacity has not been confirmed. Available capacity confirmed at this time may not be representative of when the facility is needed for OMF South construction. The facility may have access constraints based on disposal location and contractor negotiations. The location of the facility will impact haul routes, travel distances and times, and cost. If available capacity does not exist, intermodal facility development could become a project element, increasing cost and extending the schedule. The Hybrid 2 and Full Excavation options are most at risk due to the large earthwork material quantities associated with these options.

Detailed project costs and schedules will be addressed under separate cover.

3.5 Conclusions

Table 3-1 is based on the results of the landfill preparation evaluation and the summary of risks discussed in this section. The table content is relative among the three subsurface construction design options.

TABLE 3-1
Landfill Preparation Evaluation

Subsurface Construction Design Options	Settlement	Human Health and Safety	Regulatory	Cost (Landfill Preparation)	Schedule
Low Structural Platform with Some Excavation	Meets settlement criteria	Can effectively mitigate health and safety risks (with less short-term risk and more long-term risk)	More long-term regulatory risk associated with the waste mass remaining in place	Less risk due to design certainties	Less risk due to design certainties
Hybrid 2: Excavation with Ground Improvements (Slab on Grade for Tracks and Buildings on Drilled Shafts)	Meets settlement criteria (with more potential uncertainty)	Can effectively mitigate health and safety risks (more short-term risk, less long-term risk)	More short-term risk associated with regulatory requirements during construction	More risk due to material and handling unknowns	More risk due to material and handling unknowns
Full Excavation and Backfill with Competent Soils	Meets settlement criteria	Can effectively mitigate health and safety risks (more short-term risk, less long-term risk)	More short-term risk associated with regulatory requirements during construction	More risk due to material and handling unknowns	More risk due to material and handling unknowns

With the reduced amount of refuse left in place for the Hybrid 2 option, the option has become very similar to the Full Excavation option, except that by maintaining refuse below the facility, greater settlement risk exists. Additionally, the benefit of leaving the small portion of refuse in Hybrid 2 is outweighed by the cost associated with constructing buildings on shaft-supported platforms and track on a concrete slab on grade.

The evaluation indicates that the Low Platform and Full Excavation options may be preferred subsurface construction design options for the Midway Landfill Alternative. The Low Platform option generally carries more long-term risk as opposed to the Full Excavation, which has more emphasis on short-term risks. The Full Excavation option has more cost and schedule risk.

4.0 References

City of Seattle. 2007. A Reuse Planning Report, Kent Highlands and Midway Landfills. Prepared by E^2 Inc. February 2007.

King County Solid Waste Division. 2019. 2019 Comprehensive Solid Waste Management Plan. November 2019.

Sound Transit. 2018. Design Criteria Manual – Revision 5, June 2018.

Sound Transit. 2019a. OMFS Landfill Evaluation Report. Prepared by HDR. June 2019.

Sound Transit. 2019b. Midway Landfill Site Engineering Optimization Report. Prepared by HDR. November 2019.

Sound Transit. 2020a. Conceptual Basis of Design Report. Prepared by HDR. July 2020.

Sound Transit. 2020b. Interim Midway Landfill Preparation Memorandum. Prepared by HDR. February 2020.

Sound Transit. 2020c. Midway Landfill Human Health Risk Assessment. Prepared by HDR. January 2020.

Sound Transit. 2020d. Midway Landfill Human Health Risk Assessment Addendum. Prepared by HDR. June 2020.

Sound Transit. 2020e. OMFS Preliminary Geotechnical Recommendations. Prepared by Shannon & Wilson. June 2020.

Operations and Maintenance Facility South

Appendix D4:
Midway Landfill Human Health Risk Assessment

Federal Transit Administration

SoundTransit

January 2020

OMF SOUTH

Midway Landfill Human Health Risk Assessment – Final

SOUNDTRANSIT

CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

SOUNDTRANSIT

OMF SOUTH

Midway Landfill Human Health Risk Assessment

Prepared for:
Sound Transit

Prepared by:
HDR Engineering, Inc.

January 23, 2020

Table of Contents

Executive Summary **1**
1.0 Introduction **8**
2.0 Background **10**
2.1 Site Setting 10
2.2 Site History 10
2.3 Site Conditions 13
2.3.1 Site Geology and Subsurface Conditions 13
2.3.2 Site Hydrogeology 13
2.3.3 Surface Water and Storm Water System 15
2.3.4 Landfill Cover System 16
2.3.5 Landfill Gas Extraction System 16
2.3.6 Operations and Maintenance Requirements 16
2.4 Beneficial Uses of Land and Water 17
2.4.1 Current and Future Land Uses 17
2.4.2 Current and Future Water Uses 17
2.4.3 Operation and Maintenance Facility South (OMF South) 18
3.0 Data Evaluation **20**
3.1 Contaminants of Interest 21
3.2 Data Review and Summary 21
3.2.1 Groundwater Data Review 21
3.2.2 Groundwater Data Summary 23
3.2.3 Landfill Gas Data Review 24
3.2.4 Landfill Gas Data Summary 28
3.3 Potential Data Gaps 30
4.0 Exposure Assessment **31**
4.1 Conceptual Site Model 31
4.1.1 Primary Sources 31
4.1.2 Fate and Transport 33
4.1.3 Exposure Scenarios 34
4.1.4 Potential Routes of Exposure 35
4.2 Selection of COPCs for the HHRA 37
4.2.1 Screening Levels 38
4.2.2 Contaminants of Potential Concern 39
5.0 Toxicity Assessment **41**
5.1 Toxicological Profiles for VOCs in Landfill Gas 41
5.2 Toxicological Profile for Methane 48

6.0 Human Health Risk Assessment Findings 49
7.0 Non-Toxicological Hazards Evaluation 51
7.1 Methane Explosion 51
7.2 Seismic Considerations 52
7.3 Hazards Associated with Construction Activities 53
8.0 Conclusions 54
9.0 References 55

Appendices

A Supplementary Site Figures
B Landfill Gas Sampling Options

Tables

1 Groundwater Results for Onsite Monitoring Wells (2010-2014)
2 Methane Gas Results for Onsite Extraction System by Location and Year (2015-2019)
3 Methane Gas Results for Onsite Extraction System by Year (2015-2019)
4 Select VOC Results for Onsite Subsurface Gas Samples (1988a)
5a VOCs Results for Onsite Subsurface Gas and Flare Inlet Samples (1988a)
5b Hydrogen Sulfide Results for North and South Flare Inlet Samples (1988a)
6 VOC Results for Flare Inlet Duct Gas Samples (1992)
7 Sub-Slab and Deep Soil Gas Screening Levels for COIs Detected in Subsurface and Inlet Flare Gas Samples

Figures

1 Preliminary Conceptual Site Model
2 Indoor Air Screening Level Equations and Exposure Assumptions for Non-carcinogens
3 Indoor Air Screening Level Equations and Exposure Assumptions for Carcinogens
4 Soil Vapor Intrusion Screening Level Equation (MTCA and USEPA VISL)
5 Groundwater Vapor Intrusion Screening Level Equation (MTCA and USEPA VISL)

Acronyms and Abbreviations

ARI	Analytical Resources, Incorporated
bgs	below ground surface
COI	Contaminant Of Interest
COPC	Contaminant Of Potential Concern
CSM	Conceptual Site Model
Ecology	Washington State Department of Ecology
FS	Feasibility Study
GC/MS	Gas Chromatography/Mass Spectrometry
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High-Density Polyethylene
HDR	HDR Engineering, Inc.
HHRA	Human Health Risk Assessment
HSL	Hazardous Substances List
I-5	Interstate-5
IARC	International Agency for Research on Cancer
IRIS	Integrated Risk Information System
LEL	Lower Explosive Limit
MCL	Maximum Contaminant Level
MSL	Mean Sea Level
MTCA	State of Washington Model Toxics Control Act
NCEA	USEPA National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGA	Northern Gravel Aquifer
NJDOH	New Jersey Department of Health
NRC	National Research Council
OMF South	Operations and Maintenance Facility: South

Parametrix	Parametrix, Inc.
PPE	Personal Protective Equipment
PPRTV	Provisional Peer Reviewed Toxicity Values
PVC	Poly-Vinyl Chloride
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
SA	Sand Aquifer
SGA	Southern Gravel Aquifer
SIM	Selective Ion Monitoring
SPU	Seattle Public Utilities
UGA	Upper Gravel Aquifer
USEPA	U.S. Environmental Protection Agency
VISL	Vapor Intrusion Screening Levels
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

Units

µg/L	micrograms per Liter
µg/m^3	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
mg/kg-day	milligrams per kilogram per day
mg/L	milligrams per Liter
mg/min	milligrams per minute
ppb	parts per billion
ppm	parts per million

Executive Summary

This Human Health Risk Assessment (HHRA) has been prepared for the Midway Landfill as a potential site for Sound Transit's Operations and Maintenance Facility South (OMF South). Sound Transit is currently implementing a system-wide expansion of the Link light rail system and recently evaluated Midway Landfill as a potential site for the OMF South (HDR 2019a).

The purpose of the HHRA is to evaluate potential chronic health risks to Sound Transit personnel who work at the future site should it be selected for the OMF South and waste be maintained on site. Non-Toxicological hazards including acute, physical risks associated with constructing and operating the OMF South over a waste mass are also discussed.

Background

The Midway Landfill is located between Interstate-5 (I-5) and Highway 99, and South 252nd Street and South 246th Street in Kent, Washington. Between 1966 and 1983, approximately three million cubic yards of solid waste were deposited at the Midway Landfill. Records indicate that from 1980 to 1983 paint sludge, dyes, preservatives for decorative plants, alkaline wastes, oily sludges, waste coolant, truck steam cleaning wastes, and some oily wastes were deposited at the site (Parametrix 1988a). Approximately two million gallons of bulk industrial liquids from a single source were placed in the landfill (USEPA 2015a). However, the nature and type of industrial liquids disposed of in the Midway Landfill is not known. The City of Seattle (City) closed the landfill in 1983.

Cleanup work began in 1984 under the direction of the Washington State Department of Ecology (Ecology) and construction of a landfill gas extraction system began in 1985. The site was listed by the U.S. Environmental Protection Agency (USEPA) as a National Superfund Site in May 1986 (CERCLIS Identification Number: WAD 980638910). The City completed the cleanup in November 1992; however, because the Record of Decision (ROD) was not signed at that time, construction completion was not officially recognized until September 21, 2000.

Current and Future Site Uses

The landfill is currently owned by the City (USEPA 2000a) and operated by Seattle Public Utilities (SPU). The landfill is covered with a multilayered engineered cap (landfill cap) designed to reduce surface water infiltration into landfill waste and leachate discharge into underlying aquifers. A gas extraction system is in place and operating throughout the landfill to control subsurface migration of landfill gas (USEPA 2015a). Ecology oversees the City's operation and maintenance for the landfill cover system, gas extraction system, and surface water control systems constructed under the Consent Decree[1]. The landfill is fenced and no public access is allowed.

No one is known to be currently drinking the groundwater from any aquifer within almost a mile of the landfill and there are no current plans to use the groundwater near the landfill for drinking water. In addition, state regulations (WAC 173-160-171) do not allow any new private drinking water wells within 1,000 feet of a solid waste landfill or 100 feet of all other sources or potential sources of contamination and Ecology must be notified prior to the construction of any new well (USEPA 2015a).

OMF South Construction Approaches

As part of the process of evaluating the Midway Landfill for reuse as the OMF South site, Sound Transit has developed a preferred preliminary site layout and five construction design approaches for review and consideration. Differences in these five construction approaches could result in differences in occupational exposures to both toxic and non-toxic hazards at the OMF South. In order to streamline the exposure assessment step of the HHRA and the non-toxicological hazards evaluation, the five construction approaches are grouped into three future development concepts for the OMF South based on the potential exposures associated with each construction approach. Non-toxicological risks associated with each of these future development concepts are evaluated and discussed in Section 7. Human health risks are evaluated for the development concept that represents the worst case exposures scenario based on current site conditions and potentially complete routes of exposure.

Data Evaluation

Annual groundwater data collected between 2010 and 2014 from five wells located within or just outside of the landfill boundaries were available for review at the time of this assessment. These groundwater samples were analyzed for the following contaminants of interest (COIs): 1,4-dioxane, vinyl chloride, volatile organic compounds (VOCs), dissolved iron, and dissolved manganese. Detected concentrations of COIs in groundwater samples are shown in Table 1. Sample locations are shown in Figure 2-10 in Appendix A.

Monthly gas monitoring data collected from 106 onsite sample locations (e.g., landfill extraction wells and flares) between January 2015 and August 2019 were available for review at the time of this assessment. These landfill gas samples were analyzed for combustible gas (primarily methane), oxygen, carbon dioxide, temperature, static pressure, and other parameters. Methane gas concentrations in onsite landfill extraction wells and flares are summarized in Tables 2 and 3. Sample locations are shown in Figure 8 in Appendix A.

---

[1] A Consent Decree is a legal agreement entered into by the United States (through USEPA and the Department of Justice) and potentially responsible parties and lodged with a court. A consent decree dictates the final cleanup phase (remedial action) at a Superfund site.

Two available sources of data on the composition of subsurface gas in the vicinity of the Midway Landfill were identified during document review for this HHRA. These sources include a gas characterization study completed in 1988 as part of the Remedial Investigation (RI) (Parametrix 1988a), and a source emission evaluation completed in 1992 to quantify gas flare emission levels at the Midway Landfill (Am Test-Air Quality Inc. 1992). Gas samples collected in 1988 from onsite gas extraction wells and pre-combustion flares were analyzed for Hazardous Substance VOCs (Parametrix 1988a) and samples collected in 1992 from pre-combustion flare gas (flare inlet gas) were analyzed for VOCs (Am Test-Air Quality Inc. 1992). VOC concentrations in landfill gas samples are summarized in Tables 4, 5a and 6. Gas samples collected in 1988 and 1992 were also analyzed for inorganic gases (e.g., hydrogen sulfide and/or carbon monoxide). Hydrogen sulfide concentrations reported in the RI are shown in Table 5b. Carbon monoxide results were either not reported (Parametrix 1988a) or were not detected (Am Test-Air Quality Inc. 1992).

The quality of the available environmental data for the Midway Landfill was evaluated in the HHRA. Sample collection and analysis methods, sample location and frequency, and data characteristics were considered when evaluating overall data quality, appropriateness, and usability (USEPA 1992).

Based on evaluation of the available site data and supporting documents, the groundwater and methane datasets were determined to be of sufficient quality and reliability for use in this risk assessment. However, the data evaluation for this HHRA determined that the landfill gas data for VOCs and inorganic gases were not representative of current or future site conditions as they were collected more than 25 years ago from the landfill gas extraction system and thus do not represent concentrations of volatile gases to which future workers may be exposed. In addition, data collected from the landfill extraction system do not provide an appropriate measure of the concentrations that workers may be exposed to at the OMF South.

Exposure Assessment

The Midway Landfill will be used for occupational purposes if it is selected as the location of the future OMF South. As a result, various onsite workers (not residents) will have the greatest potential to contact impacted soil gas, groundwater, or air. These workers include long-term Onsite Office, Maintenance Shop, and Yard Workers and short-term Construction Workers.

Based on the knowledge of the current conditions at the Midway Landfill and planned future OMF South site uses, several potential occupational routes of exposure to COIs in landfill waste, gas, and groundwater were identified and evaluated (see the Conceptual Site Model, Figure 1).

The following routes of exposure were determined to be potentially complete for specific occupations at the OMF South:

- Inhalation of Indoor Air for Onsite Office and Maintenance Shop Workers,
- Inhalation of Air in Subsurface Confined Spaces (e.g., utility trenches and vaults) for Construction Workers,
- Inhalation of Outdoor Air for Maintenance Shop, Yard, and Construction Workers, and
- Direct Contact with Waste and Contaminated Soil for Construction Workers

Groundwater ingestion was determined to be an incomplete route of exposure because no one is known to be drinking groundwater from any aquifer within almost a mile of the landfill (USEPA 2015a), there are no water supply wells at the landfill, and state regulations (WAC 173-160-171) do not allow the development of drinking water wells in the vicinity of a landfill.

These potential routes of exposure are based on the assumptions that construction of the OMF South may result in future site conditions that could allow for vapor intrusion from subsurface gas and underlying groundwater to indoor air.

Contaminants of Potential Concern

Maximum concentrations of COIs detected in groundwater and landfill gas were compared to occupational screening levels for potentially complete routes of exposures in order to identify Contaminants of Potential Concern (COPCs). COPCs are those contaminants with the potential to cause adverse health effects in workers who are exposed to them over an extended period of time. These occupational screening levels were reviewed to verify that they were sufficiently protective of the occupational exposures expected to occur at the OMF South.

Groundwater data were compared to occupational screening levels for vapor intrusion to indoor air (e.g., MTCA Method C Groundwater Vapor Intrusion screening levels and the USEPA Worker Air VISLs for Groundwater) (see in Table 1). No COIs in groundwater exceed these screening levels.

There are no toxicity- or risk-based screening levels for methane concentrations; therefore, no comparisons were made for methane concentrations in landfill gas. In addition, due to the absence of representative landfill gas results for VOCs and inorganic gases, no comparisons were made between concentrations of these COIs in landfill gas and applicable risk-based screening levels.

As a result, no COPCs were identified in groundwater or landfill gas for further quantitative risk assessment.

Toxicological Assessment

Although no COPCs were identified for the Midway Landfill, toxicity information for those VOCs in landfill gas that were detected frequently and at high concentrations in previous investigations (Parametrix 1988a; Am Test-Air Quality Inc. 1992) is included in the Toxicity Assessment for informational purposes only. A toxicity profile for methane gas and a brief summary of the non-toxicological hazards associated with methane gas (flammability and asphyxiation) are also included.

HHRA Findings

The OMF South will be connected to the municipal water system and will not use groundwater at the facility. Groundwater ingestion is considered to be an incomplete route of exposure for all occupational exposure scenarios at the OMF South and therefore groundwater ingestion does not pose a chronic health risk to any OMF South worker.

Exposure to vapors from landfill gas and groundwater were considered as a potentially complete route of exposure under the worst-case scenario assumption that a long-term failure in engineered protections (including the landfill cap and gas collection system) occurs at the OMF South, allowing for vapor intrusion from subsurface gas and underlying groundwater to indoor air.

Based on the comparison of maximum concentrations of COIs detected in groundwater to applicable risk-based screening levels, occupational exposure to COIs in groundwater at the Midway Landfill via vapor intrusion is not expected to result in adverse chronic health effects for any OMF South worker.

In addition, occupational exposure to methane gas is not expected to result in adverse chronic health effects due to the relatively non-toxic nature of the gas. However, other occupational hazards associated with methane gas, such as flammability, at the Midway Landfill may need to be considered and addressed through risk management efforts if Sound Transit selects the site for the future OMF South.

A high level of uncertainty remains regarding the potential risks associated with occupational exposures to VOCs and inorganic gases at the site due to a lack of sufficient and reliable data necessary to characterize human health risks and uncertainty regarding the potential for occupational exposure to landfill gases based on current and future site conditions and engineered controls.

In order to effectively quantify the risk associated with occupational exposures to COIs in landfill gas, additional sampling is needed to characterize site conditions and identify potential routes of exposure. Future sampling of landfill gas constituents should be conducted following an approach that generates the appropriate environmental data needed to characterize occupational exposures and evaluate potential health risks at the OMF South (e.g., post-construction sub-slab soil gas and/or indoor air sampling).

Pre-construction sampling of flare inlet gas and gas extraction wells could also be conducted to provide information on the COIs present in landfill gas at this time; however, concentrations of COIs in samples collected from the landfill gas collection system would not be appropriate for use in the assessment of occupational exposures at the OMF South as they are likely not representative of concentrations in the subsurface that may pose an unacceptable threat to indoor air quality in site buildings. At this point, quantification of any long-term worker risk is premature until representative data can be acquired.

In order to better assess current concentrations of COIs in gas collected from the landfill, if requested by Sound Transit, follow-up sampling and analysis could be conducted. Potential landfill gas sampling options are discussed in Appendix B.

Non-Toxicological Hazards Evaluation

Some of the primary non-toxicological risk factors associated with redevelopment on a landfill include methane explosion and subsurface fire risk, seismic considerations, and occupational exposures to site COIs and environmental hazards during construction activities.

Methane Explosion Risk

Explosion risk is present at the site and needs to be mitigated through engineered controls. Common means for protection would be the re-establishment of the landfill cap and gas collection system impacted during construction of the OMF South. Additional engineered protections can also be incorporated into the OMF South design to mitigate the risk associated with a potential landfill cap leak and/or gas collection system failure for areas in contact with the landfill surface. Depending on the selected construction design, these engineered protections may include an independent, under slab methane barrier with passive gas ventilation and/or gas sensors installed in occupied areas and in areas where site operations provide an ignition source.

Methane migration to in-ground, non-building, confined spaces could occur through a leak in the landfill cap resulting in a methane explosion or asphyxiation hazard. These hazards can be managed through adherence to required confined space entry procedures, including monitoring of methane and oxygen concentrations prior to entry.

Seismic Considerations

Stability concerns have not been identified at Midway Landfill. The site configuration is primarily a backfill of a previous excavation and site slopes have no reported signs of instability. All of the construction design approaches for the OMF South are expected to improve site stability and further geotechnical analysis can be performed to evaluate site seismic and static stability with the planned landfill modifications and OMF South loading.

Hazards Associated with Construction Activities

The construction of the OMF South under all of the construction design approaches requires the disruption of established remedial systems which, without adequate and proper controls, could temporarily expose construction workers to solid waste and landfill gas and may generate dust and contaminated runoff that could impact the surrounding environment. Air intrusion into the landfill will also need to be prevented since this could result in a landfill fire. Appropriate planning and an adherence to applicable regulations will be required to provide continued protection of human health and the environment during construction of the OMF South.

An Environmental Protection Plan will likely be required to establish procedures to manage and monitor the waste excavation and handling process. A project-specific Health and Safety Plan and Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training will be required.

Conclusions

The HHRA found that occupational exposures to VOCs in groundwater and to methane in landfill gas are not expected to result in adverse chronic health effects for any OMF South worker. However, the potential risk associated with occupational exposures to COIs in landfill gases could not be characterized due to a lack of representative data. In order to quantify occupational risk at the OMF South, post-construction sampling of VOCs and inorganic gases is needed (e.g., sub-slab soil gas and/or indoor air sampling) to provide an appropriate measure of the concentrations that workers may be exposed to at the OMF South.

In order to assess current COI concentrations in landfill gas, a pre-construction landfill gas investigation could be conducted. Potential landfill gas sampling options are discussed in Appendix B.

The non-toxicological hazards evaluated for the Midway Landfill can largely be managed through appropriate engineered protections, health and safety protocols, construction design standards, and site control and environmental protection plans. Risk management approaches for non-toxicological hazards will need to be developed based on the final selected OMF South construction approach.

1.0 Introduction

This Human Health Risk Assessment (HHRA) has been prepared for the Midway Landfill as a potential site for Sound Transit's Operations and Maintenance Facility South (OMF South).

Sound Transit is currently implementing a system-wide expansion of the Link light rail system and is evaluating the Midway Landfill as a potential site for the OMF South (HDR 2019a). The purpose of the HHRA is to evaluate potential chronic health risks to Sound Transit personnel who work at the future site should it be selected for the OMF South and waste be maintained on site. Non-Toxicological hazards including acute, physical risks associated with constructing and operating the OMF South over a waste mass are also discussed briefly.

From this point forward, this report is organized in the following sections described below. The key components of the HHRA are discussed in Sections 2 through 6 and a discussion of non-toxicological hazards is contained in Section 7.

Section 2 Background provides a brief summary of background information on the Midway Landfill, including the site setting, history, geology, and hydrogeology of the area, current and reasonably likely future beneficial uses of land and water, and current redevelopment conceptual designs for OMF South.

Section 3 Data Evaluation provides a summary of the nature and extent of contamination at the Midway Landfill, past site investigation and characterization activities, contaminants of interest (COIs), and environmental data available for use in the risk assessment. Data quality is evaluated for appropriateness and usability and data gaps are identified in this Section.

Section 4 Exposure Assessment provides an estimation of the amount, frequency, duration, and routes of exposure that an OMF South worker may have to contaminants found at the Midway Landfill. This section describes the scenarios in which OMF South workers could be exposed to contaminants based on likely future site use and compares concentrations of COIs in specific media to risk-based screening levels in order to identify contaminants of potential concern (COPCs) at the landfill.

Section 5 Toxicity Assessment summarizes the nature and degree of toxicity of each COPC in order to characterize potential chronic health risks associated with exposure to COPCs at the Midway Landfill. Two types of health effects are discussed: 1) non-carcinogenic health effects, and 2) carcinogenic health effects. The same chemical may exert both kinds of effects.

Section 6 HHRA Findings provides an overview and discussion of the nature and magnitude of potential risks to OMF South workers at the Midway Landfill.

Section 7 Non-Toxicological Hazards Evaluation describes other risk factors associated with siting the OMF South at the Midway Landfill including a discussion of methane explosion hazards, seismic considerations, and worker health and safety during construction activities.

2.0 Background

2.1 Site Setting

The Midway Landfill is located between Interstate-5 (I-5) and Highway 99 and South 252nd Street and South 246th Street in Kent, Washington. The landfill is roughly 60 acres in size with solid waste buried on about 40 acres at depths of up to 100 feet. Between 1966 and 1983, approximately three million cubic yards of solid waste were deposited at the Midway Landfill. The landfill is currently owned by the City of Seattle (City) (USEPA 2000a) and operated by Seattle Public Utilities (SPU).

The landfill is covered with a multilayered engineered cap (landfill cap) designed to reduce surface water infiltration into landfill waste and leachate discharge into underlying aquifers. The landfill is fenced and no public access is allowed. A gas extraction system is in place and operating throughout the landfill to control subsurface migration of landfill gas (USEPA 2015a).

Surrounding land use is primarily commercial and residential. Commercial businesses, light industry and manufacturing border Highway 99. Most of the nearby residences are detached single-family dwellings, with some multi-unit residential developments and mobile home parks in the vicinity. Two schools, Sunnycrest Elementary School and Parkside Elementary School, and a city park, Linda Heights Park, are within a half-mile of the landfill (USEPA 2015a).

2.2 Site History

The site of the current Midway Landfill was operated as a gravel pit from 1945 until 1966. In 1966, the City leased the site for use as a landfill for demolition materials, wood waste, and other slowly decomposing materials (USEPA 2015a). Records indicate that from 1980 to 1983 paint sludge, dyes, preservatives for decorative plants, alkaline wastes, oily sludges, waste coolant, truck steam cleaning wastes, and some oily wastes were deposited at the site (Parametrix 1988a). Approximately two million gallons of bulk industrial liquids from a single source were placed in the landfill (USEPA 2015a). The nature and type of industrial liquids disposed of in the Midway Landfill is not known. The City closed the landfill in 1983.

Following closure of the landfill, the City began sampling groundwater and landfill gas in and around the site. Organic and inorganic contaminants were detected in groundwater from monitoring wells and in gas samples from gas probes both within and outside the landfill boundary (USEPA 2015a).

Cleanup work began in 1984 under the direction of the Washington State Department of Ecology (Ecology) and construction of a landfill gas extraction system began in 1985. The site was listed by the U.S. Environmental Protection Agency (USEPA) as a National Superfund Site in

May 1986 (CERCLIS Identification Number: WAD 980638910). In September 1988, the City and Ecology prepared a Remedial Investigation (RI) and a Remedial Action Feasibility Study (FS) (USEPA 2015a).

The RI investigated the impact of the landfill on the environment and included monitoring of the landfill gas, air emissions, leachate, groundwater, and surface water on or adjacent to the site (Parametrix 1988a). Findings of the RI are summarized briefly below.

- Gas samples from onsite gas extraction wells and pre-combustion flare were analyzed for a number of contaminants including numerous USEPA Hazardous Substances List (HSL) volatile organic compounds (VOCs). The VOCs found most frequently and in the highest concentrations in onsite subsurface gas included ethylbenzene, vinyl chloride, total xylenes, toluene, and benzene. The inorganic gases, hydrogen sulfide and carbon monoxide, were also reported present in onsite gas in the low parts per million (ppm) range (Parametrix 1988a).
- Landfill emissions to ambient air were evaluated by comparing contaminant concentrations in samples collected from upwind and downwind of the Midway Landfill. Samples were analyzed for VOCs. Many contaminants were found at higher concentrations upwind of the landfill and at offsite locations that were not downwind from the landfill which indicated the presence of offsite sources of emissions unrelated to the Midway Landfill (e.g., I-5 and Highway 99). In addition, ambient air quality near the landfill was not found to be measurably different from typical urban air and onsite air quality monitoring found no evidence of gas emission through the surface of the landfill sufficient to cause adverse ambient air impacts (Parametrix 1988a).
- Leachate generated by infiltration from precipitation and direct discharge of stormwater into the solid waste contained in the landfill was sampled from three wells and analyzed for USEPA HSL contaminants, including metals, VOCs, pesticides, and other potentially hazardous substances during the RI. Leachate samples were found to contain a variety of HSL compounds at trace levels (Parametrix 1988a).
- Groundwater samples were collected from approximately 40 locations in and around the landfill including 29 monitoring wells, 8 boreholes, and 2 private wells. Samples were analyzed for conventional water quality parameters as well as HSL compounds. A number of HSL VOCs were found in groundwater and five wells exceeded drinking water standards for one to three VOCs each. The VOCs detected in groundwater fall into three major groups: ketones, benzenes, and chlorinated solvents. The specific compounds detected are all involved in the use of paints, varnishes, resins and plastics, either as solvents, swelling agents, thinners, or removers (Parametrix 1988a).

- The RI found no evidence of offsite transport of contaminants in surface water or leachate contamination into nearby seeps or springs (Parametrix 1988a).

In May 1990, the City and Ecology entered into a Consent Decree pursuant to State of Washington Model Toxics Control Act (MTCA). In this Consent Decree, the City agreed to perform specific cleanup work. This cleanup work, or remedial action, had the following elements:

1) A multi-layered landfill cover system (landfill cap) designed to reduce surface water infiltration into the landfill and the release of hazardous emissions from the landfill (completed in May 1991) (USEPA 2000a, 2015a);
2) An active gas extraction system (construction began in September 1985 and was completed in March 1991) (USEPA 2015a);
3) A surface water management system to control surface water drainage and prevent surface water from infiltrating the landfill including a 10 million-gallon stormwater detention pond with a permanent dewatering system, a controlled discharge structure, and rerouting of stormwater from the Linda Heights Park drain and I-5 to the detention pond to prevent it from entering the landfill (completed in 1991) (USEPA 2015a); and,
4) A comprehensive plan for short- and long-term operations and maintenance for the systems constructed under the Consent Decree (prepared by the City and approved by Ecology in April 1992) (USEPA 2015a).

The City completed the cleanup in November 1992. However, since the Record of Decision (ROD) was not signed at that time, construction completion was not officially recognized until September 21, 2000.

An amendment to the 1990 Consent Decree specified a requirement to implement a compliance monitoring plan at the landfill to track the presence, concentration, and migration of groundwater contaminants both upgradient and downgradient of the landfill and to assess the effectiveness of the remedial action. Compliance monitoring began in 1990. In addition, the City initiated performance monitoring in 1989 to track the response of landfill leachate levels and shallow groundwater levels to the implementation actions required by the Consent Decree. Both compliance and performance monitoring programs are ongoing (USEPA 2000a, 2015a).

Landfill gas monitoring (which consists of checks for concentration, composition, temperature, flow, and velocity of gases in and around the landfill) is conducted by the City on a regular basis (USEPA 2000a, 2015a).

Available post-cleanup groundwater and landfill gas monitoring results are discussed further in Section 3.

2.3 Site Conditions

Information on the site geology, site hydrogeology, surface water and stormwater systems, landfill cap, and landfill gas extraction system is included in numerous site documents and is summarized in the sections below.

2.3.1 Site Geology and Subsurface Conditions

The Midway Landfill occupies a shallow, bowl-shaped depression (a former gravel pit) near the crest of a narrow north-south trending glacier feature known as the Des Moines Drift Plain (USEPA 2015a). The Des Moines Drift Plain lies between the Olympic Mountains on the west and the Cascade Mountains on the east and is underlain by a thick sequence of Quaternary glacial, fluvial (riverine), and lacustrine (lake bed) deposits overlying Tertiary volcanic and sedimentary bedrock (USEPA 2000a). Depth to bedrock is thought to exceed 1,000 feet near Midway Landfill (USEPA 2015a).

Subsurface materials under the site are of glacial origin and consist for the most part of mixed sands and gravels, with some silt and clay (Parametrix 1988a). The ground surface of the landfill has been modified by the placement of waste and cover material.

Based on studies of the area and analysis of geological samples collected during the installation of monitoring wells for the RI, nine stratigraphically distinct deposits were identified from the land surface down approximately 400 feet to sediments that are near current mean sea level (MSL). Because of the complex layering in all the sediments underlying the landfill, vertical and horizontal permeabilities are highly variable and produce a complex groundwater flow pattern (USEPA 2000a).

2.3.2 Site Hydrogeology

Groundwater movement within and below the landfill has been characterized to an approximate depth of 300 to 350 feet below ground surface (bgs) (50 to 100 feet above MSL). Several groundwater units have been identified within this interval. From shallowest to deepest these aquifers are: Shallow Groundwater; Saturated Refuse; Upper Gravel Aquifer (UGA); Sand Aquifer (SA); Southern Gravel Aquifer (SGA); and Northern Gravel Aquifer (NGA) (USEPA 2015a).

2.3.2.1 Shallow Groundwater

According to the ROD (USEPA 2000a), this zone of saturation is shallow, discontinuous lenses of groundwater. The majority of these shallow zones are found north and south of the landfill. The general water elevation of the shallow groundwater zone adjacent to the landfill is generally at about 325 feet above MSL north and south of the landfill, and lower, and more discontinuous to the east and west (USEPA 2000a).

The landfill's detention pond dewatering system affects shallow groundwater flow through the northern periphery of the landfill. Shallow groundwater north of the landfill (at 320 feet or above) is captured by the dewatering system and routed to North McSorley Creek. The dewatering system limits the shallow groundwater that discharges into the landfill from the north (USEPA 2000a).

2.3.2.2 Saturated Refuse

Prior to the remediation required by the 1990 Consent Decree, the major sources of water to the landfill were: surface water infiltrating from the landfill surface and from areas north of the landfill that drained into the landfill; stormwater discharge from the Linda Heights neighborhood, and I-5 drainage that was routed into the landfill as part of the construction of I-5; and shallow groundwater from north and south of the landfill (USEPA 2000a).

The Saturated Refuse consists of leachate within the landfill and is located below elevations of approximately 325 feet. Flow in the Saturated Refuse is generally from the north and west toward the south-central section of the landfill, where the pit excavations were deepest. Leachate likely discharges vertically throughout much of the landfill base, but the greatest volume of vertical flow is in the south-central area, where leachate discharges to the underlying UGA (USEPA 2000a).

Since construction of the engineered cap and stormwater diversion systems, the majority of surface water that entered the landfill has been diverted and leachate levels have dropped by as much as 20 feet (USEPA 2000a).

2.3.2.3 Upper Gravel Aquifer

The UGA is located at the base of the landfill (100 to 170 feet bgs) and consists of interbedded zones of permeable gravels and less permeable mixtures of silt, sand, and gravels. Leachate from the landfill discharges into the underlying UGA. Groundwater flow in the UGA is generally from both the north and south inward toward an area beneath the southern end of the landfill where the groundwater discharges downward into the underlying SA. The UGA and SA are separated by a discontinuous layer of fine-grained silt, clayey silt, and silty fine sand that is present throughout most of the study area known as the Upper Silt Aquitard. Vertical flow from the UGA into the SA is most pronounced where the aquitard is absent (e.g., beneath the southern end of the landfill) (USEPA 2000a).

The remediation required by the 1990 Consent Decree and the dewatering of the refuse have greatly reduced the amount of recharge entering the UGA. Within the landfill footprint and around the perimeter, the UGA monitoring wells have been dry since 1992 (USEPA 2000a).

The UGA beneath the landfill is under vacuum from the landfill gas extraction system which helps to reduce volatile organics in leachate from being released to the underlying groundwater system (USEPA 2000a).

2.3.2.4 Sand Aquifer

The SA occurs as a widespread deposit of interbedded sands and silts approximately 200 to 300 feet bgs. Flow in this aquifer is generally from the north and west to the southeast toward a hydraulic sink that occurs across a broad area beneath the southern part of the landfill and extends several hundred feet to the east. Groundwater entering this sink flows downward into the SGA (USEPA 2000a).

2.3.2.5 Southern Gravel Aquifer

The SA and SGA are separated by the Lower Silt Aquitard. Similar to the Upper Silt Aquitard, the Lower Silt Aquitard is discontinuous in places allowing for the downward flow from the SA into the SGA (USEPA 2000a).

The SGA is found beneath the southern half of the landfill at approximately 300 to 350 feet bgs and extends to the east, south, and west. It consists of permeable sands and gravel interbedded with silts and silty gravel. The SGA appears to be recharged by the SA and by lateral flow from the south. A groundwater mound in the SGA, below the hydraulic sink in the SA, is believed to be an expression of regional flow through the sink (USEPA 2000a). Groundwater flow is generally northeast-northwest and the SGA eventually discharges west to Puget Sound and east to the Green River Valley (USEPA 2015a).

2.3.2.6 Northern Gravel Aquifer

The NGA is found beneath the northern half of the landfill at approximately 300 to 350 feet bgs and extends to the north and northeast. Similar to the SGA, the NGA consists of permeable sands and gravel interbedded with silts and silty gravel. Flow from the NGA is generally from north to south toward the SGA and, like SGA, the NGA eventually discharges to Puget Sound and the Green River Valley (USEPA 2015a).

2.3.3 Surface Water and Storm Water System

Midway Creek is located northeast of the landfill, and two other streams, the north and south forks of McSorley Creek, are located to the west and southwest, respectively (USEPA 2015a).

There are no major surface water bodies in the immediate vicinity of the Midway Landfill. The closest are Lake Fenwick, located approximately one mile to the southeast, and Star Lake, located approximately 1.5 miles to the south (USEPA 2015a).

A six-acre wetland, the Parkside Wetland, located to the east of the Parkside Elementary School and west of the landfill is a naturally occurring detention basin for local surface water runoff, primarily from the west side of Highway 99 (USEPA 2000a).

A stormwater collection system was installed as part of the 1990 Consent Decree to control surface water drainage and prevent surface water infiltration into the landfill. The stormwater collection system includes a 10 million-gallon stormwater detention pond with a permanent dewatering system, a controlled discharge structure, and rerouting of clean stormwater from the site into McSorley Creek, which is a salmon-bearing stream containing coho and chum salmon, steelhead and cutthroat trout (USEPA 2000a).

2.3.4 Landfill Cover System

The Midway Landfill is currently covered by a multi-layered landfill cap comprised (from bottom to top) of a 12-inch-thick layer of low permeability soil/clay material, a 50-mil high-density polyethylene (HDPE) flexible membrane, drainage net, filter fabric, a 12-inch-thick drainage layer, and a 12-inch-thick topsoil layer planted with shallow rooted grasses (USEPA 2000a, 2015a). The landfill cap reduces surface water infiltration into the landfill and controls the release of hazardous emissions from the landfill.

2.3.5 Landfill Gas Extraction System

Construction of an active gas extraction system at the Midway Landfill began in September 1985 and was completed in March 1991. The gas extraction system originally included 87 gas extraction wells; however, 31 offsite gas extraction wells located outside of the landfill footprint in native soil have since been abandoned or capped because offsite gas has been removed from the offsite locations and is currently controlled via onsite extraction wells. Landfill gas is extracted through the onsite extraction wells at the landfill and routed to a permanent blower/flare system where the extracted gas is supplemented with natural gas and then burned before discharge to the atmosphere (USEPA 2000a, 2015a). The natural gas is needed for combustion due to the low volume of landfill gas currently generated at the site. It was noted in the Third Five-Year Review of the Midway Landfill (USEPA 2015a) that during a June 2015 site inspection, the mechanical equipment for the gas extraction system appeared to be in good operating condition.

2.3.6 Operations and Maintenance Requirements

Ecology oversees the City’s operation and maintenance for the landfill cover system, gas extraction system, and surface water control systems constructed under the Consent Decree. The short-term and long-term operation and maintenance requirements for Midway Landfill are described in the Midway Landfill Operation and Maintenance Manual (Parametrix 1992) which was approved by Ecology in April 1992. The manual addresses operation and maintenance of all components of the remedy including: gas system, surface water systems, pump stations, landfill cover system, and roadway and site control. There are no reporting requirements associated with the landfill cap, gas collection system, or surface water drainage system; however, routine maintenance records are kept onsite (USEPA 2015a). The Third Five-Year Review noted that the Midway Landfill Operations and Maintenance Manual has not been updated since 1992 and should be updated to include the current landfill gas sampling locations and schedule and location of operational gas extraction wells (USEPA 2015a).

2.4 Beneficial Uses of Land and Water

The following sections briefly describe the current and future uses of land and water at the Midway Landfill site.

2.4.1 Current and Future Land Uses

Currently the landfill is capped and fenced. No public access is allowed.

As part of the Consent Decree (Ecology 1990) and as described in the ROD (USEPA 2000a), the City is required to place a notice in the records of real property kept by the King County auditor alerting any future purchaser of the landfill property, in perpetuity, that this property had been used as a landfill, was on the USEPA’s National Priorities List, and that future use of the property is restricted. The use restriction shall comply with the post-closure use restrictions under the State of Washington’s Criteria for Municipal Solid Waste Landfills, Washington Administrative Code (WAC) 173-351-500. The City is responsible for ensuring that future owners and operators are made aware of these restrictions and that restrictions remain in effect and are complied with even in the event the property is sold or transferred (USEPA 2015a).

The City is required to ensure continued operation and maintenance of all components of the remedy if any portion of the property is sold, leased, transferred, or otherwise conveyed (USEPA 2015a).

Sound Transit is currently implementing a system-wide expansion of the Link light rail system and recently evaluated Midway Landfill as a potential site for the OMF South (HDR 2019a). The current redevelopment conceptual designs for the Midway Landfill would construct the OMF South at the site. The proposed OMF South site is described in more detail in Section 2.4.3 below.

2.4.2 Current and Future Water Uses

According to the Third Five-Year Review for the Midway Landfill Superfund Site, no one is known to be drinking the groundwater from any aquifer within almost a mile of the landfill and there are no current plans to use the groundwater near the landfill for drinking water. The closest wells currently in use for drinking water are the Lake Fenwick wells almost one mile southeast of the Midway Landfill (USEPA 2015a).

State regulations (WAC 173-160-171) do not allow any new private drinking water wells within 1,000 feet of a solid waste landfill or 100 feet of all other sources or potential sources of contamination and Ecology must be notified prior to the construction of any new well (USEPA 2015a). Per the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the Midway Landfill is considered a waste management area and thus is not considered a future drinking water source by the USEPA (USEPA 2015a).

2.4.3 Operation and Maintenance Facility South (OMF South)

As part of the process of evaluating the Midway Landfill for reuse as the OMF South site, Sound Transit has developed a preferred preliminary site layout and five construction design approaches for review and consideration. The preliminary site OMF South layout is approximately 68 total acres including an Operation and Maintenance Building and the capability to store and maintain 144 vehicles. The site also includes a 5-acre storage area with a Maintenance of Way Warehouse. The total site area includes the lead tracks from the mainline to the site and other support areas. The five construction approaches include:

- **Approach 1:** High structural platform with no excavation
- **Approach 2:** Low structural platform with some excavation
- **Approach 3:** Hybrid 1: Excavation with ground improvements (buildings on drilled shafts)
- **Approach 4:** Hybrid 2: Excavation with ground improvements (slab-on-grade for tracks and buildings on drilled shafts)
- **Approach 5:** Full excavation and backfill with competent soils

The site layout and construction approaches are discussed in detail in the Midway Landfill Site Engineering Optimization Report (HDR 2019b).

The horizontal layout of the OMF South is consistent between all of the construction approaches. However, the construction approaches differ vertically based on alternative construction designs developed to mitigate landfill settlement and other environmental impacts associated with construction in a landfill. The differences in vertical construction approaches could result in differences in occupational exposures to both toxic and non-toxic hazards at the OMF South.

In order to streamline the exposure assessment step of the HHRA and the non-toxicological hazards evaluation, the construction approaches listed above are grouped into three future development concepts for the OMF South based on the potential exposures associated with each construction approach. The concepts are as follows.

> **Concept 1:** OMF South built on an elevated structural platform. This concept includes an elevated platform constructed on shafts or pilings that are installed through the landfill cap and the underlying waste material. The landfill cap will be restored at penetrations and the gas system and other environmental controls will be preserved. This concept represents the high structural platform construction approach (Approach 1).
>
> **Concept 2:** OMF South built on a slab on the surface of the landfill following full excavation and removal of underlying landfill waste. This concept includes removal of the landfill cap and underlying solid waste, screening and reuse of contaminated, but competent, soils contained in the landfill as fill, reconstruction of the landfill cap, reconstruction of environmental controls, and construction of a slab foundation. This concept represents the full excavation and backfill with competent soils construction approach (Approach 5).
>
> **Concept 3:** This concept is a combination of Concepts 1 and 2 and will include removal of the landfill cap, partial removal of underlying solid waste, screening and reuse of contaminated, but competent, soils contained in the excavated portion of the landfill as fill, reconstruction of the landfill cap, reconstruction of environmental controls, and construction of the OMF South on a combination of slab foundation and an elevated platform on shafts or pilings. This concept represents the low structural platform, Hybrid 1, and Hybrid 2 construction approaches (Approaches 2, 3, and 4).

The activities carried out at the OMF South are generally expected to range from administrative work, warehouse management, and vehicle maintenance to track and yard maintenance. Work environments will vary between an office, shop, warehouse, or the outdoors. Regardless of the implemented construction design, Sound Transit operations work activities will remain above the landfill cap and are not expected to disrupt in-place remedies.

Non-toxicological risks associated with each of these future development concepts are evaluated and discussed in Section 7. Human health risks are evaluated for the worst case exposures scenario, which is represented by Concept 3, based on current site conditions and potentially complete routes of exposure.

3.0 Data Evaluation

The first step in the data evaluation process for the Midway Landfill is to identify any and all available environmental data for COIs for use in this HHRA[2]. The following reports contain relevant environmental data; however, some parts of these reports were not available for review at the time of this assessment resulting in a lack of supporting information needed to conduct a full data evaluation[3]. The reports that contained environmental data and that were available for review (full or partial) include:

- Midway Landfill Remedial Investigation Summary Report. Parametrix. July 1988.
- Source Emissions Evaluation for the Midway Sanitary Landfill, Landfill Gas Flare Testing. Am Test-Air Quality Inc. February 1992.
- Midway Landfill EPA ID: WAD980638910 OU 01, Kent, Washington Record of Decision. USEPA. September 2000.
- ARI Analytical Data Quality Review for the Midway Groundwater Monitoring Event 57. Analytical Resources, Incorporated (ARI). May 2010.
- Midway Landfill Groundwater Monitoring 2010 Annual Report. Parametrix. July 2011.
- Midway Landfill Groundwater Monitoring Status Report 2010-2014. Parametrix. May 2015.
- Third Five-Year Review for the Midway Landfill Superfund Site, Kent, Washington. USEPA Region 10. September 2015.

The second step in the data evaluation process is to review the available data to determine whether they are of sufficient quality and reliability to support a quantitative comparison to recommended risk-based screening levels (USEPA 1992). The following questions are considered when evaluating data quality:

- Were the samples collected and analyzed by reliable and acceptable methods?
- How old are the data? Are the data representative of current site conditions?

---

[2] At the time of this assessment, the most recent compliance groundwater monitoring data (2015 to present) were not publicly available; therefore, the most current publicly available compliance groundwater monitoring data from 2010-2014 were evaluated.

[3] The process for requesting and obtaining some reports or supporting information from Ecology and SPU was prohibitive given the timeline of this assessment.

- Were the laboratory reporting limits sufficiently low for comparison with applicable screening levels?
- Were multiple locations sampled to assess spatial variability of the results?
- Were multiple sampling events conducted to assess temporal variability of the results?

These considerations are discussed for available groundwater and landfill gas data in the data review and summary section (Section 3.2) below.

3.1 Contaminants of Interest

The RI and subsequent groundwater and landfill gas monitoring evaluated a wide range of potential contaminants in groundwater and landfill gas (Parametrix 1988a, 2011, and 2015; ARI 2010; Am Test-Air Quality Inc. 1992). Those chemicals detected in groundwater and landfill gas and reported in the documents listed above in this section are considered COIs for the purposes of this HHRA. These COIs are shown in Tables 1 through 6 of this report.

3.2 Data Review and Summary

3.2.1 Groundwater Data Review

Under the ROD, the City has conducted performance and compliance groundwater monitoring programs at the Midway Landfill since 1989. Groundwater chemistry monitoring was initiated in February 1990 and has been conducted on a quarterly or semi-annual basis until 2010 when the monitoring frequency was changed to annual sampling in the spring (April or May) (Parametrix 2015). Groundwater samples are collected from monitoring wells located upgradient and downgradient of the landfill. The current groundwater chemistry monitoring program consists of the annual sampling of 11 wells completed in the UGA, SA, and SGA. Annual sampling events were conducted by SPU staff in May of each year. Four additional wells are part of the monitoring program but are not currently sampled because they are dry. Groundwater samples are analyzed for conventional parameters, metals, and VOCs (Parametrix 2015).

At the time of this assessment, annual groundwater results from 2010 through 2014 were available for review in the Midway Landfill Groundwater Monitoring Status Report 2010-2014 (Parametrix 2015) and the Midway Landfill Groundwater Monitoring 2010 Annual Report (Parametrix 2011). Original laboratory results were also available for the May 2010 sampling event (ARI 2010). While more recent groundwater data (2015 to the present) have been collected as part of the performance and compliance groundwater monitoring programs, these data were not available for review at the time of this assessment.

Per the Midway Landfill Groundwater Monitoring Status Report 2010-2014 (Parametrix 2015), all samples were collected in accordance with the methods outlined in the approved Midway

Landfill Monitoring Plan (Parametrix 2000). The Midway Landfill Monitoring Plan (Parametrix 2000) and Appendix C of the Midway Landfill Groundwater Monitoring Status Report 2010-2014, which contains the data quality summaries for groundwater results from 2010 through 2014, were not available for review at the time of this assessment. However, one data quality summary for groundwater samples collected in May 2010 (ARI Analytical Data Quality Review for the Midway Groundwater Monitoring Event 57; ARI 2010) was available and was reviewed to assess overall data quality (including accuracy, precision, and sensitivity of the sampling results).

Based on the existing information, the following determinations were made regarding the available groundwater monitoring data:

- Although the Midway Landfill Monitoring Plan (Parametrix 2000) and all original laboratory reports and data quality summaries for the annual groundwater sampling events from 2010-2014 were not available at the time of this assessment, these documents were previously approved by Ecology, and therefore, it was assumed that groundwater samples were likely collected and analyzed by reliable and acceptable methods.
- The groundwater data were collected within the last ten years and although there are more recent data (2015-2019), it is unlikely that conditions at the landfill have changed significantly during this time period. Therefore, it was determined that the data are likely to be representative of current site conditions.
- Original analytical laboratory reports were not available at the time of this assessment for data collected in 2011 through 2014, and as a result, reporting limits for those years were not available for comparison with applicable screening levels. However, the original laboratory results for the 2010 groundwater monitoring event were available for review and original laboratory reports and data quality summaries for 2011-2014 groundwater sampling events were previously approved by Ecology. Based on this information, it was assumed that the laboratory reporting limits are sufficiently low for comparison with any applicable screening levels.
- Results for 11 wells that were sampled annually from 2010 through 2014 were available for this assessment. This number of sampling locations and frequency of sampling events were sufficient to assess spatial and temporal variability for groundwater underlying and within the vicinity of the landfill. However, as discussed in Section 3.2.2, results for five wells that were within or just outside the landfill boundaries were considered for this HHRA and two of these wells had not been sampled in several years because they were dry. While this reduced number of sample locations within the landfill footprint limits the assessment of spatial variability for groundwater results, it

has been determined that the number of sample locations and sample events were sufficient to assess the spatial and temporal variability of the results.

Based on the determinations noted above, the 2010-2014 groundwater results are considered to be of sufficient quality and reliability for use in this HHRA. These groundwater data are summarized in Section 3.2.2 and presented for comparison to applicable screening levels in Section 4.2.1.

3.2.2 Groundwater Data Summary

Of the 11 wells sampled as part of the performance and compliance groundwater monitoring programs at the Midway Landfill, the following wells were identified as being located within or just outside of the landfill boundaries (see Figure 2-10 from the Midway Landfill Groundwater Monitoring Status Report 2010-2014 in Appendix A of this report):

- MW-7A is one of three wells located in the UGA and is downgradient and near the southern boundary of the Midway Landfill. MW-7A has not been sampled since 1992 because the well has been dry.
- MW-7B is one of seven wells located in the SA and is downgradient and near the southern boundary of the Midway Landfill. MW-7B was added to the monitoring program beginning in 2011 based on the recommendations of the Second Five-Year Review (USEPA 2015a).
- MW-14B is one of five downgradient wells located in the SGA and is near the eastern boundary of the landfill.
- MW-20A is one of seven wells located in the SA and is downgradient and located just west of the landfill. This well has shown historical groundwater quality impacts but has not been sampled since 1994 because the well has been dry.
- MW-20B is one of five downgradient wells located in the SGA and is located just west of the landfill.

Groundwater samples are analyzed for field and conventional parameters (temperature, specific conductivity, pH, chloride, and sulfate) and the following compounds: 1,4-dioxane by USEPA Method 8270 (USEPA 1996a), vinyl chloride by USEPA Method 8260-Selective Ion Monitoring (SIM) (USEPA 1996b), VOCs by USEPA Method 8260 (USEPA 1996b), and dissolved iron and dissolved manganese by USEPA Method 6010B (USEPA 1996c). Detected concentrations of COIs found in groundwater samples collected from the wells listed above are summarized in Table 1 for comparison to the applicable screening levels discussed further in Section 4.2.1. The groundwater cleanup levels established in the ROD (USEPA 2000a) are also included in Table 1 for reference and are discussed briefly below.

The ROD established cleanup levels for groundwater and required ongoing monitoring of groundwater by the City until groundwater cleanup standards have been achieved. These cleanup levels are listed below.

- 1,2-dichloroethane- 5.0 micrograms per liter (µg/L) based on the Federal Drinking Water Standard Maximum Contaminant Level (MCL),
- Vinyl chloride- 0.29 µg/L based on the MTCA Method B* Groundwater cleanup level (WAC 173-340-720) with an adjusted cancer risk of 10^{-5}, and
- Manganese- 2.2 milligrams per liter (mg/L) based on the MTCA Method B* Groundwater cleanup level.

**MTCA Method B cleanup levels are for unrestricted site uses.*

In 2011, 1,4-dioxane was added to the list of parameters for the routinely monitored wells and a special sampling event was conducted in 2012 for 1,4-dioxane in five additional wells to investigate its extent upgradient of the landfill (Parametrix 2015). Although, no cleanup level was established for 1,4-Dioxane in the ROD, detected concentrations are compared to the MTCA Method B Groundwater cleanup level.

1,2-dichloroethane was not detected in any of the wells located within or just outside of the landfill boundaries during the 2010-2014 sampling rounds.

Vinyl chloride exceeded the ROD cleanup level (0.29 µg/L) in the SA in MW-7B during the 2011-2013 sampling rounds; in the SGA in MW-14B during the 2010-2013 sampling rounds; and in MW-20B during 2013-2014 sampling rounds. In 2014, wells MW-7B and MW-14B had dropped below the cleanup level. In general, the levels of vinyl chloride in all wells located downgradient from the Midway Landfill are declining (USEPA 2015a).

Manganese exceeded the ROD cleanup level in the SA in MW-7B during the 2011-2014 sampling rounds and in the SGA in MW-20B during the 2010-2014 sampling rounds. Manganese continues to decrease in these two wells (USEPA 2015a).

1,4-Dioxane exceeded the MTCA Method B Groundwater cleanup level in the SA in MW-7B during the 2012 sampling round and in the SGA in MW-14B and MW-20B during the 2010-2014 sampling rounds (MW-20B was not sampled in 2010). 1,4-Dioxane concentrations are generally decreasing; however, the levels in the SGA are up to 80 times the MTCA Method B Groundwater cleanup level (USEPA 2015a).

3.2.3 Landfill Gas Data Review

3.2.3.1 Methane Sampling Results (2015-2019)

Landfill gas monitoring has been conducted at the landfill on a regular basis beginning in 1984. Landfill gas is collected from the landfill extraction wells and flares by SPU and analyzed for combustible gas (primarily methane), oxygen, carbon dioxide, temperature, static pressure, and other parameters. SPU provided monthly gas monitoring results for 106 sample locations collected between January 2015 and August 2019 for review as part of this assessment. The sampling and analysis methods for landfill gas (methane) are outlined in the approved Midway Landfill Monitoring Plan (Parametrix 2000). However, as mentioned previously, the Midway Landfill Monitoring Plan (Parametrix 2000) was not available for review and limited-to-no information was available regarding sample locations, frequencies, sample protocols, analytical methods, or data quality at the time of this assessment.

Based on the existing information, the following determinations were made regarding the available landfill gas (methane) monitoring data:

- Although the Midway Landfill Monitoring Plan (Parametrix 2000) was not available for review, it was previously approved by Ecology, and therefore, it was assumed that landfill gas samples were likely collected and analyzed by reliable and acceptable methods.
- Methane gas samples were collected on a monthly basis over the last six years and are considered representative of current site conditions.
- Original analytical laboratory reports and supporting data quality summaries were not available at the time of this assessment and as a result, reporting limits were not available for comparison with any applicable screening levels.
- Methane gas samples were collected from 106 locations on a monthly basis over the last six years. This number of sampling locations and frequency of sampling events are sufficient to assess spatial and temporal variability for methane concentrations in landfill gas.

Based on the determinations noted above, the available landfill gas results for methane are considered to be of sufficient quality and reliability for use in this HHRA. These methane data are summarized in Section 3.2.4 and shown in Tables 2 and 3.

3.2.3.2 VOC and Inorganic Gas Sampling Results (1988 and 1992)

Two available sources of data on the composition of subsurface gas in the vicinity of the Midway Landfill were identified during document review for this HHRA. These sources include a gas characterization study completed in 1988 as part of the RI and a source emission evaluation completed in 1992 to quantify gas flare emission levels at the Midway Landfill.

The 1988 gas characterization study was included in its entirety in Appendix E of the Landfill Gas Technical Report (Parametrix 1988b), which at the time of this assessment was not available for review. However, the Landfill Gas Technical Report is summarized in Section 6.4 of the RI (Parametrix 1988a), which was available for review at the time of this assessment.

According to the RI summary (Parametrix 1988a), one objective of the gas characterization study was to characterize the chemical composition of subsurface gas in the vicinity of and within the landfill. As part of the gas characterization study, gas from individual onsite gas extraction wells was sampled and analyzed for compounds known to be present at specific locations deep within the landfill. In addition, flare inlet gas, representing the combined gas extracted from the numerous individual onsite gas extraction wells, was also characterized to provide a description of the average composition of gas extracted from the landfill (Parametrix 1988a).

Gas samples were collected in Tedlar bags from onsite gas extraction wells and pre-combustion flare gas (flare inlet gas) and analyzed for HSL VOCs by Analytical Technologies, Inc. using gas chromatography/mass spectrometry (GC/MS) in accordance with USEPA Method 624 guidance (Parametrix 1988a).

Concentrations of VOCs detected in subsurface and flare inlet gas during the 1988 gas characterization study were presented in the RI in summary form (mean and/or maximum concentrations) in Table 6-1 and Table 8-1 of the RI (Parametrix 1988a). These data are summarized in Section 3.2.4 and shown in Tables 4 and 5a of this report. The inorganic gases, hydrogen sulfide and carbon monoxide, were also detected in onsite subsurface gas in the low ppm range (Parametrix 1988a). Hydrogen sulfide concentrations reported in Table 7-6 the RI are shown in Table 5b. Carbon monoxide results were not reported (Parametrix 1988a).

The 1992 source emission evaluation, conducted by Am Test-Air Quality Inc. to quantify gas combustor emission levels at the Midway Landfill, includes measured concentrations of VOCs found in pre-combustion flare gas (flare inlet gas) and post-incineration emissions. Subsurface gas extracted from the landfill was sampled during three runs at the inlet and the outlet of one of four landfill gas combustors in order to determine the inlet and outlet emission concentrations, emission rates, and the destruction efficiencies for VOCs in landfill gas. The inlet and outlet gas at Flare #3 were measured to quantify velocity, temperature, and moisture and concentrations of carbon dioxide, oxygen, carbon monoxide, hydrochloric acid, sulfur dioxide, nitrogen oxides, and VOCs. Gas samples were collected at the inlet and outlet of Flare #3 and analyzed for VOCs by Coast-to-Coast Analytical Services in accordance with Compendium Method TO-14 (USEPA 1999) (Am Test-Air Quality Inc. 1992).

The laboratory reported VOCs in micrograms per cubic meter (µg/m^3) were converted in the source emission evaluation (Am Test-Air Quality Inc. 1992) to emission rate units of milligrams per minute (mg/min) for use in the calculation of destruction efficiencies. The emission rate results for each of the three runs at the inlet and outlet of Flare #3 were presented in summary tables on pages 12 (inlet) and 13 (outlet) of the source emission evaluation report (Am Test-Air Quality Inc. 1992). These data are summarized in Section 3.2.4 and shown in Table 6 of this report. A copy of the original laboratory report was included as Appendix B of the source emission evaluation (Am Test-Air Quality Inc. 1992); however, this appendix was not available at the time of this assessment. Carbon monoxide was not detected in flare inlet gas samples collected during the 1992 source emission evaluation.

Based on the existing information, the following determinations were made regarding the available landfill gas (VOCs and inorganic gases) data:

- Documentation detailing the sampling and analysis methods for the landfill gas characterization study (Appendix E of the Landfill Gas Technical Report; Parametrix 1988b) was not available at the time of this assessment. However, the landfill gas characterization study was conducted as part of the RI (under regulatory oversight) and, therefore, the samples were likely collected and analyzed by reliable and acceptable methods.
- The sampling and analysis methods for the source emission evaluation conducted in 1992 were described in Section 5.0 Sampling and Analysis Procedures of the report; however, at the time of this assessment, only Sections 1.0 through 3.0 of the report were available for review and the following sections and appendices were not available; Methodology References (Section 4.0), Sampling and Analysis Procedures (Section 5.0), Calculation Results (Section 6.0), Quality Assurance Plan (Section 7.0), and Laboratory Analysis Results (Appendix B). In addition, it is not clear if the sampling was collected under regulatory oversight. Therefore, a determination could not be made regarding the reliability and acceptability of the methods used for the 1992 source emission evaluation.
- VOC and inorganic gas data from the 1988 landfill gas characterization study and the 1992 source emission evaluation were collected more than 25 years ago and are not expected to be representative of current site conditions.
- The original analytical laboratory data and supporting data quality summaries were not available for the 1988 landfill gas characterization study and the 1992 source emission evaluation at the time of this assessment and as a result, reporting limits were not available for comparison with applicable screening levels.
- It is not clear how many locations were sampled and how many sample events were conducted as part of the 1988 landfill gas characterization study because these details were not provided in the RI summary and Appendix E of the Landfill Gas Technical Report was not available at the time of this assessment. In addition, VOC results were presented in the RI in summary form (mean and/or maximum concentrations only) with no notation of the number of samples collected (see Tables 6-1 and 8-1 of the RI). Therefore, it is not known if the number of sample locations or frequency of sample events were sufficient to assess spatial and temporal variability for VOCs or inorganic

gas concentrations in landfill gas. Hydrogen sulfide results for only two samples collected from the north and south flare inlet were presented in the RI.

- During the 1992 source emission evaluation, three gas samples were collected from one flare inlet and one flare outlet each during a single sample event (February 7, 1992). Additional samples were collected November 7 and 8, 1991, but were not presented in the source emission evaluation after data from this sampling event indicated that there had been a leak in the inlet sampling system. The limited number of sample locations (one flare inlet) and frequency of sample events (one day) are not sufficient to assess spatial and temporal variability for VOC concentrations in landfill gas.

Based on the determinations noted above, the available landfill gas results for VOCs and inorganic gases are not considered to be of sufficient quality and reliability for use in this HHRA and should not be compared to risk-based screening levels. However, to document the available data and for informational purposes, these data are summarized in Section 3.2.4 and Tables 4, 5a, 5b and 6 of this report. When reviewing these data, it is important to note that landfill gas samples collected from the landfill gas extraction system do not provide a representative measure of the COI concentrations that workers may be exposed to at the OMF South for the following reasons: 1) these gas samples were collected under vacuum conditions from varying depths within the landfill and therefore are not likely to be representative of gases that may be escaping the landfill cap, and 2) these gas samples are not likely to be representative of gas concentrations that would be found near the surface due to differences in attenuation prior to sample collection.

3.2.4 Landfill Gas Data Summary

3.2.4.1 Methane Sampling Results (2015-2019)

Monthly methane sample results for January 2015 through August 2019 were provided by SPU for this HHRA. These results included methane concentrations for 106 locations within the landfill gas extraction system (e.g., extraction wells, vacuum manifolds, etc.). Raw data were provided in excel format with limited information on the well locations. However, to confirm their onsite location, well identification numbers were compared to onsite extraction wells and vacuum manifold shown on Figure 8 of the Third Five-Year Review (USEPA 2015a) and included in Appendix A of this report. Wells labeled as 1, 50, 52, MAN, MAN-N, and MAN-S could not be located, but are included in the methane summary tables (Tables 2 and 3). All other wells were confirmed as onsite based on Figure 8 of the Third Five-Year Review (USEPA 2015a).

No applicable toxicity- or risk-based screening levels are available for comparison to methane concentrations detected in landfill gas. However, state regulations (WAC 173-304-460) establish that methane concentrations at a landfill shall not exceed the following:

- 25% of the lower explosive limit (LEL) in facility structures (excluding gas control or recovery system components);
- 100% of the LEL at the property boundary or beyond; and
- 100 ppm by volume of hydrocarbons (expressed as methane) in offsite structures.

Available methane data were summarized by sample location (e.g., onsite extraction well or vacuum manifold) and by year in Table 2 and Table 3. Methane concentrations above the LEL of 5% by volume were found at 75 of the onsite locations (e.g., at least one or more samples collected from these locations between January 2015 and August 2019 were greater than the LEL). The majority (>50%) of all samples collected between January 2015 and August 2019 exceed the LEL (Table 3). Methane concentrations from onsite locations sampled between January 2019 and August 2019 range from 0 to 27.9% with an average concentration of 7.3% (Table 3).

According to the Third Five-Year Review for the Midway Landfill Superfund Site, methane concentrations above the LEL have been detected outside the landfill boundary at one probe location (AM) from 2010 through 2014 (USEPA 2015a). Methane concentrations are highest in the shallow completion of the AM probe, screened from 25 to 40 feet bgs (USEPA 2015a). The AM gas probe is located at the northeast corner of the landfill and is outside the influence of the current gas extraction system (USEPA 2015a) (see Figure 9 of the Third Five-Year Review in Appendix A of this report). No additional offsite probes have shown detected concentrations of methane above the LEL from 2010 through 2014.

3.2.4.2 VOC and Inorganic Gas Sampling Results (1988 and 1992)

A wide variety of substances, including 23 HSL VOCs, were found in subsurface gas collected from the onsite gas extraction wells and flare manifolds during the gas characterization study and source emissions evaluation. The RI noted that ethylbenzene, vinyl chloride, total xylenes, toluene, and benzene were found most frequently and in the highest concentrations in onsite subsurface gas (Parametrix 1988a) and the mean and maximum concentrations of these select compounds were presented in Table 6-1 of the RI. Maximum observed concentrations of additional VOCs detected in onsite subsurface gas and flare inlet gas samples were presented in Table 8-1 of the RI (Parametrix 1988a). These results were presented in parts per billion (ppb) in the RI and were converted to $\mu g/m^3$, as shown in Tables 4 and 5a. Hydrogen sulfide concentrations reported in Table 7-6 of the RI are shown in Table 5b.

Fifteen VOCs were detected in inlet gas (Flare #3) during the 1992 source emission evaluation. The original laboratory analysis reported VOCs in concentration units of $\mu g/m^3$; however, these concentration units were converted to emission rate units of mg/min for use in calculating destruction efficiencies for the evaluation. The original laboratory analysis was not available at the time of this assessment. Therefore, the emission rate results presented in the report (mg/min) were converted back to µg/m^3 using the air flow rates (dry standard cubic feet per minute) for the inlet of Flare #3 provided in the summary table on page 8 of the source emissions evaluation. These results are shown in Table 6 of this report.

Because these VOC and inorganic gas sampling results (1988 and 1992) are not of sufficient quality and reliability and are not considered to be representative of current site conditions, a quantitative comparison between detected concentrations and applicable screening levels will not be made. However, regulatory screening levels for sub-slab, deep soil, and near source soil gas for occupational exposures are included in Table 7 of this report for reference.

3.3 Potential Data Gaps

Based on an examination of available environmental data and supporting documents, the groundwater and methane datasets are considered to be of sufficient quality and reliability to support a quantitative comparison to risk-based screening levels as part of this HHRA.

However, additional sampling is needed to develop a sufficient and reliable dataset to characterize site conditions and human health risks associated with potential exposures to COIs in landfill gas. Future sampling of landfill gas constituents should be conducted following an approach that generates the appropriate environmental data needed to characterize occupational exposures and evaluate potential health risks at the OMF South. Some representative measures of occupational exposure to VOCs and inorganic gases in landfill gas may include post-construction sub-slab soil gas concentrations and/or indoor air concentrations.

4.0 Exposure Assessment

The first step in an exposure assessment is the development of a Conceptual Site Model (CSM). The CSM describes the physical characteristics of the site, site-specific exposure scenarios, potential exposure pathways (or routes of exposure), and potentially exposed populations. Following development of the CSM, site COPCs are identified by comparing concentrations of COIs found in groundwater and landfill gas to risk-based screening levels.

Once site COPCs are identified through this screening process, the magnitude, frequency, and duration of exposures at the site can then be quantified based on COPC concentrations and chemical- and pathway-specific intake parameters.

This section presents the CSM, a quantitative comparison of exposure concentrations to risk-based screening levels, and a discussion of site COPCs.

4.1 Conceptual Site Model

The CSM for the Midway Landfill describes potential chemical sources, release mechanisms, environmental transport processes, exposure scenarios, potential routes of exposure, and potentially exposed populations. The primary purpose of the CSM is to describe pathways by which human receptors may be exposed to COIs at a site. According to the USEPA (1989), a complete exposure pathway consists of four necessary elements: 1) a source and mechanism of chemical release to the environment, 2) an environmental transport medium for a released chemical, 3) a point of potential contact with the impacted medium (referred to as the exposure point), and 4) an exposure route (e.g., groundwater ingestion, vapor intrusion) at the exposure point.

The CSM, based on available information, is shown in Figure 1 and primary sources of landfill COIs, human receptors, and potentially complete routes of exposure are discussed below.

4.1.1 Primary Sources

The majority of chemical impacts to groundwater and subsurface gas at the Midway Landfill result from landfill waste. However, site investigations indicated that some chemicals found in onsite groundwater and subsurface gas were also found in upgradient groundwater monitoring wells and therefore may be from unidentified, upgradient sources (USEPA 2015a).

As discussed in Section 2.2, the Midway Landfill was used as a landfill for demolition materials, wood waste, and other slowly decomposing materials (USEPA 2015a). Records from the early 1980s indicate that paint sludge, dyes, preservatives for decorative plants, alkaline wastes, oily sludge, waste coolant, truck steam cleaning wastes, and some oily wastes were deposited at the site (Parametrix 1988a). In addition, approximately two million gallons of bulk industrial liquids from a single source were placed in the landfill (USEPA 2015a). However, the nature and type of industrial liquids disposed of in the Midway Landfill is not known.

According to the RI, an estimated three million cubic yards of solid waste were deposited in the Midway Landfill (Parametrix 1988a). Landfill gas is a byproduct of decomposition of organic materials in landfills. Landfill gas is composed mainly of methane and carbon dioxide. However, VOCs (such as benzene and vinyl chloride) can also be found in landfill gas.

During the RI, onsite landfill gas was found to contain numerous USEPA HSL VOCs with ethylbenzene, vinyl chloride, total xylenes, toluene, and benzene found most frequently and in the highest concentrations onsite. Hydrogen sulfide and carbon monoxide were also detected in onsite landfill gas samples (Parametrix 1988a).

The RI identified a number of HSL compounds in groundwater and the ROD established groundwater cleanup levels for manganese, 1,2-dichloroethane, and vinyl chloride based on the protection of downgradient drinking water. The most recent groundwater quality results from 2010-2014 (Parametrix 2015) showed the following exceedances in groundwater wells in the vicinity of the Midway Landfill:

- One downgradient well in the SGA exceeded the 1,2-dichloroethane cleanup level in 2013.
- One upgradient well in the SA and three downgradient wells in the SGA exceeded the vinyl chloride cleanup level during the 2010-2014 sampling rounds with one upgradient well in the SA and one downgradient well in the SGA dropping below the vinyl chloride cleanup level in 2014.
- Two downgradient wells (one in the SA and one in the SGA) exceeded the manganese cleanup level during the 2010-2014 sampling rounds.
- 1,1-dichloroethene, tetrachloroethene, and trichloroethene have consistently been detected in two upgradient wells in the SA at concentrations greater than MTCA Method B Groundwater cleanup levels. However, high tetrachloroethene concentrations (ranging from 110-130 µg/L) in one of the upgradient wells indicates the presence of an upgradient source of this contaminant.
- 1,4-Dioxane has been detected in two upgradient wells and one downgradient well in the SA at concentrations greater than the MTCA Method B Groundwater cleanup level. All downgradient wells in the SGA have exceedances of 1,4-dioxane in all rounds of sampling from 2010-2014. The boundary of the 1,4-dioxane plume is unknown at this time, and additional characterization is needed to determine its extent (USEPA 2015a).

4.1.2 Fate and Transport

The primary release mechanisms that affect the fate and transport of COIs released from waste contained in the Midway Landfill include leaching from waste to underlying groundwater and the migration of landfill gas into and through subsurface soil (see Figure 1).

Secondary release mechanisms include the volatilization of COIs from groundwater into subsurface soil and the transport of subsurface soil gas through the subsurface or through the landfill cover. COIs may also migrate through underlying groundwater.

Advection and dispersion in groundwater, sorption to the soil, and natural degradation processes also play a role in the fate and transport of each COI depending on its individual chemical and physical properties. In addition, the properties of soil and the dynamics of groundwater flow also impact contaminant fate and transport. Once in groundwater, dissolved COIs may be transported by diffusion and advection in groundwater. In general, the potential for a chemical to migrate in groundwater increases as a function of chemical solubility. Dispersion, retardation, and biodegradation act to reduce dissolved concentrations of COIs in groundwater downgradient of the source area.

Some COIs found in waste, soil, soil gas, or groundwater may volatilize into soil pore spaces and migrate via diffusion and advection through the soil into indoor and/or outdoor air. Diffusive transport generally moves in the direction of lower soil gas concentrations while advective transport occurs in the direction of lower air pressure. Advection can occur near buildings due to differences in temperatures between the building and the subsurface environment or the operation of heating and cooling systems and fans that create pressure differentials and influence soil gas entry. Advection of soil gas may also occur due to fluctuations in barometric pressure. In addition, landfills where methane is generated in sufficient quantities may induce advective transport. Overall, soil gas concentrations decrease as the volatile chemicals move from the source through subsurface soil and into indoor or outdoor air (USEPA 2015b).

The infiltration of water into the landfill waste and subsequent leaching to groundwater and the migration of landfill gas through the subsurface to indoor and ambient air is currently controlled by the gas extraction system and the landfill cap. The cap provides a barrier which, along with the gas extraction system, reduces the migration of volatile compounds found in landfill gas and groundwater to the surface where they may enter onsite buildings and/or outdoor air. Migration of volatile compounds through the landfill cover is possible if the gas extraction and cover system were compromised.

If buildings are located directly over an area where the landfill cap has been compromised, it is possible that vapors may enter indoor air by penetrating cracks in a building floor, slab, or foundation, or via mechanical systems. Once in outdoor air, mixing with ambient air is expected to reduce COI concentrations substantially (USEPA 2015b).

4.1.3 Exposure Scenarios

The Midway Landfill will be used for occupational purposes if it is selected as the location of the future OMF South. As a result, various workers (not residents) will have the greatest potential to contact impacted soil gas, groundwater, or air. These workers include long-term Onsite Office, Maintenance Shop, and Yard Workers and short-term Construction Workers.

The following potential exposure scenarios were identified for OMF South personnel at the Midway Landfill. The exposure scenarios described below are not exhaustive but rather are intended to represent exposure profiles for broad occupational categories for those personnel with similar work environments, activities, and exertion levels. Potential occupational routes of exposure to COIs found in landfill waste, gas, and groundwater are described in the CSM (Figure 1) and discussed in Section 4.1.4.

4.1.3.1 Onsite Office Worker

The Onsite Office Worker spends most, if not all of the workday indoors conducting relatively sedentary activities (e.g., desk work, meetings). This exposure scenario assumes that the Onsite Office Worker is a long-term, full-time employee at the OMF South. The Onsite Office Worker is assumed to work at the OMF South for 8 hours a day, 5 days a week for 30 years.

4.1.3.2 Maintenance Shop Worker

The Maintenance Shop Worker spends most, if not all of the workday conducting maintenance activities inside a shop that can be opened to the outdoors during good weather. This exposure scenario assumes that the Maintenance Shop Worker is a long-term, full-time employee at the OMF South who spends a portion of the year working in an enclosed indoor environment and within depressed maintenance pits and a portion of the year working in an environment where s/he is exposed to a mix of indoor and outdoor air. The Maintenance Shop Worker is assumed to work at the OMF South for 8 hours a day, 5 days a week for 30 years.

4.1.3.3 Yard Worker

The Yard Worker spends most, if not all of the workday conducting relatively vigorous work activities outdoors. This exposure scenario assumes that the Yard Worker is a long-term, full-time employee at the OMF South. The Yard Worker is assumed to work at the OMF South for 8 hours a day, 5 days a week for 30 years.

4.1.3.4 Construction Worker

The Construction Worker spends most, if not all of the workday conducting vigorous construction activities outdoors. This exposure scenario assumes that the Construction Worker is a short-term, full-time employee at the OMF South. The Construction Worker may periodically enter onsite utility trenches and underground stormwater vaults for repair and maintenance. The Construction Worker is assumed to work at the OMF South for 10 hours a day, 5 days a week for 6 years.

4.1.4 Potential Routes of Exposure

Based on the knowledge of the current conditions at the Midway Landfill and possible future site uses, the following potential occupational routes of exposure to COIs in landfill waste, gas, and groundwater were identified and evaluated (see Figure 1):

- Inhalation of Indoor Air
- Inhalation of Air in Subsurface Confined Spaces (e.g., utility trenches and vaults),
- Inhalation of Outdoor Air,
- Groundwater Ingestion, and
- Direct Contact with Waste and Contaminated Soil.

These potential routes of exposure are based on the assumptions that construction of the OMF South may result in future site conditions that could allow for vapor intrusion from subsurface gas and underlying groundwater to indoor air (see the description of Concept 3 in Section 2.4.3).

4.1.4.1 Inhalation of Indoor Air

It is assumed that onsite workers could have indirect exposure to COIs in vapors from subsurface soil gas and/or groundwater due to vapor intrusion into indoor or confined spaces (including depressed maintenance pits) and subsequent inhalation of indoor air.

According to the USEPA (2015b), the vapor intrusion pathway is considered complete when the following conditions are met:

1) A subsurface source of vapor-forming chemicals is present underneath or near buildings;
2) Vapors form and have a route along which to migrate toward the building;
3) Openings exist for vapors to enter the building and driving ‘forces’ (e.g., air pressure differences between the building and the subsurface environment) exist to draw the vapors from the subsurface through the openings into the buildings;
4) One or more vapor-forming chemicals comprising the subsurface vapor sources are found to be present in the indoor environment; and
5) The buildings are occupied by one or more individuals when the vapor-forming chemicals are present indoors.

Although the migration of landfill gas is currently controlled by the gas extraction system and the landfill cap and no buildings are located at the landfill at this time, future buildings could be constructed in such a way that vapors from subsurface soil gas or groundwater could breach the cap and enter indoor air through cracks in a building's foundation where they could then be inhaled by workers. This route of exposure is likely to be complete if adequate engineered protections including a functioning gas extraction system and landfill cap are not in place to prevent vapor intrusion. This is a potentially complete route of exposure for Onsite Office and Maintenance Shop Workers.

4.1.4.2 Inhalation of Air in Confined Spaces

OMF South workers could have indirect exposure to volatile COIs in subsurface soil gas and groundwater via vapor migration through the subsurface to confined spaces such as utility trenches and stormwater vaults where they could then be inhaled by workers. This route of exposure is likely to be complete if adequate engineered protections, (e.g., a functioning gas extraction system and landfill cap) are not in place to prevent vapor migration and if worker health and safety protocols for confined spaces are not followed. This is a potentially complete route of exposure for Construction Workers.

4.1.4.3 Inhalation of Outdoor Air

Another pathway by which workers could have indirect exposure to volatile COIs in subsurface soil gas and groundwater is vapor migration through the landfill cap into outdoor air where they could then be inhaled by workers. This route of exposure is likely to be complete if adequate engineered protections (e.g., a functioning gas extraction system and landfill cap) are not in place to prevent vapor migration to the surface. This is a potentially complete route of exposure for Maintenance Shop, Yard, and Construction Workers.

4.1.4.4 Groundwater Ingestion

Currently, no one is known to be drinking groundwater from any aquifer within almost a mile of the landfill (USEPA 2015a) and there are no water supply wells at the landfill. Further, state regulations (WAC 173-160-171) do not allow any new private drinking water wells within 1,000 feet of a solid waste landfill or 100 feet of all other sources or potential sources of contamination and Ecology must be notified prior to the construction of any well (USEPA 2015a). Per the NCP, the Midway Landfill is considered a waste management area and thus is not considered a future drinking water source by the USEPA (USEPA 2015a). As a result, this route of exposure is considered to be incomplete for all occupational exposure scenarios described above.

4.1.4.5 Direct Contact with Waste and Contaminated Soil

Landfill waste and contaminated soil are currently covered by the landfill cap which prevents workers from directly contacting subsurface contamination. However, it is assumed that this landfill cap will be temporarily removed to allow for excavation into the underlying waste and soils during construction of the OMF South. Without the use of proper personal protective equipment (PPE) and site controls, Construction Workers may be exposed to contaminants through incidental inhalation, dermal exposure, and incidental ingestion of exposed waste and contaminated soil during construction and excavation activities. This is a potentially complete route of exposure for Construction Workers.

4.2 Selection of COPCs for the HHRA

To focus the HHRA on COIs with the potential to cause health risks to workers who may come in contact with them through a potentially complete or complete exposure route, the list of chemicals detected at the Midway Landfill was evaluated and reduced. COPCs have been selected using criteria recommended by the USEPA (1989) and best scientific judgment. Chemicals were selected primarily on the basis of measured concentrations and inherent toxicity.

COPCs were selected by comparing the maximum detected concentration to applicable risk-based screening levels. These risk-based screening levels are media-specific concentrations derived from conservative exposure assumptions and available toxicity values.

Screening values are compared to chemical concentrations in site media to qualitatively assess risk to future OMF South workers and to determine if COPC concentrations warrant additional investigation and/or a more detailed, site-specific risk assessment before adequate risk management decisions can be made.

Groundwater concentrations were compared to vapor intrusion screening levels for occupational exposure scenarios (MTCA Method C Groundwater Vapor Intrusion Screening Level; Ecology 2018a and 2018b; WAC 173-340-750) and USEPA Worker Air Vapor Intrusion Screening Levels (VISLs) for Groundwater (USEPA 2018a) (Table 1).

As mentioned earlier, no risk-based screening levels for methane are available for comparison in the HHRA due to a lack of toxicological effects (see the toxicological profile for methane in Section 5.1.2). However, methane is highly flammable, can explode at concentrations between 5% (LEL) and 15% (upper explosive limit), and is a simple asphyxiant that can cause death at concentrations much higher than the explosive range (5-15%). Non-toxicological hazards associated with methane are discussed in more detail in Section 5.1.2 and Section 7.

During data evaluation, it was determined that available landfill gas results for VOCs and inorganic gases are not of sufficient quality and reliability for use in this HHRA and do not represent current conditions at the Midway Landfill. Therefore, VOCs and inorganic gases found in landfill gas are not considered for quantitative risk assessment and are not compared to applicable screening levels. Instead, the data are presented in Tables 4, 5a, and 6 and the toxicities of select VOCs (e.g., those with historically high concentrations) are discussed in Section 5.1.1 for informational purposes only. Regulatory screening levels for sub-slab, deep soil, and near source soil gas for occupational exposures are also presented in Table 7 for reference.

Screening levels for groundwater vapor intrusion and sub-slab, deep soil, and near source gas, along with the exposure assumptions and target risk levels used to derive these screening levels, are discussed in detail in Section 4.2.1.

4.2.1 Screening Levels

Applicable risk-based screening levels were selected for comparison with COI concentrations based on the future occupational use of the site, the occupational (worker) exposure scenarios, and the potentially completed routes of exposure identified in Sections 4.1.3 and 4.1.4. These screening levels were reviewed to verify that they were sufficiently protective of the occupational exposures expected to occur at the OMF South. The basis for the risk-based screening levels selected for comparison (or reference, in the case of subsurface soil gas) is described below.

In order to derive groundwater vapor intrusion and soil gas vapor intrusion screening levels that are protective of indoor air, acceptable indoor air concentrations must first be established. These acceptable air concentrations (USEPA Indoor Worker VISL [USEPA 2018a] and MTCA Method C Indoor Air cleanup levels [WAC 173-340-750] for facilities qualifying as industrial properties under WAC 173-340-745 and for utility vaults and manholes [WAC 173-340-706]) are based on exposure assumptions that are highly protective in nature and are derived using the assumptions and equations shown in Figures 2 and 3.

Indoor air screening levels are calculated using conservative assumptions regarding inhalation rate, exposure duration, and other exposure factors for occupational workers. For example, the USEPA Indoor Worker VISLs have been developed assuming workers have chronic exposure to impacted indoor air over most of their careers (i.e., 250 days per year, 8 hours a day for 25 years for carcinogens and non-carcinogens) and the MTCA Method C Indoor Air cleanup levels for occupational scenarios have been developed with similar conservative exposure assumptions (i.e., 365 days per year, 24 hours per day for 30 years for carcinogens and 365 days per year, 24 hours per day for 6 years for non-carcinogens) (See Figures 2 and 3 for these screening level equations and exposure parameters).

The target risk levels used by the USEPA when developing these screening levels are the same as those used in the MTCA Method C Indoor Air cleanup level equations (see Figures 2 and 3).

Target risk levels for carcinogens is one in a one hundred thousand (10^{-5}) excess cancer risk over a lifetime or the probability that a lifetime exposure to a substance increases a person's chance of developing cancer by one chance in one hundred thousand or less. For the non-carcinogens, the target risk is a hazard quotient of one. A hazard quotient is the ratio of the potential exposure to a substance (or dose) and the level at which no adverse effects are expected. If the hazard quotient is calculated to be greater than one, then adverse health effects are possible.

Both the USEPA Indoor Worker VISL and MTCA Method C Indoor Air cleanup level for a carcinogenic chemical are expressed as a concentration associated with a one in a one hundred thousand (10^{-5}) excess cancer risk over a lifetime. For a non-carcinogen, these screening levels are expressed as the concentration associated with a hazard quotient of one.

Once acceptable risk-based indoor air concentrations have been established, screening levels for Soil Gas and Groundwater Vapor Intrusion are derived by applying USEPA-recommended generic vapor attenuation factors that are protective of worst case vapor intrusion scenarios. Generic vapor attenuation factors and equations for groundwater, and sub-slab, near source, and deep soil gas are shown in Figures 4 and 5.

Soil Gas and Groundwater Vapor Intrusion screening levels that are protective of acceptable indoor air concentrations are also expected to be protective of acceptable outdoor air concentrations due to the substantial reduction of COIs in outdoor air concentrations when mixed with ambient air. However, these screening levels are not expected to be protective of air concentrations in underground confined spaces.

4.2.2 Contaminants of Potential Concern

Maximum concentrations of those COIs detected in groundwater samples from 2010 through 2014 were compared to occupational screening levels for vapor intrusion (e.g., MTCA Method C Groundwater Vapor Intrusion screening levels or the USEPA Worker Air VISLs for Groundwater) in Table 1. Because the groundwater ingestion pathway is not currently complete and will not be complete in the future, groundwater results were not compared to screening levels for groundwater ingestion.

No COIs detected in underlying groundwater at the Midway Landfill exceed the respective MTCA Method C Groundwater Vapor Intrusion Screening Levels or the USEPA Worker Air VISLs for Groundwater (Table 1). As a result, based on the exposure scenarios and potentially complete exposure routes identified in the CSM (Figure 1) and discussed in detail in Section 4.1, no groundwater COPCs were selected for quantitative risk assessment.

As discussed in Section 4.2, due to the absence of representative landfill gas results for VOCs and inorganic gases, no subsurface soil gas COPCs were identified. However, because a number of VOCs in landfill gas were detected relatively frequently and, in some cases, at high concentrations in previous investigations, they have been included in the Toxicity Assessment in

Section 5.1.1 below. A toxicity profile for methane gas is also included in Section 5.1.2 and non-toxicological hazards associated with methane gas are discussed in Section 7.

5.0 Toxicity Assessment

In order to characterize potential carcinogenic and non-carcinogenic risks associated with complete exposure routes, toxicity information for each potential site contaminant is evaluated as part of the toxicity assessment. The recommended hierarchy of toxicological sources for use in human health risk assessment involves three tiers. Tier 1 is the USEPA Integrated Risk Information System (IRIS); the first source of toxicity data. Tier 2 is the USEPA Provisional Peer Reviewed Toxicity Values (PPRTV). Many of the PPRTVs are developed by the USEPA National Center for Environmental Assessment (NCEA). Finally, Tier 3 includes additional USEPA and non-USEPA toxicity sources.

Two general types of health effects are considered in human health risk assessment: cancer effects and adverse non-cancer effects. This distinction is made because the USEPA generally assumes that a dose threshold exists for non-carcinogens, and that adverse health effects are unlikely to occur if humans are exposed to chemical doses below the threshold. No such threshold is generally assumed for carcinogens. Instead, it is assumed that there is a finite probability of developing cancer associated with any exposure to a carcinogen.

As a result, carcinogens and non-carcinogens have separate toxicity criteria. Reference dose or reference concentration values are used to evaluate non-carcinogenic health effects, and slope factors or unit risk factors are used to evaluate carcinogenic health risks. In general, the toxicological effects of a compound are the dominant health effects of the chemical as determined by the USEPA.

5.1 Toxicological Profiles for VOCs in Landfill Gas

Benzene

Benzene is a known human carcinogen for all routes of exposure (inhalation, oral, and dermal) based upon convincing human evidence as well as supporting evidence from animal studies. Epidemiologic studies and case studies provide clear evidence of a causal association between exposure to benzene and acute myelogenous leukemia, which is a cancer of the blood-forming organs, and also suggest evidence for other subtypes of leukemia such as non-Hodgkin’s lymphoma (a cancer that forms in lymphocytes) and multiple myeloma (a cancer that forms in plasma cells) (ATSDR 2007a, 2015a). These human data are supported by animal studies. The experimental animal data add to the argument that exposure to benzene increases the risk of cancer in multiple species at multiple organ sites. Recent evidence supports the viewpoint that there are likely multiple mechanistic pathways leading to cancer and, in particular, to the development of leukemia from exposure to benzene (ATSDR 2007a, 2015a). The oral slope factor[4] for benzene is $1.5\text{x}10^{-2}$ to $5.5\text{x}10^{-2}$ milligrams per kilogram per day^{-1} (mg/kg-day)$^{-1}$ (IRIS 2003a).

Benzene has a low solubility rate and resulting low bioaccumulation in marine life. Benzene is mobile in soil and leaches into groundwater depending on soil type, amount of rainfall, depth of the groundwater, and extent of degradation. It tends to adsorb to aquifer solids and greater soil adsorption was observed with high organic matter content. Benzene is highly volatile and benzene released to the environment partitions mainly to the atmosphere. Biodegradation, principally aerobic, is the most important fate process of benzene in water and benzene can persist in groundwater (ATSDR 2007a).

Chlorobenzene

Chlorobenzene is a colorless liquid with an almond-like odor. The compound does not occur widely in nature, but is manufactured for use as a solvent and is used in the production of other chemicals. Chlorobenzene persists in soil (several months), in air (3.5 days), and water (less than 1 day) (ATSDR 1990).

Chlorobenzene is not classifiable as a human carcinogen based on no human data and inadequate animal data (IRIS 1990a). Occupational exposure occurs primarily through breathing the chemical. Workers exposed to high levels of chlorobenzene complained of headaches, numbness, sleepiness, nausea, and vomiting. However, it is not known if chlorobenzene alone was responsible for these health effects since the workers may have also been exposed to other chemicals at the same time (ATSDR 1990). The reference dose (RfD) is $2\text{x}10^{-2}$ mg/kg-day and affects the liver (IRIS 1990a).

1,4-Dichlorobenzene

Dichlorobenzenes do not occur naturally; chemical companies produce them to make products for home use and other chemicals such as herbicides and plastics. 1,4-Dichlorobenzene, the most important of the three chemicals (1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene), is a colorless to white solid. It smells like mothballs and it is one of two chemicals commonly used to make mothballs. 1,4-Dichlorobenzene also is used to make deodorant blocks used in garbage cans and restrooms, and to help control odors in animal-holding facilities. 1,4-Dichlorobenzene has been used as an insecticide on fruit and as an agent to control mold and mildew growth on tobacco seeds, leather, and some fabrics (ATSDR 2006a).

---

[4] An oral slope factor is a measure of a chemical's carcinogenicity. More precisely, it is an estimate of the probability that an individual will develop cancer if orally exposed to a specified amount or dose of the chemical every day for a lifetime.

The U.S. Department of Health and Human Services has determined that 1,4-dichlorobenzene might be a human carcinogen. The International Agency for Research on Cancer (IARC) (an expert group that is part of the World Health Organization) determined that 1,4-dichlorobenzene is possibly carcinogenic to humans (ATSDR 2006a; IRIS 1994). It has a reference concentration (RfC) of $8x10^{-1}$ milligrams per cubic meter (mg/m^3) (IRIS 1994). Humans are exposed to 1,4-dichlorobenzene mainly by breathing vapors from 1,4-dichlorobenzene products. Inhaling the vapor or dusts of 1,2-dichlorobenzene and 1,4-dichlorobenzene at very high concentrations could be very irritating to the eyes and nose and cause burning and tearing of the eyes, coughing, difficult breathing, and an upset stomach. Animal studies also found that 1,4-dichlorobenzene caused effects in the kidneys and blood. Lifetime exposure to 1,4-dichlorobenzene by breathing or eating induced liver cancer in mice.

1,1-Dichloroethane

1,1-Dichloroethane is a colorless oily liquid with a chloroform-like odor and is a chemical used mostly as an intermediate in the manufacture of 1,1,1-trichloroethane. 1,1-Dichloroethane is also used in limited amounts as a solvent for cleaning and degreasing, and in the manufacture of plastic wrap, adhesives, and synthetic fiber (ATSDR 2015b).

Based on no human data and limited evidence of carcinogenicity in animals (rats and mice), 1,1-dichloroethane is a possible human carcinogen. In those studies using high doses of 1,1-dichloroethane in rats and mice, there is an increased incidence of mammary gland adenocarcinomas (cancer of the glandular tissues) and hemangiosarcomas (cancer of the blood vessels) in female rats and an increased incidence of hepatocellular carcinomas (liver cancer) and benign uterine polyps in mice (IRIS 1990b).

Relatively little information is available on the health effects of 1,1-dichloroethane in humans or animals. 1,1-Dichloroethane is in a class of chemicals, called chlorinated aliphatics, which are known to cause central nervous system depression and respiratory tract and dermal irritation when humans are exposed by inhalation to sufficiently high levels. In the past, 1,1-dichloroethane was used as an anesthetic; however, this use was discontinued due to the risk of causing heart rhythm problems (cardiac arrhythmias) in humans at anesthetic doses (approximately 26,000 ppm). A small number of animal studies have examined the toxicity and carcinogenicity of 1,1-dichloroethane; these studies have failed to conclusively identify the critical targets of toxicity (ATSDR 2015b). There is neither a RfD for oral exposure nor a RfC for inhalation exposure (IRIS 1990b).

1,1-Dichloroethane does not degrade quickly in water, but it can evaporate from the water into the air. 1,1-Dichloroethane released to soil surfaces evaporates rapidly to the air. Residual 1,1-dichloroethane remaining on soil surfaces would be available for transport into groundwater, since it is not expected to bind to soil particulates unless the organic content of the soil is high (ATSDR 2015b).

1,2-Dichloroethane

1,2-Dichloroethane is a manufactured chemical that is not found naturally in the environment. It is a clear liquid and has a pleasant smell and sweet taste. The most common use of 1,2-dichloroethane is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including polyvinyl chloride (PVC) pipes, furniture and automobile upholstery, wall coverings, housewares, and automobile parts. It is also used as a solvent and is added to leaded gasoline to remove lead (ATSDR 2001).

1,2-Dichloroethane is a probable human carcinogen based on sufficient evidence of carcinogenicity in animals. In those studies, several tumor types in rats and mice treated by feeding tube were found and benign cell growths (papillomas) in the lungs of mice were found after they were fed large doses of 1,2-dichloroethane. There are no human data to support this carcinogenic finding (IRIS 1987). People who were accidentally exposed to large amounts of 1,2-dichloroethane in the air or who swallowed 1,2-dichloroethane by accident or on purpose often developed nervous system disorders and liver and kidney disease. Lung effects were also seen after a large amount of 1,2-dichloroethane was inhaled. Studies in laboratory animals also found that breathing or swallowing large amounts of 1,2-dichloroethane produced nervous system disorders, kidney disease, or lung effects. Reduced ability to fight infection was also seen in laboratory animals who breathed or swallowed 1,2-dichloroethane, but it is not known if this also occurs in humans. Longer-term exposure to lower doses also caused kidney disease in animals (ATSDR 2001). The oral slope factor for 1,2-dichloroethane is 9.1×10^{-2} (mg/kg-day)$^{-1}$. Oral RfD and inhalation RfC have not been evaluated (IRIS 1987).

1,2-Dichloroethane evaporates into the air very fast from soil and water. In the air, it breaks down by reacting with other compounds formed by the sunlight. 1,2-Dichloroethane will stay in the air for more than 5 months before it is broken down. It may also be removed from air in rain or snow. Since it stays in the air for a while, the wind may carry it over large distances. In water, 1,2-dichloroethane breaks down very slowly and most of it will evaporate to the air. In soil, 1,2-dichloroethane either evaporates into the air or travels down through soil and enters underground water. Small organisms living in soil and groundwater may transform it into other less harmful compounds, although this happens slowly (ATSDR 2001).

Ethylbenzene

Ethylbenzene is a colorless liquid that smells like gasoline. It moves easily into the air from water and soil. Ethylbenzene in soil can also contaminate groundwater. However, ethylbenzene is not considered highly persistent in the environment. Biodegradation under aerobic conditions and indirect photolysis are important degradation mechanisms for ethylbenzene in soil and water. Volatilization from water and soil surfaces is expected to be an important environmental fate process for ethylbenzene (ATSDR 2010).

Ethylbenzene is not classifiable as to human carcinogenicity due to lack of animal and human studies (IRIS 1988); however, the IARC has determined that long-term exposure to ethylbenzene may cause cancer in humans (ATSDR 2010). Ethylbenzene has an RfD of $1x10^{-1}$ mg/kg-day (IRIS 1988). In humans, exposure to high levels of ethylbenzene in the air for short periods can cause eye and throat irritation. Exposure to higher levels of ethylbenzene in short periods can result in vertigo and dizziness.

1,1,2,2-Tetrachloroethane

1,1,2,2-Tetrachloroethane is a synthetic, colorless, dense liquid that does not burn easily. It has a penetrating, sweet odor similar to chloroform. In the past, it was used in large amounts to produce other chemicals and as an industrial solvent. 1,1,2,2-Tetrachloroethane was also used to separate fats and oils from other substances, to clean and degrease metals, and in paints and pesticides. Although at one time it was used as an insecticide, fumigant, and weed killer, it presently is not registered for any of these purposes. Less toxic chemicals are now available to replace this solvent and large scale commercial production has stopped, although some production still occurs. It is presently used as a chemical intermediate, and information about this use is limited (ATSDR 2008).

1,1,2,2-Tetrachloroethane is likely to be carcinogenic to humans based on animal data (IRIS 2010). Breathing high levels in a closed room can cause fatigue, vomiting, dizziness, and possibly unconsciousness. Breathing, drinking, or touching large amounts of 1,1,2,2-tetrachloroethane for a long period of time can cause liver damage, stomachaches, or dizziness (ATSDR 2008). The oral slope factor and chronic RfD for 1,1,2,2-tetrachloroethane is $2x10^{-1}$ $(mg/kg\text{-}day)^{-1}$ and $2x10^{-3}$ (mg/kg-day), respectively.

Most 1,1,2,2-tetrachloroethane released to the environment eventually moves to the air or ground water. It does not attach to soil particles when released to land. When released to surface water, much of it will evaporate to the air while the rest may break down in the water. It takes about one year for half of the chemical to disappear from groundwater and two months in air.

Trichloroethene

Trichloroethene (also known as trichloroethylene) is a colorless, volatile liquid. It is nonflammable and has a sweet odor. The two major uses of trichloroethene are as a solvent to remove grease from metal parts and as a chemical that is used to make other chemicals. Trichloroethene has also been used as an extraction solvent for greases, oils, fats, waxes, and tars; by the textile processing industry to scour cotton, wool, and other fabrics; in dry cleaning operations; and as a component of adhesives, lubricants, paints, varnishes, paint strippers, pesticides, and cold metal cleaners (ATSDR 2019)

Based on sufficient evidence in humans regarding trichloroethene exposure and cancer, and evidence that high doses of trichloroethene can cause cancer in animals, trichloroethene is classified as a human carcinogen. There is strong evidence that trichloroethene can cause kidney cancer in people and some evidence that it causes liver cancer and malignant lymphoma (a blood cancer). Lifetime exposure to trichloroethene resulted in increased liver cancer in mice and increased kidney cancer in rats at relatively high exposure levels. There is some evidence for trichloroethene-induced testicular cancer and leukemia in rats and lymphomas and lung tumors in mice. There is also some evidence of an association between trichloroethene exposure and non-Hodgkin's lymphoma in humans (IRIS 2011; ATSDR 2019).

People who are overexposed to moderate amounts of trichloroethene may experience headaches, dizziness, and sleepiness; large amounts of trichloroethene may cause coma and even death. Some people who breathe high levels of trichloroethene may develop damage to some of the nerves in the face. Other effects seen in people exposed to high levels of trichloroethene include evidence of nervous system effects related to hearing, vision, and balance, changes in the rhythm of the heartbeat, liver damage, and evidence of kidney damage. Some people who get concentrated solutions of trichloroethene on their skin develop rashes. Relatively short-term exposure of animals to trichloroethene resulted in harmful effects on the nervous system, liver, respiratory system, kidneys, blood, immune system, heart, and body weight (ATSDR 2019). The oral slope factor and RfD for trichloroethene is $4.6x10^{-2}$ (mg/kg-day$^{)-1}$ and $5x10^{-4}$ (mg/kg-day), respectively (IRIS 2011).

Trichloroethene shows high mobility in soil. Trichloroethene partitions rapidly to the atmosphere from surface water. It has low volatility in soil. Trichloroethene has a low tendency to bioaccumulate in aquatic organisms and biomagnification does not seem to be important, although bioaccumulation in plants has been indicated (ATSDR 2019).

Vinyl chloride

Vinyl chloride is a manufactured substance that does not occur naturally; however, it can be formed in the environment when other manufactured substances, such as trichloroethene, trichloroethane, and tetrachloroethylene, are broken down by certain microorganisms. At room temperature and pressure, vinyl chloride is a colorless gas with a mild, sweet odor. Vinyl chloride is poorly soluble in water. Most of the vinyl chloride produced in the United States is used to make PVC, which consists of long repeating units of vinyl chloride. Vinyl chloride can migrate to groundwater and can be in groundwater due to the breakdown of other chemicals. Some vinyl chloride can dissolve in water (IRIS 2000). Overall, the data indicate that neither vinyl chloride nor its metabolites are likely to accumulate in plants, animals, or the human body (ATSDR 2006b; IRIS 2000).

Vinyl chloride is a known human carcinogen. The vinyl chloride RfD is $3x10^{-3}$ mg/kg-day and the RfC is $1x10^{-1}$ mg/m^3 (IRIS 2000). Because vinyl chloride usually exists in a gaseous state, you are most likely to be exposed to it by breathing it. If you breathe high levels of vinyl chloride, you will feel dizzy or sleepy. These effects occur within 5 minutes if you are exposed to about 10,000 ppm of vinyl chloride. People who breathe extremely high levels of vinyl chloride can die. Studies in animals show that extremely high levels of vinyl chloride can damage the liver, lungs, and kidneys. These levels also can damage the heart and prevent blood clotting. You can also be exposed to vinyl chloride by drinking water from contaminated wells. The effects of ingesting vinyl chloride are unknown. The liver is the most sensitive target organ for vinyl chloride toxicity for both intermediate- and chronic-duration inhalation and chronic-duration oral exposures (ATSDR 2006b).

Xylenes

Xylene, also known as xylol or dimethylbenzene, is primarily a synthetic chemical. It is a colorless, flammable liquid with a sweet odor. The term total xylenes refers to all three isomers of xylene (m-, o-, and p-xylene). Since xylene evaporates easily, most xylene that gets into soil and water (if not trapped underground) is expected to move into the air where it is broken down by sunlight into other less harmful chemicals within a couple of days. People are most likely to be exposed to xylene by breathing it in air contaminated with xylene vapors. Xylenes tend not to accumulate in the body, but may be sequestered briefly in fat tissues; elimination of xylene is slower in individuals with a greater percentage of body fat (ATSDR 2007b; IRIS 2003b).

There is insufficient information to determine whether or not xylene is carcinogenic (ATSDR 2007b; IRIS 2003b). The xylenes RfD is $2x10^{-1}$ mg/kg-day and the RfC is $1x10^{-1}$ mg/m^3 (IRIS 2003b). The primary effects of xylene exposure involve the nervous system by all routes of exposure, the respiratory tract by inhalation exposure, and, at higher oral exposure levels, liver, kidney, and body weight effects. Scientists have found that the three forms of xylene have very similar effects on health. Short-term exposure of people to high levels of xylene can cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; impaired function of the lungs; delayed response to a visual stimulus; impaired memory; stomach discomfort; and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance (ATSDR 2007b). The available studies indicate that xylenes are rapidly absorbed following both inhalation and oral exposure. Following absorption, considerable metabolism occurs, with the liver being the primary site of metabolism (IRIS 2003b).

5.2 Toxicological Profile for Methane

Methane is a colorless, odorless, flammable gas and the major component of natural gas (NRC 1984). In nature, methane is produced by the anaerobic bacterial decomposition of vegetable matter. Methane is an important source of hydrogen and some organic chemicals. Methane reacts with steam at high temperatures to yield carbon monoxide and hydrogen; the latter is used in the manufacture of ammonia for fertilizers and explosives. Other valuable chemicals derived from methane include methanol, chloroform, carbon tetrachloride, and nitromethane (Encyclopædia Britannica 2019).

Methane is lighter than air, having a specific gravity of 0.554. It is only slightly soluble in water. Methane in general is very stable, but mixtures of methane and air, with the methane content between 5 and 14 percent by volume, are explosive (Encyclopædia Britannica 2019). Methane is liquid under pressure (NJDOH 2016).

Little information is available on the toxicity of methane. It appears that toxic effects of methane, considered biologically inert, are related to the oxygen deprivation (asphyxiation) that occurs when methane is present in air at a high concentration (NRC 1984). Very high levels of methane can cause suffocation with symptoms of headache, dizziness, weakness, nausea, vomiting, loss of coordination and judgment, increased breathing rate, and loss of consciousness. Skin contact with liquefied methane can cause frostbite (NJDOH 2016).

6.0 Human Health Risk Assessment Findings

Risk characterization is the final step in an HHRA during which exposure estimates are combined with toxicity information to make qualitative and quantitative statements about risk and the conditions under which risk may occur. Risk characterization provides an overall depiction of the nature, magnitude, and likelihood of human health risks at a site and provides the basis for the selection of appropriate risk management options.

Exposure to vapors in landfill gas and groundwater were considered as a potentially complete route of exposure under the worst-case scenario assumption that a long-term failure in engineered protections (including the landfill cap and gas collection system) occurs at the OMF South, allowing for vapor intrusion from subsurface gas and underlying groundwater to indoor air.

Based on the comparison of available groundwater data to applicable risk-based screening levels, occupational exposure to COIs detected in underlying groundwater at the Midway Landfill via vapor intrusion is not expected to result in adverse chronic health effects.

In addition, occupational exposure to methane gas is not expected to result in adverse chronic health effects due to the relatively non-toxic nature of the gas. However, other occupational hazards associated with methane gas at the Midway Landfill may need to be considered and addressed through risk management efforts if Sound Transit selects the site for the future OMF South (see Section 7).

A high level of uncertainty remains regarding the potential risks associated with occupational exposures to VOCs and inorganic gases at the site due to a lack of sufficient and reliable data necessary to characterize human health risks. Although a number of toxic volatile compounds were identified in previous site investigations, these data were collected more than 25 years ago and likely do not represent current and future site conditions. An additional level of uncertainty exists regarding the potential for occupational exposure to COIs in landfill gas based on current and future site conditions and engineered controls. At this time, the migration of landfill gas through the subsurface to indoor and ambient air is controlled by the gas extraction system and the landfill cap. Based on the ROD, the City is required to ensure continued operation and maintenance of all components of the remedy (including the gas extraction system and the landfill cap) if any portion of the property is sold, leased, transferred, or otherwise conveyed. It is expected that future development of the OMF South at the Midway Landfill would include a gas extraction system and the landfill cap and other engineered protections to mitigate and monitor vapor intrusion of landfill gas (including methane) to indoor air.

However, in order to effectively quantify the risk associated with occupational exposures to COIs in landfill gas, additional sampling is needed to characterize site conditions and identify potential routes of exposure. Future sampling of landfill gas constituents should be conducted following an approach that generates the appropriate environmental data needed to characterize occupational exposures and evaluate potential health risks at the OMF South (e.g., post construction sub-slab soil gas and/or indoor air sampling). Pre-construction sampling of flare inlet gas and gas extraction wells could also be conducted to provide information on the COIs present in landfill gas at this time; however, concentrations of COIs in samples collected from the landfill gas collection system would not be appropriate for use in the assessment of occupational exposures at the OMF South as they are likely not representative of concentrations in the subsurface that may pose an unacceptable threat to indoor air quality in site buildings. At this point, quantification of any long-term worker risk is premature until representative data can be acquired.

7.0 Non-Toxicological Hazards Evaluation

Potential non-toxicological hazards at the OMF South are less a factor of exposure to the contaminants within the landfill and are more focused on site conditions at the landfill as a whole. As the landfill ages, material changes occur through the degradation of the solid waste material and the resulting production of liquid and gas. A more detailed background discussion of the landfill life cycle is available in the OMF South Landfill Evaluation Report (HDR 2019a). Some of the primary non-toxicological risk factors associated with redevelopment on a landfill include methane explosion risk, seismic events, and occupational exposure to site COIs during construction activities which are discussed below.

7.1 Methane Explosion

Decomposing solid waste generates landfill gas, of which methane is a primary constituent. The percentage of methane within landfill gas varies with time and other site-specific factors. Methane is an explosive hazard in the right concentration and under the right conditions. The Midway Landfill is currently generating landfill gas, which is collected by landfill gas wells, conveyed to a flare station by surface piping and vacuum blowers, and safely combusted. The landfill cap is a critical component of landfill gas control, eliminating the opportunity for gas to move through the landfill surface, and requiring landfill gas to progress through the landfill gas system. The development of the OMF South will require the reconstruction of portions, or all, of the landfill cap and gas collection system, depending on the construction design.

Further, the direct proximity of the OMF South to the landfill can create explosion risk if methane is able to intrude and build up in a confined space within the OMF South. In this case, if an ignition source was provided, an explosion could occur.

Explosion risk is present at the site and needs to be mitigated through engineering controls. Common means for protection would be the re-establishment of the landfill cap and gas collection system impacted during construction of the OMF South. This approach provides a methane barrier at the landfill surface and an active landfill gas collection system to create a positive draw on gas within the landfill.

Additional engineered protections can be incorporated into the OMF South design to mitigate the risk associated with a potential landfill cap leak and/or gas collection system failure for areas in contact with the landfill surface and subsequent migration of landfill gas into indoor air and confined spaces within the OMF South. An independent under slab methane barrier with passive gas ventilation could also be installed below building foundations and slabs to prevent vapor intrusion. This option would only be appropriate for three of the construction design approaches (Approaches 2, 3, and 4), which has portions of the OMF South constructed in contact with the landfill surface and a risk of gas intrusion through cracks in the slab and other vulnerabilities (see Section 2.4.3 for brief description of the each of the five construction design approaches). A methane barrier would not be required for yard slabs as these areas are able to vent to atmosphere. Approach 1 incorporates construction of the OMF South on an elevated platform making vapor intrusion of landfill gas unlikely since gas escaping from the landfill cap would dissipate prior to being able to enter the OMF South structure. Approach 5 incorporates construction of the OMF South on a slab foundation following the excavation of underlying solid waste. This approach would remove most of the landfill gas producing material during construction such that vapor intrusion would no longer be a concern. Approach 5 would not likely require an active landfill gas system, if one is required at all. However, if one were required, the system would be expected to be passive.

In addition to, or instead of, an independent methane barrier, gas sensors can be installed in occupied areas and in areas where site operations provide an ignition source. Sensors could be set to alarm at methane levels of 10% and 25% of the LEL. Appropriately classified electrical equipment can also help reduce potential ignition sources; however, considering the function of the OMF South, it is not reasonable to expect that all potential ignition sources can be eliminated.

Methane migration to in-ground, non-building, confined spaces, such as manholes and vaults, could occur through a leak in the landfill cap resulting in a methane explosion or asphyxiation hazard. These hazards can be managed through adherence to required confined space entry procedures including monitoring of methane and oxygen concentrations prior to entry.

If a seismic event were to occur, the site can be reviewed for visual indications of instability.

7.2 Seismic Considerations

Stability of a landfill mass can be different from developed sites on typical earth. A seismic and static stability analysis to demonstrate that a proposed landfill configuration will be stable is a requirement for new landfills. Old landfills may also have stability analysis requirements and are regularly inspected for signs of instability. Stability concerns have not been identified at Midway Landfill. The site configuration is primarily a backfill of a previous excavation and site slopes have no reported signs of instability.

All of the construction design approaches for the OMF South are expected to improve site stability. If Approach 1 is developed, the elevated platform will be designed to meet seismic standards. Approaches 2, 3, 4 and 5 will lower the landfill elevation and increase stability through the use of competent soil. Further geotechnical analysis can be performed to evaluate site seismic and static stability with the OMF South loading.

7.3 Hazards Associated with Construction Activities

The construction of the OMF South under all five construction design approaches require the disruption of established remedial systems, such as the continuity of the landfill cap and landfill gas collection system. These disruptions which, without adequate and proper controls, could temporarily expose construction workers to solid waste and landfill gas. Additionally, exposed areas may also generate dust and contaminated runoff that could impact the surrounding environment. Applicable regulatory requirements will need to be followed to provide continued protection of human health and the environment during construction of the OMF South.

An Environmental Protection Plan will likely be required to establish procedures to manage and monitor the waste excavation and handling process, including management of stormwater and landfill gas. In addition to continuous landfill gas management, measures will need to be established to prevent air intrusion into the landfill that could result in a landfill fire.

A project-specific Health and Safety Plan will also be required and will include stipulations that construction workers who may be exposed to potentially hazardous substances will be required to obtain the appropriate level of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training.

8.0 Conclusions

The HHRA found that occupational exposures to VOCs in groundwater and to methane in landfill gas are not expected to result in adverse chronic health effects for any OMF South worker. However, the potential risk associated with occupational exposures to COIs in landfill gases could not be characterized due to a lack representative data. In order to quantify occupational risk at the OMF South, post-construction sampling of VOCs and toxic inorganic gases is needed (e.g., sub-slab soil gas and/or indoor air sampling) to provide an appropriate measure of the concentrations that workers may be exposed to at the OMF South.

In order to assess current COI concentrations in landfill gas, a pre-construction landfill gas investigation could be conducted. Potential landfill gas sampling options are discussed in Appendix B.

The non-toxicological hazards evaluated for the Midway Landfill can largely be managed through appropriate engineered protections, health and safety protocols, construction design standards, and site control and environmental protection plans. Risk management approaches for non-toxicological hazards will need to be developed based on the final selected OMF South construction approach.

9.0 References

Am Test-Air Quality Inc. (Am Test-Air Quality Inc.), 1992. Source Emissions Evaluation for the Midway Sanitary Landfill, Landfill Gas Flare Testing. February.

Analytical Resources Incorporated (ARI), 2010. ARI Analytical Data Quality Review for the Midway Groundwater Monitoring Event 57. May.

Agency for Toxic Substances and Disease Registry (ATSDR), 1990. Toxicological profile for chlorobenzene. December 1990. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=489&tid=87 on October 23, 2019.

ATSDR, 2001. Toxicological profile for 1,2-Dichloroethane. September 2011. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=592&tid=110 on November 5, 2019.

ATSDR, 2006a. Toxicological profile for dichlorobenzenes. August 2006. Accessed from https://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=704&tid=126 on October 23, 2019.

ATSDR, 2006b. Toxicological profile for vinyl chloride. July 2006. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=282&tid=51 on October 4, 2019.

ATSDR, 2007a. Toxicological profile for benzene. August 2007. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=40&tid=14 on October 4, 2019.

ATSDR, 2007b. Toxicological profile for xylenes. August 2007. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=296&tid=53 on October 4, 2019.

ATSDR, 2008. Toxicological profile for 1,1,2,2-Tetrachloroethane. September 2008. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=801&tid=156 on November 5, 2019.

ATSDR, 2010. Toxicological profile for ethylbenzene. November 2010. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=383&tid=66 on October 4, 2019.

ATSDR, 2015a. Addendum to the toxicological profile for benzene. June 2015. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=40&tid=14 on October 4, 2019.

ATSDR, 2015b. Toxicological profile for 1,1-Dichloroethane. August 2015. Accessed from https://www.atsdr.cdc.gov/PHS/PHS.asp?id=716&tid=129 on November 5, 2019.

ATSDR, 2019. Toxicological profile for Trichloroethylene. June 2019. Accessed from https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=173&tid=30 on November 5, 2019.

Encyclopædia Britannica, 2019. “Methane, chemical compound”. Accessed from https://www.britannica.com/science/methane on October 23, 2019.

HDR Engineering, Inc. (HDR), 2019a. Tacoma Dome Link Extension. Final OMF South Landfill Evaluation Report. Prepared for Sound Transit. June.

HDR, 2019b. Tacoma Dome Link Extension. Phase 2 OMF South. Midway Landfill Site Engineering Optimization Report. Draft 1. Prepared for Sound Transit. November.

Integrated Risk Information System (IRIS), 1987. Chemical Assessment Summary for 1,2-Dichloroethane.

IRIS, 1988. Chemical Assessment Summary for Ethylbenzene.

IRIS, 1990a. Chemical Assessment Summary for Chlorobenzene.

IRIS, 1990b. Chemical Assessment Summary for 1,1-Dichloroethane.

IRIS, 1994. Chemical Assessment Summary for 1,4-Dichlorobenzene.

IRIS, 2000. Toxicological review of Vinyl Chloride. EPA/635R-00/004.

IRIS, 2003a. Toxicological Review of Benzene.

IRIS, 2003b. Toxicological Review of Xylenes. January. EPA 635/R-03/001.

IRIS, 2005. Toxicological Review of Toluene. EPA/635/R-05/004.

IRIS, 2010. Chemical Assessment Summary for 1,1,2,2-Tetrachloroethane.

IRIS, 2011. Chemical Assessment Summary for Trichloroethylene.

National Research Council (NRC). 1984. Emergency and Continuous Exposure Limits for Selected Airborne Contaminants: Volume 1. Washington, DC: The National Academies Press. https://doi.org/10.17226/689.

New Jersey Department of Health (NJDOH). 2016. Hazardous Substance Fact Sheet for Methane. July. https://nj.gov/health/eoh/rtkweb/documents/fs/1202.pdf.

Parametrix, Inc. (Parametrix), 1988a. Midway Landfill Remedial Investigation Summary Report. Prepared by Parametrix, Inc., for the City of Seattle Engineering Department, Solid Waste Utility. July.

Parametrix 1988b. Midway Landfill Remedial Investigation. Landfill Gas Technical Report. Prepared by Parametrix, Inc., for the City of Seattle Engineering Department. Solid Waste Utility. March.

Parametrix, 1992. Midway Landfill, Operation and Maintenance Manual, Prepared for Seattle Engineering Department, Solid Waste Utility. December.

Parametrix, 2000. Midway Landfill Monitoring Plan, Prepared for City of Seattle, Seattle Public Utilities. April.

Parametrix, 2011. Midway Landfill Groundwater Monitoring 2010 Annual Report. Parametrix. July.

Parametrix, 2015. Midway Landfill Groundwater Monitoring Status Report 2010-2014. Prepared by Parametrix, Seattle, Washington. May.

USEPA (United States Environmental Protection Agency). 1989. Risk assessment guidance for Superfund. Volume I, Human health evaluation manual (Part A). Interim final. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/1Ä89/002. December.

USEPA, 1992. Guidance for Data Useability in Risk Assessment (Part A). Final. April.

USEPA, 1996a. Method 8270D: Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). Revision 3. December.

USEPA, 1996b. Method 8260B: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). Revision 2. December.

USEPA, 1996c. Method 6010B: Inductively coupled Plasma-Atomic Emission Spectrometry. Revision 2. December.

USEPA. 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition, Compendium Method TO-14A, Determination Of Volatile Organic Compounds (VOCs) In Ambient Air Using Specially Prepared Canisters With Subsequent Analysis By Gas Chromatography. January.

USEPA, 2000a. EPA Superfund: Record of Decision, Midway Landfill EPA ID: WAD980638910 OU 01, Kent, Washington. September.

USEPA, 2000b. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health. EPA-822-B-00-004. Pages 2-6 and 2-7. October.

USEPA, 2015a. Third Five-Year Review for the Midway Landfill Superfund Site, Kent, Washington, USEPA Region 10. September.

USEPA, 2015b. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154 U.S. Environmental Protection Agency.

USEPA, 2018a. Vapor Intrusion Screening Level Calculator. May. https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator

Washington Administrative Code (WAC) 173-160-171. What are the requirements for the location of the well site and access to the well? https://apps.leg.wa.gov/WAC/default.aspx?cite=173-160-171

WAC 173-304-460. Landfilling standards. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-304-460

WAC 173-340-706. Use of Method C. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-706

WAC 173-340-720. Groundwater cleanup standards. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-720

WAC 173-340-745. Soil cleanup standards for industrial properties. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-745

WAC 173-340-750. Cleanup standards to protect air quality. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-750

Washington State Department of Ecology (Ecology), 1990. Consent Decree. May 29, 1990.

Ecology, 2018a. Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action. Washington State Department of Ecology Toxics Cleanup Program. April.

Ecology, 2018b. Frequently Asked Questions (FAQs) Regarding Vapor Intrusion (VI) and Ecologies 2009 Draft VI Guidance. Implementation Memorandum No. 21. November.

Tables

Table 1 Groundwater Results for Onsite Monitoring Wells (2010-2014)[a]

Screening Level			Dissolved Iron	1,4-Dioxane	1,1-dichloroethane	cis-1,2-dichloroethene	Chloride	Sulfate	Manganese	Vinyl Chloride
ROD Cleanup Level			-	4.4*	-	-	-	-	2.2	0.29
MTCA Method C Groundwater Vapor Intrusion Screening Level[b] (µg/L)			not a volatile analyte	-	-	not a volatile analyte	not a volatile analyte	not a volatile analyte	not a volatile analyte	3.5 ^{CA}
USEPA Worker Air Vapor Intrusion Screening Levels (VISL) for Groundwater[c] (µg/L)			not a volatile analyte	12,500 ^{CA}	821 ^{NC}	no inhalation toxicity information	not a volatile analyte	not a volatile analyte	not a volatile analyte	4.45 ^{CA}
Well	**Aquifer**	**Sample Date**	**mg/L**	**µg/L**	**µg/L**	**µg/L**	**mg/L**	**mg/L**	**mg/L**	**µg/L**
MW-7A	Upper Gravel Aquifer	Not sampled since 1992 because the well has been dry.								
MW-7B	Sand Aquifer	5/4/2011	3.57	4.3	2.1	1.0 U	25.0	39.2	3.07	0.30
		5/9/2012	3.57	6.0	2.9	1.0 U	28.1	27.9	3.20	0.31
		5/15/2013[d]	3.32	3.6	2.2	1.0 U	19.7	29.4	2.94	0.32
		5/21/2014	3.05	2.0	1.9	1.0 U	14.4	29.9	2.63	0.20
MW-20A		Not sampled since 1994 because the well has been dry.								
MW-14B	Southern Gravel Aquifer	5/4/2010	11.2	17	1.5	4.5	18.0	30.9	0.961	0.63
		5/3/2011	11.0	13	1.3	3.8	19.4	32.2	0.897	0.64
		5/8/2012	10.1	12	1.4	3.9	16.6	34.6	0.908	0.41
		5/14/2013	10.3	9.3	1.2	3.3	16.3	24.8	0.913	0.39
		5/20/2014	10.3	9.1	1.1	3.1	14.8	25.2	0.904	0.28
MW-20B		5/3/2010	9.5	-	1.0 U	1.0 U	44.7	8.9	3.24	0.27
		5/4/2011	8.8	53	1.0 U	1.0 U	44.9	10.1	2.99	0.24
		5/9/2012	8.2	48	1.0 U	1.0 U	35.2	13.0	2.95	0.22
		5/15/2013	7.5	39	1.0 U	1.0 U	30.6	11.5	2.77	0.34
		5/21/2014	6.9	35	1.0 U	1.0 U	26.6	9.9	2.43	0.30

[a] Report in the Midway Landfill Groundwater Monitoring Status Report 2010-2014 (Parametrix 2015)

[b] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables
MTCA Method C Screening Levels are protective of industrial exposures and derived using the exposure assumptions shown in Figures 2-5.

[c] https://epa-visl.ornl.gov/cgi-bin/visl_search
USEPA Worker Air VISLs are protective of commercial exposures and derived using the exposure assumptions shown in Figures 2-5.

[d] Original and duplicate samples were collected from MW-7B during this round. The higher of the two results is shown.

*A cleanup level was not established for 1,4-Dioxane in the ROD. Detected concentrations are compared to the MTCA Method B cleanup level.

A shaded cell indicates that the concentrations exceeds ROD cleanup level.
- = not established
U = indicates the compound was undetected at the reported concentration
CA = based on cancer health risk
NC = based on non-cancer risk

Table 2. Methane Gas Results for Onsite Extraction Wells by Location and Year (2015-2019)

Location	Number of Samples	Number of Samples > LEL	% of Samples > LEL	Minimum	Maximum	Average	Std Dev
1*	56	0	0%	0.0	0.2	0.0	0.1
2	56	53	95%	1.2	25.8	12.4	5.3
3	56	44	79%	0.0	11.9	7.1	3.2
4	55	0	0%	0.0	0.2	0.0	0.0
5	56	56	100%	5.8	35.3	14.3	5.0
6	56	1	2%	0.0	5.3	0.6	1.2
7	56	31	55%	0.6	13.4	5.9	3.2
8	56	55	98%	4.8	14.4	10.5	1.8
9	56	56	100%	6.6	19.7	12.7	2.3
10	56	56	100%	12.1	23.0	17.2	2.8
11	56	43	77%	1.1	18.2	6.5	2.5
12	56	0	0%	0.0	3.0	0.3	0.5
13	56	1	2%	0.0	5.3	0.3	0.9
14	56	30	54%	0.0	11.0	5.2	2.1
15	56	55	98%	2.4	14.2	9.7	2.2
16	56	34	61%	0.0	23.2	8.6	7.4
17	56	40	71%	0.0	19.4	8.0	5.1
18	56	31	55%	0.5	15.4	6.0	3.9
19	56	53	95%	0.0	14.5	9.1	2.8
20	56	11	20%	0.0	12.7	2.4	4.1
21	56	41	73%	2.1	16.7	8.5	4.4
22	56	1	2%	0.0	14.7	0.4	2.0
23	56	53	95%	3.4	24.9	10.4	4.8
24	56	4	7%	0.0	18.8	1.1	3.8
25	56	27	48%	1.5	23.6	6.3	4.5
26	56	56	100%	7.0	25.4	17.7	4.6
27	56	55	98%	4.7	22.6	15.9	4.7
28	56	24	43%	0.5	16.1	5.4	3.9
29	56	51	91%	3.4	24.1	9.7	4.7
30	56	56	100%	15.9	21.1	18.6	1.2
31	56	35	63%	0.0	37.3	10.8	9.6
32	56	7	13%	0.0	8.3	1.1	2.6
33	56	56	100%	7.9	27.6	13.2	3.5
34	56	56	100%	5.7	13.4	9.7	1.7
55	56	31	55%	1.9	9.0	5.3	1.8
35D	56	51	91%	0.0	20.4	11.3	4.9
35S	56	52	93%	1.3	20.4	11.5	4.9
36D	56	0	0%	0.0	0.8	0.1	0.1
36S	56	0	0%	0.0	0.9	0.1	0.2
37D	56	55	98%	0.7	18.3	11.3	3.5
37S	56	53	95%	1.0	16.7	9.1	3.4
38D	56	56	100%	19.8	29.2	24.6	2.2
38S	56	56	100%	10.6	19.5	14.0	2.4
39D	56	56	100%	14.2	22.7	18.0	2.1
39S	56	56	100%	9.2	15.7	12.8	1.3
40D	56	55	98%	0.0	22.8	18.1	3.2
40S	56	6	11%	0.0	16.6	1.5	4.0
41D	56	7	13%	0.0	36.0	3.0	8.0
41S	56	8	14%	0.0	35.7	4.2	10.1
42D	56	56	100%	14.7	21.3	17.6	1.6
42S	56	56	100%	15.1	20.4	17.7	1.4
43D	56	56	100%	15.0	19.8	17.9	1.1
43S	56	56	100%	10.5	17.7	14.2	1.4
44D	56	56	100%	15.8	22.2	19.4	1.6
44S	56	56	100%	9.1	14.2	11.7	1.2
45D	56	56	100%	13.6	25.3	19.0	1.9
45S	56	15	27%	0.0	8.5	2.7	2.6
46D	56	56	100%	14.7	22.3	19.5	1.6
46S	56	15	27%	0.0	12.7	2.7	4.2
47D	56	5	9%	0.0	21.0	2.7	4.8
47S	56	9	16%	1.4	23.2	4.6	3.9
48D	56	56	100%	11.4	24.4	17.9	2.3
48S	56	56	100%	10.5	18.4	12.8	1.5
49D	56	56	100%	12.4	20.4	17.8	1.4
49S	56	52	93%	3.8	13.5	9.1	2.2
50D*	56	56	100%	5.7	18.9	14.3	2.9
50S*	56	56	100%	15.8	21.6	18.9	1.5
51D	56	51	91%	0.1	16.2	9.4	3.7
51S	56	56	100%	13.0	18.8	16.0	1.4

Table 2. Methane Gas Results for Onsite Extraction Wells by Location and Year (2015-2019)

Location	Number of Samples	Number of Samples > LEL	% of Samples > LEL	Minimum	Maximum	Average	Std Dev
52D*	56	56	100%	16.5	21.3	18.6	1.3
52S*	56	56	100%	11.6	16.4	13.9	1.2
53D	56	56	100%	13.3	19.5	16.4	1.7
53S	56	40	71%	0.0	12.9	7.9	5.0
54D	56	5	9%	0.0	10.0	1.0	2.4
54S	56	56	100%	11.9	17.6	14.2	1.5
56D	56	55	98%	0.1	17.3	13.6	2.5
56S	56	0	0%	0.0	0.2	0.0	0.1
C-11	56	0	0%	0.0	0.1	0.0	0.0
MAN*	112	112	100%	14.3	19.9	17.2	1.1
MAN-N*	112	112	100%	13.0	19.9	16.9	1.1
MAN-S*	112	112	100%	14.4	19.8	17.1	1.2
PA10D	56	0	0%	0.0	0.2	0.0	0.0
PA10S	56	0	0%	0.0	0.2	0.0	0.1
PA1D	56	0	0%	0.0	0.1	0.0	0.0
PA1S	56	0	0%	0.0	0.1	0.0	0.0
PA2D	56	0	0%	0.0	0.1	0.0	0.0
PA2S	56	0	0%	0.0	0.1	0.0	0.0
PA3D	56	0	0%	0.0	0.1	0.0	0.0
PA3S	56	0	0%	0.0	0.2	0.0	0.0
PA4D	56	0	0%	0.0	0.1	0.0	0.0
PA4S	56	0	0%	0.0	0.1	0.0	0.0
PA5D	56	0	0%	0.0	0.1	0.0	0.0
PA5S	56	0	0%	0.0	0.2	0.0	0.0
PA6D	56	0	0%	0.0	0.2	0.0	0.0
PA6S	56	0	0%	0.0	0.2	0.0	0.0
PA7D	56	55	98%	1.6	26.6	17.6	4.5
PA7S	56	0	0%	0.0	0.1	0.0	0.0
PA8D	56	0	0%	0.0	0.1	0.0	0.0
PA8S	56	0	0%	0.0	0.1	0.0	0.0
PA9D	56	0	0%	0.0	0.2	0.0	0.1
PA9S	57	0	0%	0.0	0.2	0.1	0.1
PD1D	56	0	0%	0.0	0.1	0.0	0.0
PD1S	56	0	0%	0.0	0.1	0.0	0.0

All concentrations reported in percent by volume of air

LEL = lower explosive limit, which is 5% methane by volume

*These wells were not shown on Figure 8 of the Second Five-Year Review for the Midway Landfill Superfund Site.

Table 3. Methane Gas Results for Onsite Extraction System by Year (2015-2019)

Year	Number of Samples	Number of Samples > LEL	% of Samples > LEL	Minimum	Maximum	Average	Std Dev
2015	1272	742	58%	0	33.8	8.9	8.1
2016	1272	725	57%	0	34.7	8.6	8.1
2017	1272	756	59%	0	37.3	8.7	7.8
2018	1272	686	54%	0	33.4	7.7	7.4
2019	848	451	53%	0	27.9	7.3	7.1

All concentrations reported in percent by volume of air

LEL = lower explosive limit, which is 5% methane by volume

Std Dev = standard deviation

Table 4 Select VOC Results for Onsite Subsurface Gas Samples[ab] (1988a)

Concentration[b]	Units	Benzene	Ethyl Benzene	Styrene	Toluene	Vinyl Chloride	Xylenes (Total)
Mean	ppb	318	2,825	41	1,920	2,807	3,419
	μg/m³	1,016	12,266	175	7,235	7,175	14,846
Maximum	ppb	1,384	16,610	508	24,044	31,215	29,195
	μg/m³	4,421	72,119	2,164	90,600	79,793	126,774

[a] Midway Landfill Remedial Investigation Summary Report, Table 6-1, page 6-29 (Parametrix 1988a)

Table 5a VOCs Results for Onsite Subsurface Gas and Flare Inlet Samples[a] (1988a)

Maximum Concentration	unit	Benzene	Chlorobenzene	Chloroethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	trans-1,2-Dichloroethene	Ethyl Benzene	Methylene chloride	4-Methyl-2-Pentanone (MIBK)	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Acetate	Vinyl Chloride	Xylenes (Total)	Tetrahydrofuran	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-trifluoroethane
On-site Sub-surface Gas	ppbV	1,384	258	708 E	748	126	112	79	16,610	2,648 E	6	508	ND	80	24,044	ND	97	483	31,215	29,195	2,099	357	106
	μg/m^3	4,421	1,188	1,868	3,028	510	444	313	72,119	9,199	25	2,164	ND	543	90,600	ND	521	1,701	79,793	126,774	6,190	2,006	812
Flare Inlet Gas	ppbV	944	260	301	340	ND	1,004	822	5,749	314	ND	ND	37	ND	6,579	60	683	ND	1,056	22,489	NR	196	451
	μg/m^3	3,016	1,197	794	1,376	ND	3,981	3,259	24,962	1,091	ND	ND	254	ND	24,790	327	3,671	ND	2,699	97,655	-	1,101	3,456

[a] Midway Landfill Remedial Investigation Summary Report, Table 8-1, page 8-10 (Parametrix 1988a)

E = estimated value

Table 5b Hydrogen Sulfide Results for North and South Flare Inlet Samples[a] (1988a)

Concentration	unit	Hydrogen Sulfide
North Flare Inlet	ppbV	26,000
	μg/m^3	36,240
South Flare Inlet	ppbV	17,000
	μg/m^3	23,696

[a] Midway Landfill Remedial Investigation Summary Report, Table 7-6, page 7-24 (Parametrix 1988a)

Table 6 VOC Results for Flare Inlet Duct Gas Samples (1992)[a]

Sample Location	Units	Benzene	Chlorobenzene	Chloroethane	Chloromethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	cis-1,2-Dichloroethene	Ethyl Benzene	4-Methyl-2-Pentanone (MIBK)	Styrene	Toluene	Trichlorofluoromethane	Vinyl Chloride	Xylenes (Total)
#3 Flare Inlet Duct (Run 1)	µg/m^3	1,598	2,801	280	941	479	1,598	400	1,099	45,005	270.1	491	6,501	150	2,901	47,003
#3 Flare Inlet Duct (Run 2)	µg/m^3	1,501	2,600	250	1,002	260	1,002	380	1,002	43,001	270.1	440	6,400	170	3,001	44,003
#3 Flare Inlet Duct (Run 3)	µg/m^3	1,700	2,799	280	981	360	1,201	410	1,099	46,002	270.2	520	6,901	160	3,002	47,004
Maximum (all runs)	µg/m^3	1,700	2,801	280	1,002	479	1,598	410	1,099	46,002	270.2	520	6,901	170	3,002	47,004
Average (all runs)	µg/m^3	1,600	2,733	270	974	366	1,267	397	1,067	44,670	270.1	484	6,600	160	2,968	46,003

[a] Reported in the Midway Sanitary Landfill Landfill Gas Flare Testing Source Emissions Evaluation, page 12 (Am Test-air Quality Inc. 1992)

Table 7 Sub-Slab and Deep Soil Gas Screening Levels for COIs Detected in Subsurface and Flare Inlet Gas Samples

Screening Level	**Units**	**Benzene**[ab]	**Chlorobenzene**[ab]	**Chloroethane**[ab]	**Chloromethane**[b]	**1,2-Dichlorobenzene**[b]	**1,4-Dichlorobenzene**[b]	**1,1-Dichloroethane**[ab]	**1,2-Dichloroethane**[a]	**1,1-Dichloroethene**[a]	**cis-1,2-Dichloroethene**[b]	**trans-1,2-Dichloroethene**[a]	**Ethyl Benzene**[ab]	**Hydrogen Sulfide**	**Methylene Chloride**[a]	**4-Methyl-2-Pentanone (MIBK)**[ab]	**Styrene**[ab]	**1,1,2,2-Tetrachloroethane**[a]	**Tetrachloroethene**[a]	**Toluene**[ab]	**1,1,1-Trichloroethane**[a]	**Trichloroethene**[a]	**Vinyl Acetate**[a]	**Vinyl Chloride**[ab]	**Xylenes (Total)**[ab]	**Tetrahydrofuran**[a]	**Trichlorofluoromethane**[ab]	**1,1,2-Trichloro-1,2,2-trifluoromethane**[a]
MTCA Method C Sub-slab Soil Gas Screening Level[c]	$\mu g/m^3$	**110** ^{CA}	**1,700** ^{NC}	330,000 ^{NC}	3,000 ^{NC}	6,700 ^{NC}	**76** ^{CA}	**520** ^{CA}	**32** ^{CA}	6,700 ^{NC}	-	-	**33,000** ^{NC}	-	20,000 ^{NC}	100,000 ^{NC}	33,000 ^{NC}	**14** ^{CA}	1,300 ^{NC}	170,000 ^{NC}	170,000 ^{NC}	**67** ^{NC}	6,700 ^{NC}	**93** ^{CA}	**3,300** ^{NC}	-	23,000 ^{NC}	170,000 ^{NC}
MTCA Method C Deep Soil Gas Screening Level[c]	$\mu g/m^3$	**320** ^{CA}	5,000 ^{NC}	1,000,000 ^{NC}	9,000 ^{NC}	20,000 ^{NC}	**230** ^{CA}	**1,600** ^{CA}	**96** ^{CA}	20,000 ^{NC}	-	-	100,000 ^{NC}	-	60,000 ^{NC}	300,000 ^{NC}	100,000 ^{NC}	**43** ^{CA}	4,000 ^{NC}	500,000 ^{NC}	500,000 ^{NC}	**200** ^{NC}	20,000 ^{NC}	**280** ^{CA}	**10,000** ^{NC}	-	70,000 ^{NC}	500,000 ^{NC}
USEPA Worker Air Vapor Intrusion Screening Levels (VISL) for Sub-slab or Near Source Soil Gas[d]	$\mu g/m^3$	**524** ^{CA}	7,300 ^{NC}	1,460,000 ^{NC}	13,100 ^{NC}	29,200 ^{NC}	**372** ^{CA}	**2,560** ^{CA}	**157** ^{CA}	29,200 ^{NC}	No Inhal. Tox. Info	No Inhal. Tox. Info	**1,640** ^{CA}	292 ^{NC}	87,600 ^{NC}	438,000 ^{NC}	146,000 ^{NC}	**70.5** ^{CA}	5,840 ^{NC}	730,000 ^{NC}	730,000 ^{NC}	**292** ^{NC}	29,200 ^{NC}	**929** ^{CA}	**14,600** ^{NC}	292,000 ^{NC}	No Inhal. Tox. Info	730,000 ^{NC}

[a] Reported as a detected constituent in sub-surface landfill gas in the Midway Landfill Remedial Investigation Summary Report, Table 6-1, page 6-29 and/or Table 8-1, page 8-10 (Parametrix 1988a)

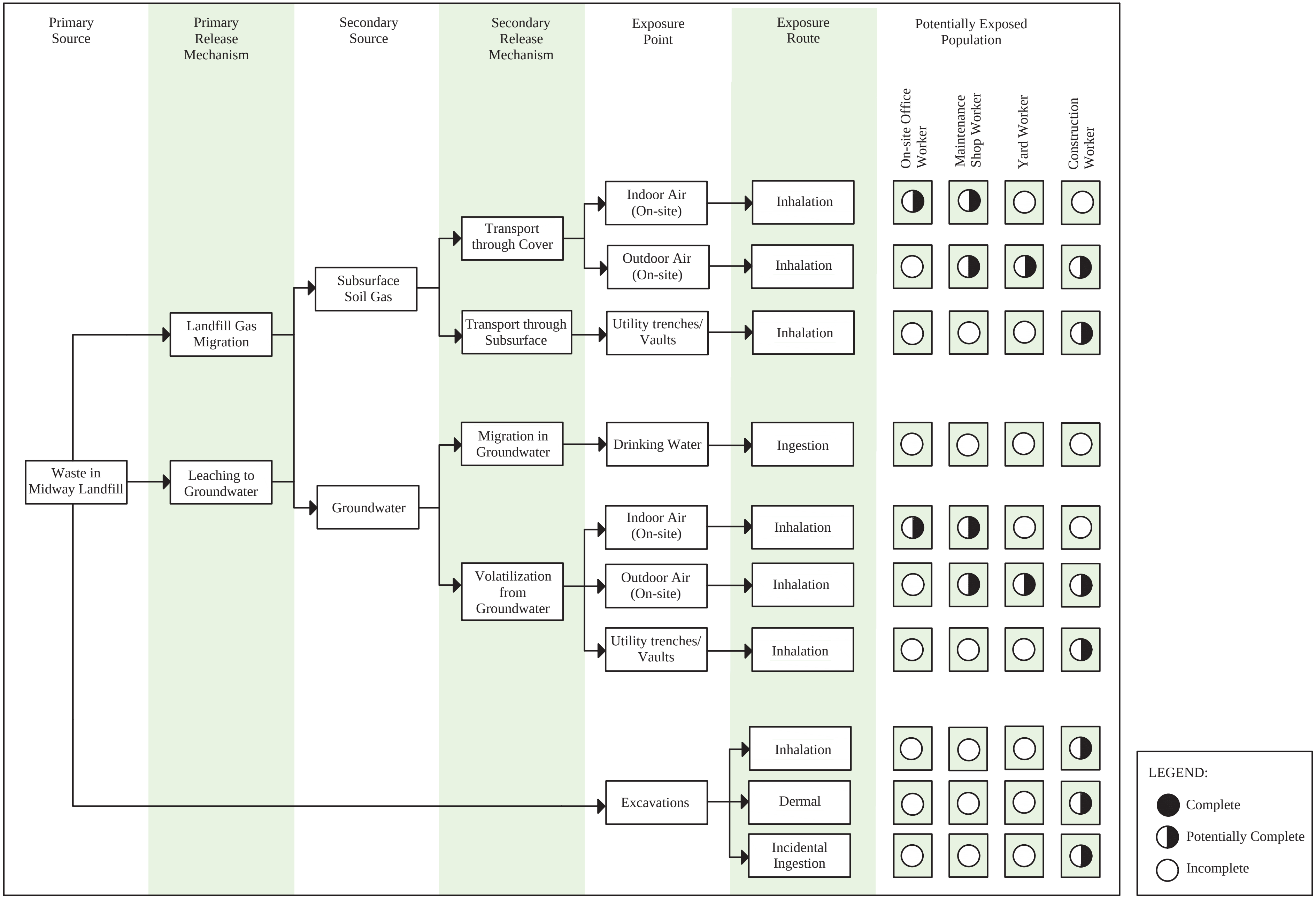
[b] Reported as a detected constituent in inlet flare gas in the Midway Sanitary Landfill Landfill Gas Flare Testing Source Emissions Evaluation (Am Test-air Quality Inc. 1992)

[c] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables;
MTCA Method C Screening Levels are protective of industrial exposures and derived using the exposure assumptions shown in Figures 2-5.

[d] https://epa-visl.ornl.gov/cgi-bin/visl_search
USEPA Worker Air VISLs are protective of commercial exposures and derived using the exposure assumptions shown in Figures 2-5.

Bold screening levels indicate one or more landfill gas samples had a concentration exceeding this value.
- = not established
CA = based on cancer health risk
NC = based on non-cancer risk

Figures



Primary Source
Primary Release Mechanism
Secondary Source
Secondary Release Mechanism
Exposure Point
Exposure Route
Potentially Exposed Population
On-site Office Worker
Maintenance Shop Worker
Yard Worker
Construction Worker
Waste in Midway Landfill
Landfill Gas Migration
Leaching to Groundwater
Subsurface Soil Gas
Groundwater
Transport through Cover
Transport through Subsurface
Migration in Groundwater
Volatilization from Groundwater
Indoor Air (On-site)
Inhalation
◐ ◐ ○ ○
Outdoor Air (On-site)
Inhalation
○ ◐ ◐ ◐
Utility trenches/ Vaults
Inhalation
○ ○ ○ ◐
Drinking Water
Ingestion
○ ○ ○ ○
Indoor Air (On-site)
Inhalation
◐ ◐ ○ ○
Outdoor Air (On-site)
Inhalation
○ ◐ ◐ ◐
Utility trenches/ Vaults
Inhalation
○ ○ ○ ◐
Excavations
Inhalation
○ ○ ○ ◐
Dermal
○ ○ ○ ◐
Incidental Ingestion
○ ○ ○ ◐
LEGEND:
● Complete
◐ Potentially Complete
○ Incomplete

FIGURE 1

Preliminary Conceptual Site Model
Exposure Pathway Evaluation for
Midway Landfill

Figure 2: Indoor Air Screening Level Equations and Exposure Assumptions for Non-carcinogens

Comparison of Model Toxics Control Act (MTCA) Method C: Industrial Scenario and EPA Vapor Intrusion (VISL) Worker Scenario

	Method C: Indoor Air Cleanup Level – Noncarcinogens (Equation 750-1)	**USEPA VISL Worker Indoor Air Screening Level - Noncarcinogens**
Where:	$SL_{IA\,(nc)} = \frac{RfD \times ABW \times UCF \times HQ \times AT}{BR \times ABS \times ED \times EF \times ET}$	$SL_{IA\,(nc)} = \frac{UCF \times HQ \times AT}{ED \times EF \times ET \times \left(\frac{1}{RfC}\right)}$
Screening Level for Indoor Air (SL_{IA})	calculated (µg/m^3)	calculated (µg/m^3)
Noncancer (nc) Toxicity Values	contaminant specific Reference Dose (RfD) (mg/kg-day) as specified in WAC 173-340-708(7)	contaminant specific Reference Concentrations (RfC) (mg/m3)
Average Body Weight (ABW)	70 kg (adult)	NA
Unit Conversion Factor (UCF)	1,000 µg/mg	1,000 µg/mg
Breathing Rate (BR)	20 m^3/day (adult)	NA
Absorption Factor (ABS)	1 (unitless)	NA
Hazard Quotient (HQ)	1 (unitless)	1 (unitless)
Averaging Time (AT)	6 years	25 years
Exposure Duration (ED)	6 years	25 years
Exposure Frequency (EF)	365 days per year	250 days per year
Exposure Time	24 hours per day	8 hours per day

Figure 3: Indoor Air Screening Level Equations and Exposure Assumptions for Carcinogens

Comparison of Model Toxics Control Act (MTCA) Method C: Industrial Scenario and EPA Vapor Intrusion (VISL) Worker Scenario

	MTCA Method C: Indoor Air Cleanup Level – Carcinogens (Equation 750-2)	**USEPA VISL Worker Indoor Air Screening Level - Carcinogens**
Where:	$SL_{IA\,(c)} = \frac{Risk \times ABW \times UCF \times AT}{CPF \times BR \times ABS \times ED \times EF}$	$SL_{IA\,(c)} = \frac{Risk \times AT}{ED \times EF \times ET \times IUR}$
Screening Level for Indoor Air (SL_{IA})	calculated (µg/m^3)	calculated (µg/m^3)
Cancer (c) Toxicity Values	contaminant specific cancer potency factor (CPF) (kg-day/mg) as specified in WAC 173-340-708(8)	contaminant specific inhalation unit risk (IUR) (µg/$mg^3)^{-1}$
Average Body Weight (ABW)	70 kg (adult)	NA
Unit Conversion Factor (UCF)	1,000 µg/mg	NA
Breathing Rate (BR)	20 m^3/day (adult)	NA
Absorption Factor (ABS)	1 (unitless)	NA
Acceptable Cancer Risk	1 in 100,000 (unitless) or 10^{-5}	1 in 100,000 (unitless) or 10^{-5}
Averaging Time (AT)	75 years	70 years
Exposure Duration (ED)	30 years	25 years
Exposure Frequency (EF)	365 days per year	250 days per year
Exposure Time (ET)	24 hours per day	8 hours per day

Figure 4: Soil Vapor Intrusion Screening Level Equation (MTCA and USEPA VISL)

	Soil Gas Vapor Intrusion Screening Level Equation
Where:	$$SL_{SG} = \frac{SL_{IA}}{VAF}$$
Screening Level for Soil Gas based on Indoor Air Screening Level (SL_{SG})	calculated (µg/m^3)
Screening Level for Indoor Air (SL_{IA})	µg/m^3
Vapor Attenuation Factor (VAF)	0.03 for sub-slab/near source soil gas; 0.01 for deep soil gas[a] (unitless)

[a] Deep soil gas vapor screening levels are calculated for MTCA only.

Figure 5: Groundwater Vapor Intrusion Screening Level Equation (MTCA and USEPA VISL)

	Groundwater Vapor Intrusion Screening Level Equation
Where:	$$SL_{GW} = \frac{SL_{IA}}{VAF \times UCF \times H_{cc}}$$
Screening Level for Groundwater based on Indoor Air Screening Level (SL_{GW})	calculated (µg/L)
Screening Level for Indoor Air (SL_{IA})	µg/m^3
Vapor Attenuation Factor (VAF)	0.001 for groundwater (unitless)
UCF	1,000 L/m^3
Henry's Law constant (H_{cc})	chemical specific parameter (unitless)

Appendix A: Supplementary Site Figures

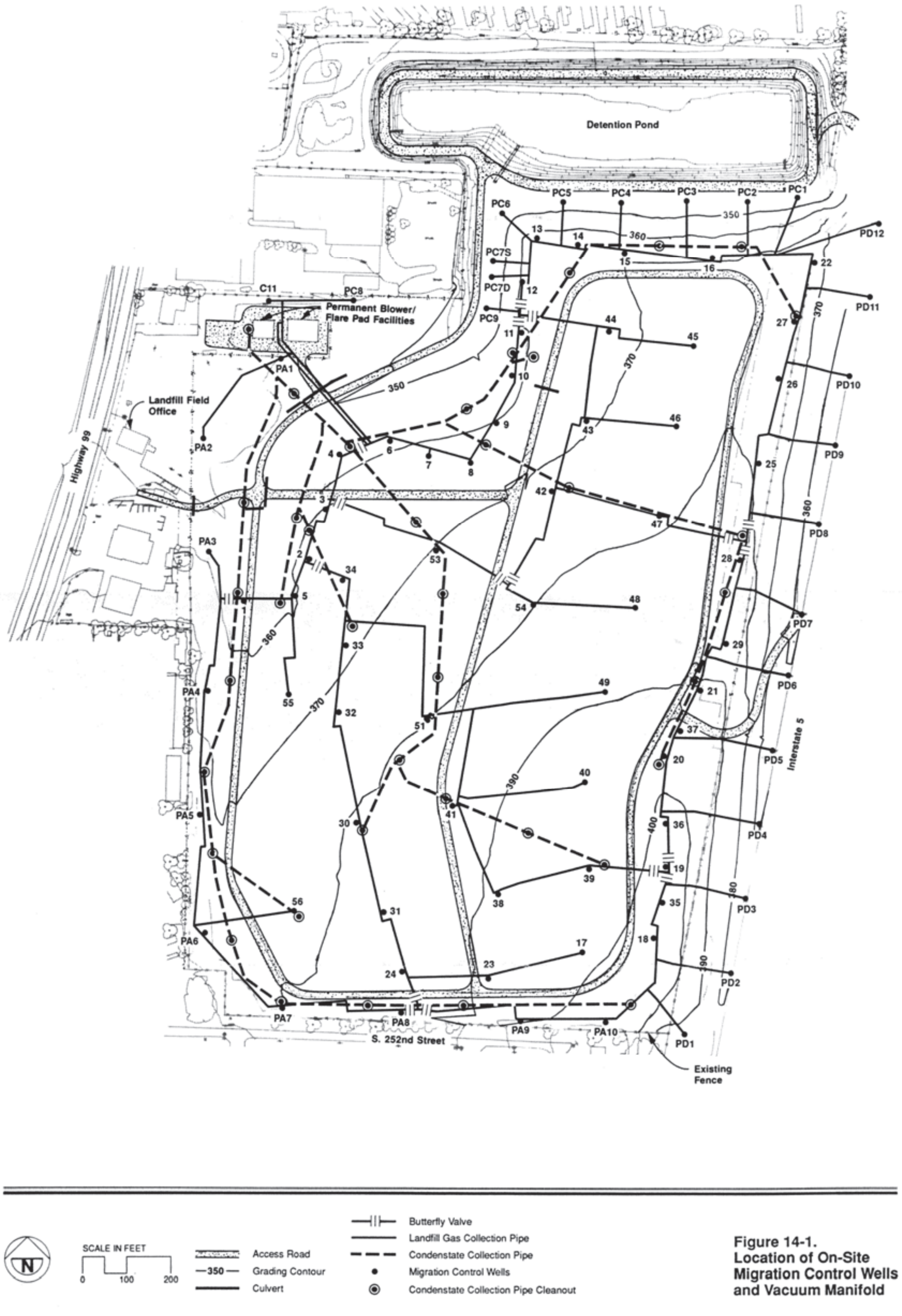

Detention Pond
PC1
PC2
PC3
PC4
PC5
PC6
PC7S
PC7D
PC8
PC9
C11
PD1
PD2
PD3
PD4
PD5
PD6
PD7
PD8
PD9
PD10
PD11
PD12
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
Permanent Blower/
Flare Pad Facilities
Landfill Field
Office
Highway 99
Interstate 5
S. 252nd Street
Existing
Fence
350
360
370
380
390
400
SCALE IN FEET
0
100
200
Access Road
Grading Contour
Culvert
Butterfly Valve
Landfill Gas Collection Pipe
Condenstate Collection Pipe
Migration Control Wells
Condenstate Collection Pipe Cleanout
N
Figure 14-1.
Location of On-Site
Migration Control Wells
and Vacuum Manifold

Figure 8. On-site gas extraction wells, flare/blower, and detention pod.

Midway Composite Map for Methane for Shallow Probes

(From 10/01/2010 To 09/30/2015)

Map Generated on 1/22/2015

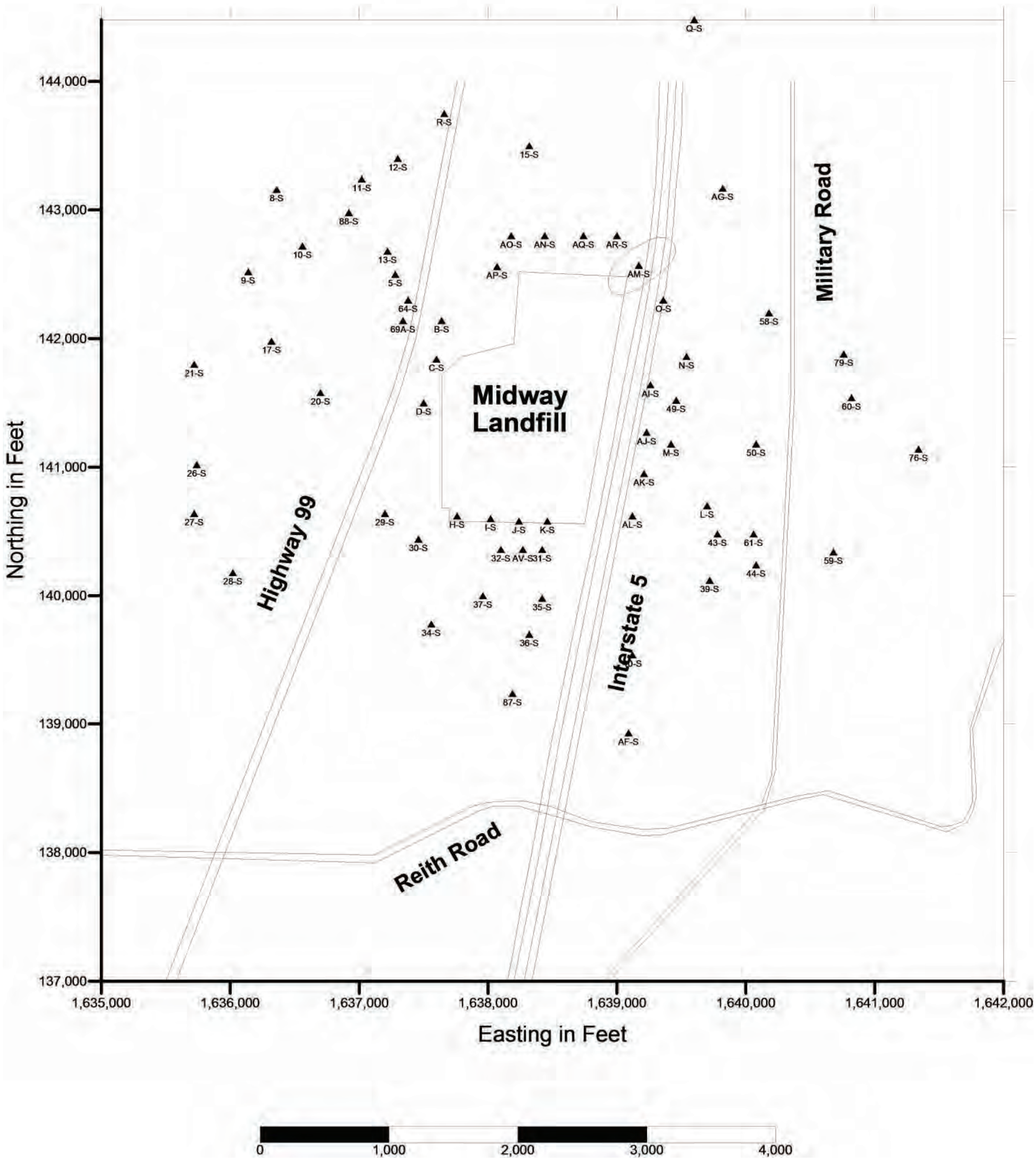

Q-S
R-S
15-S
12-S
11-S
8-S
AG-S
88-S
Military Road
AO-S
AN-S
AQ-S
AR-S
10-S
13-S
AM-S
AP-S
9-S
5-S
64-S
O-S
58-S
69A-S
B-S
17-S
C-S
N-S
79-S
21-S
Midway Landfill
AI-S
20-S
D-S
49-S
60-S
AJ-S
M-S
50-S
76-S
26-S
AK-S
Highway 99
L-S
27-S
29-S
H-S
I-S
J-S
K-S
AL-S
30-S
43-S
61-S
59-S
32-S
AV-S
31-S
44-S
28-S
39-S
37-S
35-S
Interstate 5
34-S
36-S
87-S
AF-S
Reith Road
144,000
143,000
142,000
141,000
140,000
139,000
138,000
137,000
Northing in Feet
1,635,000
1,636,000
1,637,000
1,638,000
1,639,000
1,640,000
1,641,000
1,642,000
Easting in Feet
0
1,000
2,000
3,000
4,000

Figure 9. Shallow Gas Probes

Appendix B: Landfill Gas Sampling Options

Landfill Gas Sampling Options

Introduction

This appendix discusses potential options for pre-construction sampling of landfill gas constituents (e.g., VOCs and inorganic gases) at the Midway Landfill. Landfill gas sample results can provide Sound Transit with a better understanding of the current conditions at the Midway Landfill and information about the types and concentrations of COIs found in the landfill gas. Sample results can inform decisions about the mitigation and/or management of risks associated with the potential exposure to VOCs and inorganic gases at the OMF South. However, pre-construction sample results would not be appropriate for use in quantitative exposure or risk assessment as they do not necessarily reflect the levels of contamination to which OMF South workers may be exposed in the future.

Potential Sampling Options

Potential landfill gas sampling options include: 1) flare inlet and extraction well gas sampling, 2) near surface gas sampling, and 3) shallow soil gas sampling. These sampling options and the applications and limitations of each in the context of the Midway Landfill are described below.

Collection of flare inlet and extraction well gas samples: Measurements of landfill gas constituents can be taken at depth using the existing landfill gas extraction system. Samples may be collected at the flare inlet and at individual wells located throughout the landfill. Samples collected from the flare inlet represent a composite of all gases and vapors contained within the landfill under the landfill cap. The flare inlet sample results could be compared to historic landfill gas data from the 1988 gas characterization study completed as part of the RI (Parametrix 1988a) and the 1992 source emission evaluation (Am Test-Air Quality Inc. 1992). This comparison may provide insight into changes in concentrations in landfill gas constituents over the last 30 years. Samples collected from individual extraction wells may also provide information about the distribution of VOC-containing waste and/or areas of higher or lower VOC concentrations at specific locations within the landfill.

These landfill gas data would not provide an actual measure of the concentrations of VOCs and inorganic gases that workers at the OMF South may come in contact with. These samples are collected deep beneath the landfill cap and landfill gas constituent concentrations are expected to change as the gases move horizontally and vertically in the subsurface prior to possible exposure through a leak in the landfill cap and into ambient air. Consequently, these data should not be used for quantitative exposure or risk assessment.

Monitoring of near surface gas: Near surface gas monitoring measures the concentrations of gases at a point no higher than 4 inches above the surface of the landfill. This type of sampling can qualitatively indicate whether high levels of landfill gas are escaping from the landfill surface or if the landfill cap and gas extraction system are working effectively. Near surface gas monitoring often uses a portable instrument to screen for high levels of landfill gas along with collection of grab samples for laboratory analysis. Results from near surface gas sampling can be greatly influenced by meteorological conditions. Moderate winds can quickly dilute near surface gas concentrations.

Near surface gas data can help identify point sources of high concentrations of landfill gases (caused by leaks in the landfill cap). However, because of expected changes to the site due to the construction of the OMF South (e.g., the possible removal of underlying waste material and changes in the configuration of the landfill cap, etc.), pre-construction near surface gas samples are not expected to provide an actual measure of the concentrations of VOCs and inorganic gases that workers at the OMF South may come in contact with in the future. Changes in site conditions are likely to result in a difference in pre- and post-construction near surface gas results.

Near surface gas sampling can be conducted following a planned or unplanned breach in the landfill cap. In this case, once the landfill cap is penetrated, near surface gas sampling can be used to measure landfill gas constituent concentrations in gas escaping from the landfill. These data provide information about potential exposures to VOCs and inorganic gases at the specific location and time of the breach. Because VOC and inorganic gas concentrations can vary spatially throughout a landfill, near surface gas results from a breach in one location within the landfill may not be representative of near surface gas results at other locations where a breach may occur.

Exposure to VOCs and inorganic gases caused by a breach in the landfill cap would be influenced by the size and location of the breach, the location of waste within the landfill relative to the breach, the construction and configuration of the OMF South, and other site-specific factors. Pre-construction sampling of a breach in the landfill cap would not be expected to reflect the levels of contamination to which OMF South workers may be exposed in the future.

A planned breach or penetration of the landfill cap would likely require regulatory coordination and approval, and the logistics and costs of sampling a planned breach are likely to be prohibitive; as a result, near surface gas sampling of a planned breach are not recommended.

Collection of shallow soil gas samples: Shallow soil gas samples can be used to provide a measure of VOC and inorganic gas concentrations in soil gas near buildings or developable areas. Sample results can then be used to determine if constituent concentrations in the subsurface are high enough to pose a potentially unacceptable threat to indoor air quality in current or future site buildings.

Shallow soil gas sampling involves the installation of a temporary or permanent soil gas sampling probe to a recommended depth of no less than 5 feet bgs followed by the collection of a sample into an evacuated sampling canister. Due to the possibility of diluting the collected soil gas with atmospheric air and to minimize barometric pumping effects, samples should seldom be collected from depths shallower than 5 feet bgs (Ecology 2018a).

The Midway Landfill is currently covered by a multi-layered landfill cap comprised of a top layer of 12-inch-thick topsoil planted with shallow rooted grasses followed by a 12-inch-thick drainage layer, a layer of filter fabric, drainage net, and 50-mil HDPE flexible membrane. Below the HDPE membrane is a 12-inch-thick layer of low permeability soil/clay material (USEPA 2000a, 2015a). The depth of the prescribed cover over the geosynthetic membrane in the landfill cap is variable throughout the landfill due to grading activities conducted to maintain effective surface water management over the life of the landfill. Cover soil is estimated to be as deep as 14 feet in places.

If this sampling option was selected for the Midway Landfill prior to construction of the OMF South, shallow soil gas samples would need to be collected at locations where the cover soil is greater than 5 feet in order to avoid disturbing the integrity of geosynthetic membrane in the landfill cap. Shallow soil gas results should be reviewed with the understanding that sample results are likely to vary based on sample location relative to VOC and inorganic gases concentrations in the landfill, whether there is a leak in the landfill cap in the vicinity of the sample location, and other site-specific factors.

As discussed earlier in the context of near surface gas sampling, shallow soil gas samples could be collected following a breach in the cap; however, pre-construction shallow soil gas results are not expected to be representative of levels of contamination to which OMF South workers may be exposed in the future.

Potential Sampling Approach

In order to provide Sound Transit with information about the types and concentrations of VOCs and inorganic gases found in landfill gas at the Midway Landfill under current site conditions, the following sampling approach could be implemented prior to construction of the OMF South.

- Phase 1: Landfill Gas Characterization

  Conduct limited landfill gas sampling of the flare inlet for comparison to historical data from the 1988 gas characterization study (Parametrix 1988a) and the 1992 source emission evaluation (Am Test-Air Quality Inc. 1992). Samples collected from the flare inlet would be analyzed for those VOCs and inorganic gases detected in the 1988 and

1992 samples. Flare inlet sample results would provide information on VOCs and inorganic gases currently present in extracted landfill gas.

- Phase 2: Landfill Gas Constituent Distribution

  Depending on the results of flare inlet gas sampling, Sound Transit may opt to conduct landfill gas sampling of individual extraction wells throughout the landfill footprint. Samples collected from the individual wells would be analyzed for those VOCs and inorganic gases detected in flare inlet gas samples. Individual extraction well sample results would provide information on the distribution of VOCs and inorganic gases by well location throughout the landfill and within the proposed OMF South footprint.

Near surface sampling and shallow soil gas sampling are not recommended at this time but may be considered in the future depending on the selected construction approach, potential changes in site conditions, and the results of the landfill gas characterization and constituent distribution sampling described above.

August 2020

OMF SOUTH

Midway Landfill Human Health Risk Assessment Addendum – Final

SOUNDTRANSIT

CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

OMF SOUTH

Midway Landfill Human Health Risk Assessment Addendum-Final

Prepared for:
Sound Transit

Prepared by:
HDR Engineering, Inc.

August 10, 2020

Table of Contents

Executive Summary 1

1.0 Introduction 5

2.0 LFG Sampling 7

2.1 Sampling Approach 8

2.2 April 2020 Sampling Event 8

2.3 Data Validation 10

2.3.1 Data Accuracy and Precision 11

2.3.2 Data Sensitivity 11

2.3.3 Data Usability 11

2.4 Data Limitations 11

2.4.1 Subsurface LFG Data Limitations 11

2.4.2 Air Grab Sample Limitations 12

2.5 Comparison Screening Levels 12

2.6 LFG Sample Results 12

2.6.1 Manifold Inlet Sample Results 13

2.6.2 Extraction Well Sample Results 13

2.6.3 Air Grab Samples Results 14

2.7 Comparison to Historic LFG Data 15

2.7.1 VOC and Inorganic Gas Sampling Results (1988 and 1992) 15

2.7.2 Methane Sampling Results (2015-2019) 16

3.0 LFG Sampling Findings 17

4.0 HHRA Conclusions 18

5.0 References 19

Appendices

A Conceptual Site Model

B Well Logs

C QA/QC Review Memorandum and Laboratory Report

D Hydrogen Sulfide Toxicological Profile

Tables

1 VOC Concentrations in Landfill Gas Extraction System by Sample Location (2020)

2 Methane Concentrations in Landfill Gas Extraction System by Sample Location (2020)

3 VOC Concentrations in Air Grab Samples (2020)

4 Methane Concentrations in Air Grab Samples by Sample Location (2020)

5 Maximum and Average VOC Concentrations in Landfill Gas Extraction System (1988, 1992, and 2020)

Figures

1 Approximate Sample Locations

Acronyms and Abbreviations

Alta	Alta Science and Engineering, Inc.
bgs	below ground surface
City	City of Seattle
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COI	Contaminant Of Interest
COPC	Contaminant Of Potential Concern
CSM	Conceptual Site Model
EAS	Environmental Analytical Service, Inc.
HDPE	High-Density Polyethylene
HHRA	Human Health Risk Assessment
LEL	Lower Explosive Limit
LFG	landfill gas
MTCA	State of Washington Model Toxics Control Act
OMF South	Operations and Maintenance Facility: South
Parametrix	Parametrix, Inc.
QAO	Quality Assurance Officer
QA/QC	quality assurance/quality control
RI	Remedial Investigation
SPU	Seattle Public Utilities
USEPA	U.S. Environmental Protection Agency
VISL	Vapor Intrusion Screening Levels
VOC	Volatile Organic Compound

Units

$\mu g/m^3$	micrograms per cubic meter

Executive Summary

A Human Health Risk Assessment (HHRA) was prepared for the Midway Landfill as a potential site alternative for Sound Transit's Operations and Maintenance Facility South (OMF South) in January 2020 (HDR 2020). Sound Transit is currently implementing a system-wide expansion of the Link light rail system and is evaluating the Midway Landfill (Comprehensive Environmental Response, Compensation, and Liability Information System [CERCLIS] Identification Number: WAD 980638910) as a potential site alternative in the OMF South Draft Environmental Impact Statement (EIS) (HDR 2019a).

The HHRA evaluated several contaminants of interest (COIs) identified during previous site investigations of the Midway Landfill including a number of volatile organic compounds (VOCs), hydrogen sulfide, and methane (HDR 2020).

Several potentially complete occupational routes of exposure to COIs in landfill waste, gas, and groundwater at the OMF South were also identified in the HHRA (HDR 2020). These potentially complete exposure routes include:

- Inhalation of Indoor Air for Onsite Office and Maintenance Shop Workers,
- Inhalation of Air in Subsurface Confined Spaces (e.g., utility trenches and vaults) for Construction Workers,
- Inhalation of Outdoor Air for Maintenance Shop, Yard, and Construction Workers, and
- Direct Contact with Waste and Contaminated Soil for Construction Workers (HDR 2020).

The HHRA found that occupational exposures to VOCs in groundwater and to methane in landfill gas (LFG) are not expected to result in adverse chronic health effects for potential future OMF South workers (HDR 2020). However, the potential risk associated with occupational exposures to VOCs and inorganic gases detected in LFGs could not be characterized due to a lack representative data (HDR 2020).

In order to provide Sound Transit with information about the types and concentrations of VOCs and inorganic gases found in LFG at the Midway Landfill under current site conditions, Parametrix, Inc. (Parametrix) conducted a pre-construction LFG sampling event at the Midway Landfill on April 9, 2020. While these data are not intended (or appropriate) for use in quantitative risk assessment at OMF South, they can inform decisions about the mitigation and/or management of risks associated with the potential exposure to VOCs and inorganic gases during the construction and operation of OMF South.

LFG samples were collected directly from the active gas extraction system. LFG is extracted through the onsite extraction wells at the landfill and routed to a permanent blower/flare system where the extracted gas is supplemented with natural gas and then burned before discharge to the atmosphere (USEPA 2000, 2015).

LFG samples were collected from a manifold inlet to the flare and several gas extraction wells located within the proposed OMF South facility footprint that were still producing a measureable amount of LFG (according to information provided by SPU). Sampled wells were selected based on their proximity to proposed geotechnical borings. In addition, air grab sampling was conducted in areas where the landfill cap had been breached prior to repair during a geotechnical investigation completed in March-April 2020.

This addendum supplements the Midway Landfill HHRA (HDR 2020) with a summary of the April 2020 sampling activities and results, and compares results to historic (1988 and 1992) LFG concentrations previously presented in the HHRA. A qualitative evaluation of the April 2020 results and subsequent updates to the information presented in the HHRA are also included.

LFG Sampling

On April 9, 2020, Parametrix collected 11 samples from a manifold inlet and nine landfill extraction system wells. Three near-surface gas samples were collected in the vicinity of three geotechnical borings where the landfill cover system had been breached (see Figure 1 for approximate sample locations). The LFG extraction system was operating during the sample event and as a result, gas contained in the landfill was under vacuum conditions at the time of sample collection.

All samples were analyzed by Environmental Analytical Services, Inc. (EAS) for:

- VOCs by U.S. Environmental Protection Agency (USEPA) Method TO-15 (USEPA 1999),
- Hydrogen sulfide by USEPA Method M16 (USEPA 2017a), and
- Carbon dioxide and methane by ASTM D1945 (ASTM 2019).

LFG Sample Results

Benzene, ethylbenzene, and hydrogen sulfide were found in the manifold inlet and several extraction wells at concentrations that exceed one or more regulatory screening levels. Methane was detected in the manifold inlet and all of the extraction well samples (with the exception of GW-7) at concentrations that exceed the lower explosive limit (LEL) of 5% (WAC 173-304-460).

Three VOCs (ethylbenzene, toluene, and total xylenes) were detected in one air grab sample. Methane was not detected in any air grab samples.

Comparison to Historic LFG Data

Manifold inlet and extraction well sample results from the April 2020 sampling event were compared to the 1988 gas characterization study which was completed as part of the Remedial Investigation (RI) (Parametrix 1988) and the 1992 source emission evaluation (Am Test-Air Quality Inc. 1992) in order to provide insight into changes in concentrations in LFG constituents over the last 25 to 30 years. The RI was conducted by the City of Seattle (City) and the Washington State Department of Ecology (Ecology) in 1988 to investigate the impact of the landfill on the environment.

Average VOC concentrations in subsurface and flare inlet (or manifold inlet) gas combined have decreased since 1988 and 1992 for all detected VOCs. Compared to 1988 LFG results, the average concentrations of vinyl chloride, toluene, total xylenes, benzene, and ethylbenzene in subsurface gas (LFG extraction wells and manifold or flare inlet combined) have decreased by 98%, 91%, 85%, 52% and 35%, respectively. Hydrogen sulfide concentrations have decreased by 66% since 1988. When compared to the 1992 flare inlet results, vinyl chloride, toluene, total xylenes, benzene, and ethylbenzene concentrations have decreased by 95%, 90%, 95%, 70% and 82%, respectively.

Methane concentration data collected from the LFG extraction system by Seattle Public Utilities (SPU) on a monthly basis from January 2015 to August 2019 were compared to April 2020 methane results for sampled extraction wells. Methane was detected in all extraction wells and the manifold inlet sample at concentrations within (near the lower end of) the range of the 2015-2019 data.

LFG Sampling Findings

The April 2020 LFG extraction system sample results indicate that several VOCs remain in LFG at the site; however, the VOCs with the highest concentrations in 2020 (benzene, ethylbenzene, and hydrogen sulfide) have decreased substantially since 1988.

VOC results from the manifold inlet and extraction wells and from co-located wells demonstrate that concentrations can vary significantly by depth and by location throughout the landfill footprint.

The sampled extraction wells with the highest concentrations of benzene, ethylbenzene, and hydrogen sulfide include GW-42S and GW-42D and GW-48S and GW-48D.

HHRA Updates and Conclusions

The April 2020 LFG sampling event did not provide any new information that would result in a change in the current conceptual site model (CSM) included in Appendix A of this addendum and described in detail in the HHRA (HDR 2020). The primary source of Contaminants of Potential Concern (COPCs) at the site, chemical release mechanisms and environmental transport processes, and potentially complete routes of exposure for specific occupations at the OMF South depicted in the CSM remain the same as those presented in the HHRA (HDR 2020). Overall, the HHRA findings and conclusions have not changed.

1.0 Introduction

A HHRA was prepared for the Midway Landfill as a potential site alternative for Sound Transit's OMF South in January 2020 (HDR 2020). Sound Transit is currently implementing a system-wide expansion of the Link light rail system and is evaluating the Midway Landfill (CERCLIS Identification Number: WAD 980638910) as a potential site alternative in the OMF South Draft Environmental Impact Statement (EIS) (HDR 2019a).

The purpose of the HHRA was to assess potential chronic health risks to Sound Transit personnel who work at the future site should it be selected for the OMF South and waste be maintained on site. Non-Toxicological hazards including acute, physical risks associated with constructing and operating the OMF South over a waste mass were also discussed.

The HHRA evaluated several COIs detected in groundwater and LFG during previous site investigations of the Midway Landfill. The COIs found in onsite groundwater wells include dissolved iron, manganese, chloride, sulfate, 1,4-dioxane, 1,1-dichloroethane, cis-1,2-dichloroethene, and vinyl chloride. The COIs found in onsite LFGs include methane, hydrogen sulfide, and numerous volatile organic compounds (VOCs) (including ethylbenzene, vinyl chloride, total xylenes, toluene, and benzene which were found most frequently and in the highest concentrations). The HHRA provides a summary of findings and additional details about the previous site investigations (HDR 2020).

Several potentially complete occupational routes of exposure to COIs in landfill waste, gas, and groundwater at the OMF South were also identified in the HHRA (HDR 2020). These potentially complete exposure routes include:

- Inhalation of Indoor Air for Onsite Office and Maintenance Shop Workers,
- Inhalation of Air in Subsurface Confined Spaces (e.g., utility trenches and vaults) for Construction Workers,
- Inhalation of Outdoor Air for Maintenance Shop, Yard, and Construction Workers, and
- Direct Contact with Waste and Contaminated Soil for Construction Workers

These potential routes of exposure are based on the assumptions that construction of the OMF South may result in future site conditions that could allow for vapor intrusion from subsurface gas and underlying groundwater to indoor air (HDR 2020).

The HHRA found that occupational exposures to VOCs in groundwater and to methane in LFG are not expected to result in adverse chronic health effects for potential future OMF South workers (HDR 2020). However, the potential risk associated with occupational exposures to VOCs and inorganic gases detected in LFGs could not be characterized due to a lack representative data (HDR 2020). Although a number of toxic VOCs were identified in previous site investigations, these data were collected more than 25 years prior to completion of the HHRA and likely do not represent current or future site conditions.

The HHRA determined that in order to quantify potential future occupational risk to LFGs, *post-construction* sampling of VOCs and toxic inorganic gases is needed to provide a representative measure of the concentrations that workers may be exposed to at OMF South. Any future post-construction sampling of LFG constituents should be conducted following an approach that generates the representative environmental data needed to characterize occupational exposures and to evaluate potential health risks at the OMF South (such as sub-slab soil gas and/or indoor air sampling). Post-construction sub-slab soil gas and/or indoor air sampling results could then be compared to the appropriate risk-based screening levels (e.g., USEPA Worker Air Vapor Intrusion Screening Levels [VISLs] for Sub-slab or Near Source Soil Gas [USEPA 2019], USEPA Worker VISLs for Indoor Air [USEPA 2019], Model Toxics Control Act [MTCA] Method C Sub-slab Soil Gas Screening Levels [WAC 173-340-745], and MTCA Method C Indoor Air Screening Levels [WAC 173-340-750]).

However, in order to provide Sound Transit with information about the types and concentrations of VOCs and inorganic gases found in LFG at the Midway Landfill under current site conditions, Parametrix conducted a pre-construction LFG sampling event at the Midway Landfill on April 9, 2020.

LFG samples were collected directly from the active LFG extraction system which has been in operation since 1985. The extraction system places the landfill under vacuum conditions to pull gases from the underlying waste material. LFG is extracted through the onsite extraction wells at the landfill and routed to a permanent blower/flare system where the extracted gas is supplemented with natural gas and then burned before discharge to the atmosphere (USEPA 2000, 2015).

LFG samples were collected from a manifold inlet to the flare and several gas extraction wells located within the proposed OMF South facility footprint that were still producing a measureable amount of LFG (according to information provided by SPU). Sampled wells were selected based on their proximity to proposed geotechnical borings. In addition, three air grab samples were collected in areas where the landfill cap had been breached prior to repair during a geotechnical investigation conducted in March-April 2020.

This addendum supplements the Midway Landfill HHRA (HDR 2020) with a summary of the April 2020 sampling activities and results, and compares these results to historic LFG concentrations presented in the HHRA. An evaluation of the April 2020 results and subsequent updates to the information presented in the HHRA are also included.

2.0 LFG Sampling

The Midway Landfill is covered with a multilayered engineered cap (landfill cap) and a gas extraction system is in place and operating throughout the landfill to control subsurface migration of LFG to indoor and ambient air. Ecology oversees the City's operation and maintenance for the landfill cover system, gas extraction system, and surface water control systems constructed under the Consent Decree (Ecology 1990).

LFG is extracted through the onsite extraction wells at the landfill and routed to a permanent blower/flare system where the extracted gas is supplemented with natural gas and then burned before discharge to the atmosphere (USEPA 2000, 2015). Additional natural gas is needed for combustion due to the low volume of LFG currently generated at the site.

The landfill cap is comprised of a top layer of 12-inch-thick topsoil planted with shallow rooted grasses followed by a 12-inch-thick drainage layer, a layer of filter fabric, drainage net, and 50-mil High-Density Polyethylene (HDPE) flexible membrane. Below the HDPE membrane is a 12-inch-thick layer of low permeability soil/clay material (USEPA 2000, 2015). The depth of the prescribed cover over the geosynthetic membrane in the landfill cap is variable throughout the landfill due to grading activities conducted to maintain effective surface water management over the life of the landfill. Cover soil is estimated to be as deep as 14 feet in places.

The cap provides a barrier which, along with the operating gas extraction system (constructed in 1985), reduces the migration of volatile compounds found in LFG and groundwater to the surface where they may enter future onsite buildings and/or outdoor air. Migration of volatile compounds through the landfill cover is only possible if the gas extraction and cover system were compromised.

The HHRA considers exposure to vapors from LFG and groundwater a potentially complete route of exposure under the worst-case scenario assumption that a long-term failure in engineered protections (including the landfill cap and gas collection system) occurs at the OMF South, allowing for vapor intrusion from subsurface gas and underlying groundwater to indoor air (HDR 2020).

In order to characterize the types and concentrations of COIs currently found in the LFG, samples were collected directly from the LFG extraction system and analyzed for those COIs that were previously detected in historic LFG samples. In addition, air grab samples were collected in the vicinity of three geotechnical borings where the landfill cover system had been breached. The sampling approach, sample locations, and depths of the sampled wells are described in Section 2.2. Appendix B contains well logs for the sampled wells and Figure 1 shows the sampled wells and boring locations.

2.1 Sampling Approach

Prior to sampling, Parametrix selected several extraction wells within the proposed OMF South facility footprint that were producing measurable amounts of methane gas (according to information provided by SPU). These extraction wells were also selected based on their proximity to the proposed geotechnical borings where air samples were collected. Co-located shallow and deep wells were selected where possible. A manifold inlet to the flare station (located to the north/northwest of the sampled wells) was also identified for sampling.

The sampled LFG extraction wells are listed below along with nearby proposed (or completed) borings (Figure 1 shows the sampling locations).

- GW-52S [S=shallow] and GW-52D [D=deep] located near B-1.
- GW-7 located near B-2.
- GW-38S and GW-38D located near B-3.
- GW-48S and GW-48D located near B-4.
- GW-42S and GW-42D located near B-5.

Only borings B-2, B-4, and B-5 were completed at the time of the gas sampling.

Collection of Manifold and Extraction Well Gas Samples:

Samples were collected from a manifold inlet and individual extraction wells located throughout the landfill. Samples were collected directly from manifold inlet and extraction well sample ports. Samples collected from the manifold inlet represent a composite of all gases and vapors contained within the landfill under the landfill cap. Measurements of LFG constituents were taken at depth using existing gas extraction wells. Samples collected from individual extraction wells provide information about the distribution of VOC-containing waste and/or areas of higher or lower VOC concentrations at specific locations within the landfill.

Collection of Air Grab Samples:

In addition to samples collected directly from the LFG extraction system, air grab samples were collected in areas where the landfill cap had been breached during a geotechnical investigation conducted in March-April 2020. Samples were collected a couple inches above the ground at the breach in the liner.

2.2 April 2020 Sampling Event

On April 9, 2020, Parametrix collected 11 samples from a manifold inlet (MAN-1 and MAN-2 [duplicate]) and nine landfill extraction system wells (GW-7, GW-38S and GW-38D, GW-42S and GW-42D, GW-48S and GW-48D, and GW-52S and GW-52D). Three near-surface gas samples were collected in the vicinity of three geotechnical borings (B-2, B-4, and B-5) where the landfill cover system had been breached. The LFG extraction system was operating during the sample event and as a result, gas contained in the landfill was under vacuum conditions at the time of sampling. Figure 1 shows approximate sample locations.

The following samples were collected from the manifold inlet on April 9, 2020.

- MAN-1
- MAN-2 (duplicate sample of MAN 1)

LFG system extraction wells have been installed at specific locations and depths throughout the landfill to apply different vacuum pressure at different depths in underlying waste material. Shallow and deep wells are co-located in several locations throughout the landfill footprint. The depth of each sampled gas extraction well is provided below. Well logs are included in Appendix B. The following samples were collected on April 9, 2020.

- GW-7 – This sample was collected from extraction well GW-7 which has a depth of 70 feet below ground surface (bgs).
- GW-38S and GW-38D – These samples were collected from two co-located extraction wells (GW-38S and GW-38D). GW-38S has a depth of 56 feet bgs and GW-38D has a depth of 112 feet bgs.
- GW-42S and GW-42D – These samples were collected from two co-located extraction wells (GW-42S and GW-42D). GW-42S has a depth of 32 feet bgs and GW-42D has a depth of 64 feet bgs.
- GW-48S and GW-48D – these samples were collected from two co-located extraction wells (GW-48S and GW-48D). GW-48S has a depth of 49 feet bgs and GW-48D has a depth of 112 feet bgs.
- GW-52S and GW-52D – These samples were collected from two co-located extraction wells (GW-52S and GW-52D). GW-52S has a depth of 30 feet bgs and GW-52D has a depth of 64 feet bgs.

Three geotechnical borings were completed through the exposed and breached landfill cap between March 24 and April 1, 2020. Two borings could not be completed at the time of sampling due to restrictions associated with the Covid-19 pandemic. The completed borings ranged in depth from 120 feet bgs to 150 feet bgs. Air grab samples B-2, B-4, and B-5 were collected in the vicinity of these borings on April 9, 2020. At the time of sampling, the temperature was 42 degrees Celsius. The weather was noted as mostly sunny with calm winds and a steady barometric pressure of 30.30 inches mercury throughout the sampling.

Figure 1 shows the sampled wells and boring locations.

The field crew sampled the manifold inlet and extraction wells using Entech Bottle Vacs with a Quick Connect Adapter. The field crew collected the samples by connecting the Quick Connect

Adapter to the sample port and then connecting the Entech Bottle Vac to the adapter/sample port assembly. The field crew listened for air rushing into the canister and kept the Bottle Vac on the assembly for at least 1 minute or until the Bottle Vac reached a maximum pressure of 5 pound-force per square inch. The field crew then removed the Quick Connect Adapter to stop sampling. Air grab samples were collected by attaching sample tubing to an Entech Bottle Vac and opening the bottle for at least 1 minute or until the Bottle Vac reached a maximum pressure of 5 pound-force per square inch. After collection, all samples were shipped to EAS for analysis.

EAS analyzed samples for the following COIs previously detected in historic LFG samples:

- VOCs including benzene, chlorobenzene, chloromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, dichloromethane (or methylene chloride), 4-methyl-2-pentanone (or methyl isobutyl ketone), styrene, 1,1,2,2-tetrachloroethane, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl acetate, vinyl chloride, total xylenes, tetrahydrofuran, trichlorofluoromethane, chloroethane (ethyl chloride), 1,1,2-trichloro-1,2,2-trifluoromethane (Freon 113), cis-1,2-dichloroethene, 1,4-dichlorobenzene, and 1,2-dichlorobenzene by USEPA Method TO-15 (USEPA 1999),
- Hydrogen sulfide by USEPA Method M16 (USEPA 2017a), and
- Carbon dioxide and methane by ASTM D1945 (ASTM 2019).

2.3 Data Validation

A Stage 2A data validation and data quality assessment was performed by Alta on the sample results for the additional site characterization efforts conducted by Parametrix on April 9, 2020, at the Midway Landfill (see Appendix C for the full quality assurance/quality control [QA/QC] review memorandum). Sampling procedures and the QA/QC review followed guidelines set forth in the following documents:

- ≠ Sampling Instructions for Collecting Samples in Entech Bottle Vacs (EAS no date) – This sampling procedure is provided in Appendix C. Parametrix followed this sampling procedure in lieu of a Quality Assurance Project Plan.
- ≠ National Functional Guidelines for Organic Superfund Methods Data Review (USEPA 2017b)
- ≠ Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 2009)
- ≠ USEPA Guidance on Environmental Data Verification and Data Validation (USEPA 2002)

2.3.1 Data Accuracy and Precision

Based on the data quality review, Alta determined the laboratory and field data to be of acceptable quality, with the exception of MAN-1, B-2, and GW-52D, which were rejected (R) based on insufficient sample volume.

2.3.1.1 Accuracy

Alta's Quality Assurance Officer (QAO) did not qualify any data based on accuracy results (surrogate recoveries and laboratory control samples).

2.3.1.2 Precision

Alta's QAO did not qualify any data based on precision results (laboratory control sample duplicates).

2.3.2 Data Sensitivity

All laboratory reporting limits were below screening levels.

2.3.3 Data Usability

Three samples were rejected (MAN-1, B-2, and GW-52D); therefore, the calculated completeness for this sampling event is 79%.

2.4 Data Limitations

It is important to note the limitations of the April 2020 LFG data; particularly in the application and interpretation of these data in the context of occupational exposure and risk assessment. These limitations are discussed below.

2.4.1 Subsurface LFG Data Limitations

As discussed in the HHRA (HDR 2020), samples collected directly from the LFG extraction system are not representative of VOC concentrations in subsurface gas that could pose an unacceptable risk to indoor air quality, and should not be used to quantify occupational exposures and resulting risk for the following reasons: 1) these samples were collected under vacuum conditions from varying depths within the landfill and therefore are not likely to be representative of gases that may be escaping the landfill cap, and 2) these samples are not likely to be representative of gases that would be found near the surface (where exposure occurs) due to differences in attenuation prior to sample collection.

In addition, subsurface LFG samples were collected from a relatively small number of sample locations within a large area (>60 acres), and during a single (one-day) sampling event and short sampling duration (one minute). Consequently, these results are representative of LFG concentrations at one point in time under specific conditions. These data do not capture potential fluctuations in concentrations due to seasonal variation and changes in weather, or due to changes in site conditions that might be caused by waste removal and/or OMF South construction activities. In addition, the underlying waste type and conditions and applied vacuum pressure and resulting radius of influence for each individual LFG extraction wells is not known. These factors may affect VOC and inorganic gas concentrations in the sampled wells.

Despite the limitations of these data for use in exposure assessment and quantitative risk assessment, these data are helpful in understanding current concentrations and types of VOCs and inorganic gases found in LFG at the site, and can inform decisions about the mitigation and/or management of risks associated with the potential occupational exposures during and following construction of OMF South.

2.4.2 Air Grab Sample Limitations

The interpretation and application of air grab sample results in understanding potential occupational exposures at OMF South is extremely limited due to the small sample volume (less than one liter) and short sampling duration (one minute). These factors may result in very low VOC concentrations in air (below detection limits) and do not capture fluctuations in concentrations due to changes in temperature and barometric pressure over a more representative exposure period (8 hours or more).

2.5 Comparison Screening Levels

In order to provide some context to the VOC concentrations in LFG extraction wells and the manifold inlet, the following regulatory screening levels for deep soil and near source soil gas for occupational exposures are included in Table 1 of this report:

- MTCA Method C Deep Soil Gas Screening Levels (for samples collected deeper than 15 feet bgs) (WAC 173-340-745), and
- USEPA Worker Air VISL for Sub-slab or Near Source Soil Gas (USEPA 2019).

These regulatory screening levels are provided for contextual purposes only and, as previously discussed in the HHRA (HDR 2020), are not used to identify COPCs in LFG extraction system samples.

No risk-based screening levels for methane are available for comparison due to a lack of toxicological effects. However, methane is highly flammable, can explode at concentrations between 5% (LEL) and 15% (upper explosive limit), and is a simple asphyxiant that can cause death at concentrations much higher than the explosive range (5-15%). Methane concentrations are compared to the LEL in the HHRA and in this addendum (WAC 173-304-460).

2.6 LFG Sample Results

LFG sample results from the onsite extraction wells and the manifold inlet are presented in Table 1 (VOCs) and Table 2 (methane) and are discussed in detail below.

2.6.1 Manifold Inlet Sample Results

An original/duplicate sample pair (MAN-1 and MAN-2) was collected from the manifold inlet (shown in Figure 1) and represents a composite of all gases and vapors contained within the landfill under the landfill cap. The original sample (MAN-1) did not have sufficient sample volume and was rejected; therefore, results for this sample are not discussed.

The following VOCs were found in the duplicate manifold inlet sample (MAN-2): benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, tetrachloroethene, toluene, vinyl chloride, total xylenes, tetrahydrofuran, trichlorofluoromethane, chloroethane, cis-1,2-dichloroethene, and hydrogen sulfide. Of these detected VOCs, benzene and ethylbenzene exceeded one or more regulatory screening level (Table 1).

- MAN-2
    - Benzene = 492 µg/m^3 (compared to USEPA VISL = 524 µg/m^3 and MTCA Method C Deep Soil SL = 320 µg/m^3)
    - Ethylbenzene = 13,362 µg/m^3 (compared to USEPA VISL = 1,640 µg/m^3 and MTCA Method C Deep Soil SL = 100,000 µg/m^3)

Methane was detected in the manifold inlet sample at 13.48%, which exceeds the LEL of 5% (Table 2).

2.6.2 Extraction Well Sample Results

Nine samples were collected from LFG extraction wells; however, one sample (GW-52D) was rejected due to insufficient sample volume; therefore, results for this sample are not discussed.

The following VOCs were found in the extraction wells: benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, dichloromethane, tetrachloroethene, toluene, trichloroethene, vinyl chloride, total xylenes, tetrahydrofuran, trichlorofluoromethane, chloroethane, cis-1,2-dichloroethene, and hydrogen sulfide. Table 1 summarizes the extraction well results. Of these detected VOCs, benzene, ethylbenzene, and hydrogen sulfide exceed one or more regulatory screening level. These results are shown in Table 1.

Of the sampled wells, benzene was detected at the highest concentration in GW-48D (1,701 µg/m^3 relative to the USEPA VISL of 524 µg/m^3 and the MTCA Method C Deep Soil SL of 320 µg/m^3). Benzene in this extraction well is approximately three times higher than in the manifold inlet and the co-located shallower well (GW-48S) (492 µg/m^3 and 549 µg/m^3, respectively). The next highest benzene concentrations were found in GW-42S and GW-42D, which are 550 µg/m^3 and 535 µg/m^3, respectively. All other extraction wells had benzene concentrations less than the average represented by the manifold inlet sample results (MAN-2).

Ethylbenzene and hydrogen sulfide were detected at the highest concentrations in GW-42S (25,679 µg/m^3 [relative to the USEPA VISL of 1,640 µg/m^3 and the MTCA Method C Deep Soil SL of 100,000 µg/m^3] and 32,297 µg/m^3 [relative to the USEPA VISL of 292 µg/m^3], respectively). This extraction well is one of the shallower sampled wells (completed to a depth of 32 feet bgs). Ethylbenzene in this extraction well is approximately two times higher than in the manifold inlet and the co-located deeper well (GW-42D) (13,362 µg/m^3 and 9,927 µg/m^3, respectively). The next highest ethylbenzene concentration detected in the extraction wells was in GW-48D at 13,207 µg/m^3; the ethylbenzene concentration for the co-located shallow well GW-48S is 1,231 µg/m^3. All other extraction wells had ethylbenzene concentrations less than the average represented by the manifold inlet sample (MAN-2).

Hydrogen sulfide in GW-42S is approximately 1.5 times higher than in the co-located deeper well (GW-42D) (18,072 µg/m^3 relative to the USEPA VISL of 292 µg/m^3) and orders of magnitude higher than in the manifold inlet sample (124 µg/m^3). The next highest hydrogen sulfide concentrations were found in GW-48S and its co-located deeper well (GW-48D) (16,288 µg/m^3 and 12,500 µg/m^3, respectively). All other extraction wells (with the exception of GW-7 which was below the detection limit) had hydrogen sulfide concentrations greater than the average represented by the manifold inlet sample results (MAN-2).

Methane was detected in all of the extraction well samples (Table 2). Results ranged from 0.72% (GW-7) and 20.42% (GW-38D). Methane exceeds the LEL in all wells with the exception of GW-7.

2.6.3 Air Grab Samples Results

Three air grab samples were collected in the vicinity of the geotechnical borings where the cap had been breached. However, one sample (B-2) was rejected due to insufficient sample volume; therefore, results for this sample are not discussed.

Three VOCs (ethylbenzene, toluene, and total xylenes) were detected in the air grab samples. The majority of analyzed VOCs were not detected in the air grab samples; however, these air samples are small volume samples collected over a short period of time (one minute) and as a result, interpretation of these data is extremely limited. Ethylbenzene, toluene, and total xylenes were detected in one sample (B-5).

As discussed in Section 2.4.2, the interpretation and application of air grab sample results in understanding potential occupational exposures at OMF South is extremely limited due to the small sample volume (less than one liter) and short sampling duration (one minute). Therefore, Table 3 summarizes air grab sample VOCs results but these results are not discussed in detail.

Methane was not detected in any air grab samples (see Table 4).

2.7 Comparison to Historic LFG Data

Manifold inlet and extraction well sample results from the April 2020 sampling event are compared to the 1988 gas characterization study (Parametrix 1988) and the 1992 source emission evaluation (Am Test-Air Quality Inc. 1992) and are discussed in the following sections to provide insight into changes in concentrations in LFG constituents over the last 25 to 30 years. Average and maximum VOC results for all sampled wells and the manifold inlet are included in Table 5 for comparison to historical data. Table 2 shows the average and range of methane sample results for January 2015 to August 2019 data, along with the April 2020 results for comparison.

2.7.1 VOC and Inorganic Gas Sampling Results (1988 and 1992)

Two historic sources of data on the composition of subsurface gas at the Midway Landfill were identified during the initial document review for the HHRA. These sources include a gas characterization study completed in 1988 as part of the RI and a source emission evaluation completed in 1992 to quantify gas flare emission levels at the Midway Landfill.

As part of the 1988 gas characterization study, gas from individual onsite gas extraction wells was sampled and analyzed for compounds known to be present at specific locations deep within the landfill. In addition, flare inlet gas, representing the combined gas extracted from the numerous individual onsite gas extraction wells, was also characterized to provide a description of the average composition of gas extracted from the landfill (Parametrix 1988).

The 1992 source emission evaluation, conducted by Am Test-Air Quality Inc. to quantify gas combustor emission levels at the Midway Landfill, measured concentrations of VOCs found in pre-combustion flare gas (flare inlet gas) and post-incineration emissions. Subsurface gas extracted from the landfill was sampled during three runs at the inlet and the outlet of one of four LFG combustors to determine the destruction efficiencies for VOCs in LFG.

A number of VOCs were detected in subsurface gas collected from the onsite gas extraction wells and flare inlets in the 1988 and 1992 sampling events.

Concentrations of VOCs detected in subsurface and flare inlet gas during the 1988 gas characterization study were presented in the RI in summary form only (mean and/or maximum concentrations) (Parametrix 1988). Concentrations of VOCs detected in flare inlet gas during the 1992 source emission evaluation were presented for each of the three sample runs. Table 5 presents these data and the April 2020 results in summary (maximum and mean concentrations).

Average VOC concentrations in subsurface and flare or manifold inlet gas combined have decreased since 1988 and 1992 for all detected VOCs. The RI noted that benzene, ethylbenzene, toluene, total xylenes, and vinyl chloride were found most frequently and in the highest concentrations in onsite subsurface gas (Parametrix 1988). Hydrogen sulfide was also detected in onsite subsurface gas in the low parts per million range (Parametrix 1988). Compared to 1988 LFG results, the average concentrations of vinyl chloride, toluene, total xylenes, benzene and ethylbenzene in subsurface gas (LFG extraction wells and manifold or flare inlet combined) have decreased by 98%, 91%, 85%, 52% and 35%, respectively. Hydrogen sulfide concentrations have decreased by 66% since 1988.

When compared to the 1992 flare inlet results, vinyl chloride, toluene, total xylenes, benzene and ethylbenzene concentrations have decreased by 95%, 90%, 95%, 70% and 82%, respectively.

2.7.2 Methane Sampling Results (2015-2019)

LFG monitoring has been conducted at the landfill on a regular basis beginning in 1984. Installation and operation of the LFG extraction system is part of the remedy for the Midway Landfill and monitoring and sampling of the extraction wells is part of the operations and maintenance of the system. The Final HHRA discusses the remedy for the Midway Landfill in more detail (HDR 2020).

LFG is collected from the landfill extraction wells and flares by SPU and analyzed for combustible gas (primarily methane), oxygen, carbon dioxide, temperature, static pressure, and other parameters. SPU provided monthly gas monitoring results for 106 sample locations collected between January 2015 and August 2019 for review as part of the HHRA. These results included methane concentrations for 106 locations within the LFG extraction system (e.g., extraction wells, vacuum manifolds, etc.).

Table 2 summarizes methane results from January 2015 - August 2019 and April 2020 for those extraction wells and the manifold inlet sampled in April 2020. Methane was detected in all extraction wells and manifold inlet samples at concentrations within (near the lower end of) the range of the 2015-2019 data.

3.0 LFG Sampling Findings

The April 2020 LFG extraction system sample results indicate that several VOCs remain in LFG at the site; however, when compared to historical data, the VOCs with the highest concentrations in 2020 (benzene, ethylbenzene, and hydrogen sulfide) have decreased substantially since 1988.

VOC results from the manifold inlet and extraction wells and from co-located wells demonstrate that concentrations can vary significantly by depth and by location throughout the landfill footprint. This variation may be due to differences in underlying waste material and conditions and to differences in the vacuum pressure exerted at these depths and locations.

The sampled extraction wells with the highest concentrations of benzene, ethylbenzene, and hydrogen sulfide include those GW-42S and GW-42D and GW-48S and GW-48D. Sampled extraction wells with the lowest VOCs concentrations include GW-7 and GW-52S.

4.0 HHRA Conclusions

The April 2020 LFG sampling event did not provide any new information that would result in a change in the current CSM included in Appendix A of this addendum and described in detail in the HHRA (HDR 2020). The primary source of COPCs at the site, chemical release mechanisms and environmental transport processes, and potentially complete routes of exposure for specific occupations at the OMF South depicted in the CSM remain the same as those presented in the HHRA (HDR 2020).

As discussed in the HHRA (HDR 2020) and in Section 2.4 of this addendum, samples collected directly from the LFG extraction system are not representative of VOC concentrations in subsurface gas that could pose an unacceptable risk to indoor air quality, and should not be used to quantify occupational exposures and resulting risk. As a result, the April 2020 pre-construction sampling results were not used to identify subsurface soil gas COPCs.

However, because hydrogen sulfide was detected at relatively high concentrations (32,297 µg/m^3 in GW-42S relative to the USEPA VISL of 292 µg/m^3) in LFG samples during the April 2020 sampling event, a toxicity profile for hydrogen sulfide is included in Appendix D. The toxicity profile is a summary of available toxicological information and known health effects for a hazardous substance. Overall, the HHRA findings and conclusions have not changed.

As stated in the HHRA findings, the migration of LFG through the subsurface to indoor and ambient air is currently controlled by the gas extraction system and the landfill cap. Continued operation and maintenance of all components of the remedy (including the gas extraction system and the landfill cap) is required if any portion of the property is sold, leased, transferred, or otherwise conveyed. As a result, it is expected that future development of the OMF South at the Midway Landfill would include a gas extraction system and the landfill cap and other engineered protections to mitigate and monitor vapor intrusion of LFG (including methane) to indoor air.

5.0 References

Am Test-Air Quality Inc. (Am Test-Air Quality Inc.), 1992. Source Emissions Evaluation for the Midway Sanitary Landfill, Landfill Gas Flare Testing. February.

Agency for Toxic Substances and Disease Registry (ATSDR), 2007. Toxicological profile for Xylenes. August 2007. Accessed from https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=53.

ATSDR, 2016. Toxicological profile for Hydrogen Sulfide and Carbonyl Sulfide. November 2016. Accessed from https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=67 on May 15, 2020.

ASTM International (ASTM), 2019. ASTM D1945: Standard Test Method for Analysis of Natural Gas by Gas Chromatography.

Environmental Analytical Services, Inc. (EAS), no date. “Sampling Instructions for Collecting Samples in Entech Bottle Vacs.”

HDR Engineering, Inc. (HDR), 2019a. Tacoma Dome Link Extension. Final OMF South Landfill Evaluation Report. Prepared for Sound Transit. June.

HDR, 2020. Final OMF South Midway Landfill Human Health Risk Assessment. Prepared for Sound Transit. January.

Integrated Risk Information System (IRIS), 2003. Toxicological Review of Hydrogen Sulfide. June. EPA/635/R-03/005.

Parametrix, Inc. (Parametrix), 1988. Midway Landfill Remedial Investigation Summary Report. Prepared by Parametrix, Inc., for the City of Seattle Engineering Department, Solid Waste Utility. July.

USEPA. 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition, Compendium Method TO-14A, Determination Of Volatile Organic Compounds (VOCs) In Ambient Air Using Specially Prepared Canisters With Subsequent Analysis By Gas Chromatography. January.

USEPA, 2000. EPA Superfund: Record of Decision, Midway Landfill EPA ID: WAD980638910 OU 01, Kent, Washington. September.

USEPA, 2002. USEPA Guidance on Environmental Data Verification and Data Validation. USEPA QA/G-8; November.

USEPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, EPA 540-R-08-005 prepared by the Office of Solid Waste and Emergency Response; January.

USEPA, 2015. Third Five-Year Review for the Midway Landfill Superfund Site, Kent, Washington, USEPA Region 10. September.

USEPA, 2017a. Method 16 – Semicontinuous Determination of Sulfur Emissions from Stationary Sources. August. Available at: https://www.epa.gov/emc/method-16-sulfur-semicontinuous-determination.

USEPA, 2017b. National Functional Guidelines for Organic Superfund Methods Data Review, (SOM02.4), OLEM 9355.0-136, USEPA-540-R-2017-002; January.

USEPA, 2019. Vapor Intrusion Screening Level Calculator. May. Available at: https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator

USEPA, 2019. Vapor Intrusion Screening Level Calculator. May. https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator

Washington Administrative Code (WAC) 173-304-460. Landfilling standards. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-304-460

WAC 173-340-745. Soil cleanup standards for industrial properties. Available at: https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-745

WAC 173-340-750. Cleanup standards to protect air quality. https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-750

Washington State Department of Ecology (Ecology), 1990. Consent Decree. May 29, 1990.

Tables

Table 1. VOC Concentrations in Landfill Gas Extraction System by Sample Location (2020)

Sample ID	Date	Unit	Benzene	Chlorobenzene	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	trans-1,2-Dichloroethene	Ethylbenzene	Dichloromethane (Methylene Chloride)	4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl acetate	Vinyl chloride	Xylenes [a]	Tetrahydrofuran	Trichlorofluoromethane	Chloroethane (Ethyl Chloride)	1,1,2-Trichloro-1,2,2-trifluoromethane (Freon 113)	cis-1,2-Dichloroethene	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Hydrogen Sulfide
USEPA Worker Air Vapor Intrusion Screening Levels (VISL) for Sub-slab or Near Source Soil Gas		µg/m^3	**524**	7,300	13,100	2,560	157	29,200	No Tox Info	**1,640**	87,600	438,000	146,000	70.5	5,840	730,000	730,000	292	29,200	929	14,600	292,000	No Tox Info	1,460,000	No Tox Info	No Tox Info	372	29,200	**292**
VISL Toxicity Basis			CA	NC	NC	CA	CA	NC	--	CA	NC	NC	NC	CA	NC	NC	NC	NC	NC	CA	NC	NC	--	NC	--	--	CA	NC	NC
MTCA Method C Deep Soil Gas Screening Level[b]		µg/m^3	**320**	5,000	9,000.00	1,600.0	96	20,000	No Tox Info	100,000	60,000	300,000	100,000	43	4,000	500,000	500,000	200	20,000	280	10,000	--	70,000	--	--	--	--	--	--
MTCA Method C Toxicity Basis			CA	NC	NC	CA	CA	NC	--	NC	NC	NC	NC	CA	NC	NC	NC	NC	NC	CA	NC	--	NC	--	--	--	--	--	--
MAN-1	4/9/2020	µg/m^3	<1.42 R	<1.02 R	<1.34 R	<0.90 R	<0.90 R	<0.88 R	<0.88 R	<2.04 R	<1.54 R	<3.64 R	<1.96 R	<1.51 R	<0.90 R	<1.67 R	<1.21 R	<0.72 R	<0.78 R	<0.57 R	<2.05 R	<1.31 R	<1.97 R	<0.59 R	<1.70 R	<1.76 R	<2.67 R	<5.34 R	<11.3 R
MAN-2 (duplicate of MAN-1)	4/9/2020	µg/m^3	**492**	531	<1.34	29	<1.34	<1.31	<1.31	**13,362**	<2.29	<5.41	<2.91	<2.24	15	3,117	<1.80	<1.06	<1.16	224	9,787	300	27	74.16	<2.53	55.94	<3.97	<7.93	124
GW-7	4/9/2020	µg/m^3	<6.31	42	<2.04	<4.00	<4.00	<3.92	<3.92	37	<6.86	<16.20	<8.72	<6.72	<4.02	46	<5.39	<3.19	<3.48	<2.53	54.8 J	<5.83	<5.55	<2.61	<7.58	<7.83	<11.89	<23.77	<50.2
GW-38S	4/9/2020	µg/m^3	256	537	<1.65	<3.24	<3.24	<3.17	<3.17	637	<5.55	<13.11	<7.06	<5.43	<3.25	29	<4.36	<2.58	<2.82	<2.04	234	120	20.95 J	60.31	<6.13	<6.34	<9.61	<19.23	**4,348**
GW-38D	4/9/2020	µg/m^3	62	753	<1.34	<1.49	<1.49	<1.45	<1.45	**6,851**	<2.55	<6.01	<3.24	<2.49	5.88 J	291	<2.00	11	<1.29	234	1,613	396	<2.06	27.00	<2.81	70.05	<4.41	<8.82	**6,590**
GW-42S	4/9/2020	µg/m^3	**550**	320	<2.13	123	<4.18	<4.10	<4.10	**25,679**	<7.18	<16.94	<9.12	<7.02	<4.20	773	<5.64	<3.33	<3.64	212	2,170	307	86	129.16	<7.92	<8.19	<12.43	<24.85	**32,297**
GW-42D	4/9/2020	µg/m^3	**535**	395	<1.34	37	<1.75	<1.71	<1.71	**9,927**	<3.00	<7.09	<3.82	<2.94	<1.76	266	<2.36	<1.39	<1.52	101	1,812	330	78	87.84	<3.31	12.41	<5.20	<10.40	**18,072**
GW-48S	4/9/2020	µg/m^3	**549**	677	<1.34	<2.00	<2.00	<1.96	<1.96	1,231	<3.44	<8.11	<4.37	<3.36	<2.01	176	<2.70	11.85 J	<1.74	137	418	309	<2.78	298.80	<3.79	24.53	<5.95	<11.90	**16,288**
GW-48D	4/9/2020	µg/m^3	**1,701**	370	<1.34	190	<2.48	<2.43	<2.43	**13,207**	47	<10.04	<5.40	<4.16	8.7	742	<3.34	14.44 J	<2.16	312	3,284	278	<3.44	796.18	<4.69	43.17	<7.36	<14.72	**12,500**
GW-52S	4/9/2020	µg/m^3	192	189	<1.34	28	<1.46	<1.43	<1.43	1,083	<2.50	<5.90	<3.18	<2.45	8.6	372	<1.96	12	<1.27	55	1,016	182	13	39.22	<2.76	<2.85	<4.33	<8.65	178
GW-52D	4/9/2020	µg/m^3	<1.79 R	<1.29 R	<1.34 R	<1.13 R	<1.13 R	<1.11 R	<1.11 R	6.95 R	<1.94 R	<4.59 R	<2.47 R	<1.90 R	<1.14 R	<2.11 R	<1.53 R	<0.90 R	<0.99 R	<0.72 R	32 R	<1.65 R	<1.97 R	<0.74 R	<2.15 R	<2.22 R	<3.37 R	<6.73 R	<12.7 R

Notes:

A **bolded** number in the "Results" row denotes that the laboratory detected analyte is greater than the Commercial USEPA Vapor Intrusion Screening Levels (VISLs).

[a] m,p-Xylenes and o-Xylenes were added together and compared to the Xylenes VISL.

[b] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables;

MTCA Method C Screening Levels are protective of industrial exposures and derived using the exposure assumptions shown in Figures
2-5. - = not available
CA = Carcinogenic
NC = Non-Carcinogenic
R = rejected value
J = estimated value

Table 2. Methane Concentrations in Landfill Gas Extraction System by Sample Location (2020)

Sample ID	Date	Unit	Methane (April 2020)	Methane Range (January 2015-August 2019)	Average Methane (January 2015-August 2019)
Lower Explosive Limit (LEL)		%	5		
MAN-1	4/9/2020	%	<0.03 R	13-19.9*	17.1*
MAN-2	4/9/2020	%	13.48		
GW-7	4/9/2020	%	0.72	0.6-13.4	5.9
GW-38S	4/9/2020	%	10.55	10.6-19.5	14.0
GW-38D	4/9/2020	%	20.42	19.8-29.2	24.6
GW-42S	4/9/2020	%	12.70	15.1-20.4	17.7
GW-42D	4/9/2020	%	13.07	14.7-21.3	17.6
GW-48S	4/9/2020	%	9.37	10.5-18.4	12.8
GW-48D	4/9/2020	%	15.19	11.4-24.4	17.9
GW-52S	4/9/2020	%	7.05	11.6-16.4	13.9
GW-52D	4/9/2020	%	<0.03 R	16.5-21.3	18.6

Notes:

< = less than the laboratory method detection limit

*SPU provided results for Man, Man-N, and Man-S; these summary data are for all manifold samples combined.

Table 3. VOC Concentrations in Air Grab Samples (2020)

Sample ID	Date	Unit	Benzene	Chlorobenzene	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	trans-1,2-Dichloroethene	Ethylbenzene	Dichloromethane (Methylene Chloride)	4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl acetate	Vinyl chloride	Xylenes [a]	Tetrahydrofuran	Trichlorofluoromethane	Chloroethane (Ethyl Chloride)	1,1,2-Trichloro-1,2,2-trifluoromethane (Freon 113)	cis-1,2-Dichloroethene	1,4-Dichlorobenzene	1,2-Dichlorobenzene	Hydrogen Sulfide
B-2	4/9/2020	μg/m^3	<1.42 R	<1.02 R	<1.34 R	<0.90 R	<0.90 R	<0.88 R	<0.88 R	<2.04 R	<1.54 R	<3.64 R	<1.96 R	<1.51 R	<0.90 R	2.98 R	<1.21 R	<0.72 R	<0.78 R	<0.57 R	10.89 R	<1.31 R	<1.97 R	<0.59 R	<1.70 R	<1.76 R	<2.67 R	<5.34 R	<11.3 R
B-4	4/9/2020	μg/m^3	<2.14	<1.54	<1.34	<1.36	<1.36	<1.33	<1.33	<3.08	<2.33	<5.50	<2.96	<2.28	<1.36	<2.53	<1.83	<1.08	<1.18	<0.86	<6.09	<1.98	<1.97	<0.88	<2.57	<2.66	<4.03	<8.07	<17.0
B-5	4/9/2020	μg/m^3	<2.47	<1.78	<1.34	<1.57	<1.57	<1.53	<1.53	12.94	<2.69	<6.35	<3.42	<2.63	<1.58	10.28	<2.11	<1.25	<1.36	<0.99	38.15	<2.28	<2.18	<1.02	<2.97	<3.07	<4.66	<9.31	<17.5

Notes:

[a] m,p-Xylenes and o-Xylenes were added together and compared to the Xylenes VISL.

R = rejected value

μg/m^3 = micrograms per cubic meter

< = less than the laboratory method detection limit

Table 4. Methane Concentrations in Air Grab Samples by Sample Location (2020)

Sample ID	Date	Unit	Methane
Lower Explosive Limit (LEL)		%	5
B-2	4/9/2020	%	<0.03 R
B-4	4/9/2020	%	<0.06
B-5	4/9/2020	%	<0.06

Notes:

< = less than the laboratory method detection limit

Table 5. Maximum and Average VOC Concentrations in Landfill Gas Extraction System (1988, 1992, and 2020)

Date	Sample ID	Unit	Benzene	Chlorobenzene	Chloroethane (Ethyl Chloride)	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	trans-1,2-Dichloroethene	Ethylbenzene	Dichloromethane (Methylene Chloride)	4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,2,2-Tetrachloroethane	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Acetate	Vinyl Chloride	Xylenes[a]	Tetrahydrofuran	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-trifluoromethane (Freon 113)	cis-1,2-Dichloroethene
1988[b, c, d]	Maximum On-site Sub-surface Gas	μg/m^3	4,421	1,188	1,868	NR	3,028	510	444	313	72,119	9,199	25	2,164	ND	543	90,600	ND	521	1,701	79,793	126,774	6,190	2,006	812	NR
	Maximum Flare Inlet Gas	μg/m^3	3,016	1,197	794	NR	1,376	ND	3,981	3,259	24,962	1,091	ND	ND	254	ND	24,790	327	3,671	ND	2,699	97,655	NR	1,101	3,456	NR
	Mean Sub-surface/Flare Inlet Gas combined	μg/m^3	1,016	NR	NR	NR	NR	NR	NR	NR	12,266	NR	NR	175	NR	NR	7,235	NR	NR	NR	7,175	14,846	NR	NR	NR	NR
1992[e]	Maximum Flare Inlet (all runs)	μg/m^3	1,700	2,801	280	1,002	410	NR	NR	NR	46,002	NR	270	520	NR	NR	6,901	NR	NR	NR	3,002	47,004	NR	170	NR	1,099
	Average Flare Inlet (all runs)	μg/m^3	1,600	2,733	270	974	397	NR	NR	NR	44,670	NR	270	484	NR	NR	6,600	NR	NR	NR	2,968	46,003	NR	160	NR	1,067
2020	Maximum (Extraction Wells and Manifold)	μg/m^3	1,701	753	796	ND	190	ND	ND	ND	25,679	47	ND	ND	ND	15	3,117	ND	14	ND	312	9,787	396	86	ND	70
	Manifold Only	μg/m^3	492	531	74	<1.34	29	<1.34	<1.31	<1.31	13,362	<2.29	<5.41	<2.91	<2.24	15	3,117	<1.80	<1.06	<1.16	224	9,787	300	27	<2.53	56
	Average Sub-surface Gas (Extraction Wells and Manifold)	μg/m^3	483	424	168	-	46	-	-	-	8,002	9	-	-	-	6	645	-	7	-	142	2,266	248	26	-	26

Notes:

[a] m,p-Xylenes and o-Xylenes were added together.

[b] Midway Landfill Remedial Investigation Summary Report, Table 6-1, page 6-29 (Parametrix 1988a)

[c] Midway Landfill Remedial Investigation Summary Report, Table 8-1, page 8-10 (Parametrix 1988a)

[d] Midway Landfill Remedial Investigation Summary Report, Table 7-6, page 7-24 (Parametrix 1988a)

[e] Reported in the Midway Sanitary Landfill Landfill Gas Flare Testing Source Emissions Evaluation, page 12 (AM Test-air Quality Inc. 1992)

- = not applicable

μg/m^3 = micrograms per cubic meter

Figures

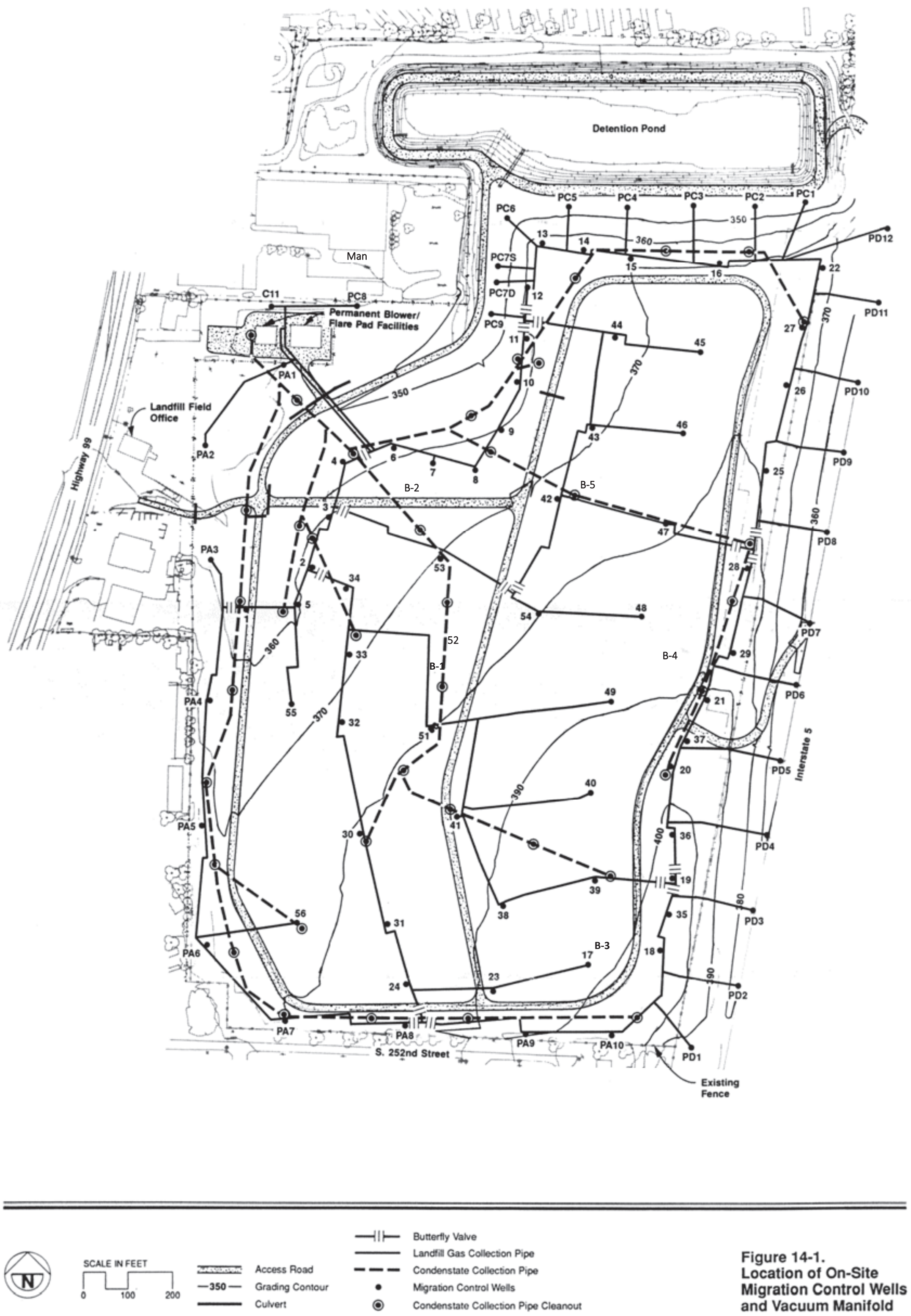
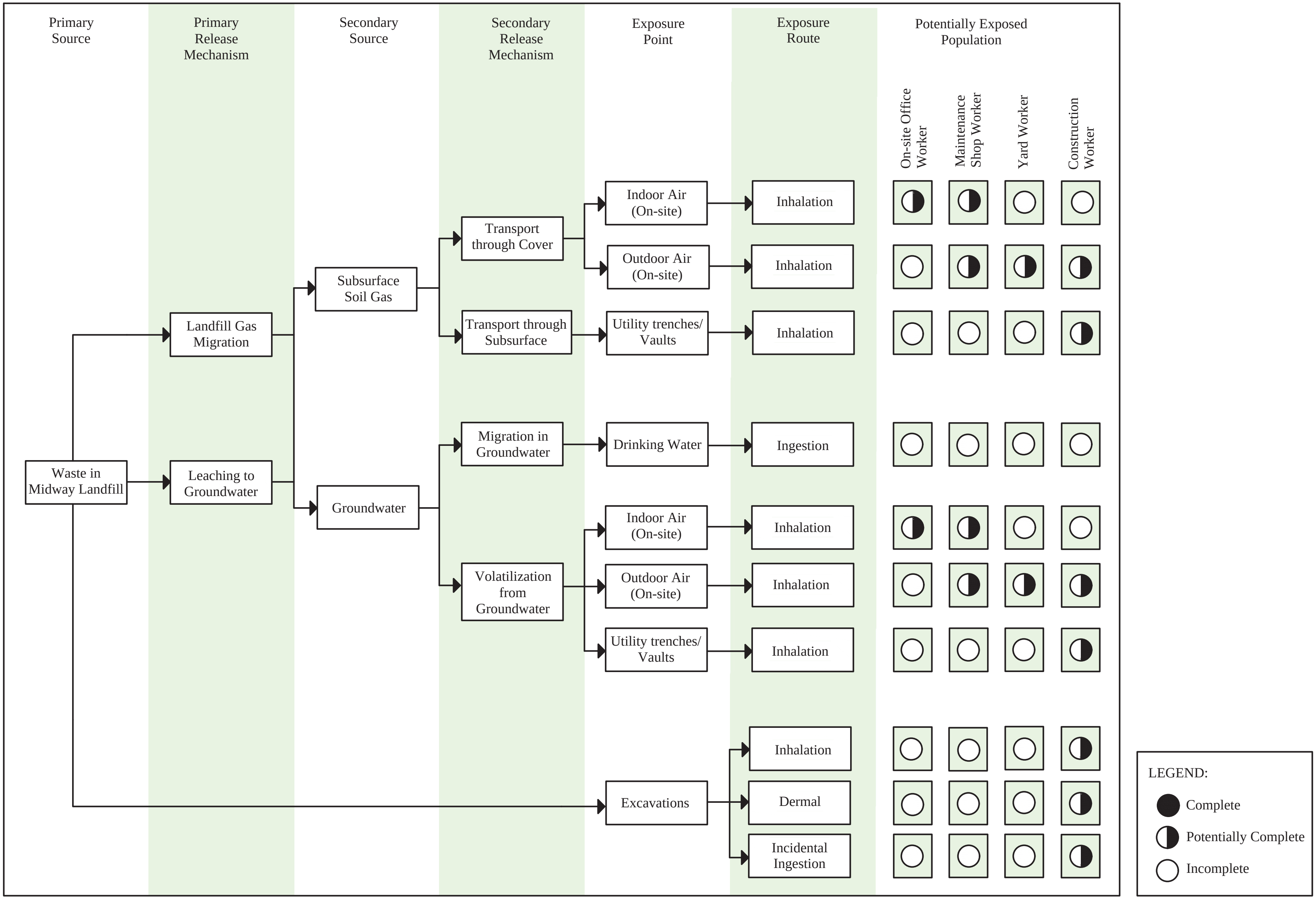

Detention Pond
PC1
PC2
PC3
PC4
PC5
PC6
PC7S
PC7D
PC8
PC9
C11
PD12
PD11
PD10
PD9
PD8
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
Man
Permanent Blower/ Flare Pad Facilities
Landfill Field Office
Highway 99
Interstate 5
S. 252nd Street
Existing Fence
B-1
B-2
B-3
B-4
B-5
350
360
370
380
390
400
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
51
52
53
54
55
56
N
SCALE IN FEET
0
100
200
Access Road
—350— Grading Contour
Culvert
Butterfly Valve
Landfill Gas Collection Pipe
Condenstate Collection Pipe
Migration Control Wells
Condenstate Collection Pipe Cleanout
Figure 14-1.
Location of On-Site Migration Control Wells and Vacuum Manifold

Figure 1. Approximate Sample Locations

Appendix A: Conceptual Site Model


Primary Source
Primary Release Mechanism
Secondary Source
Secondary Release Mechanism
Exposure Point
Exposure Route
Potentially Exposed Population
On-site Office Worker
Maintenance Shop Worker
Yard Worker
Construction Worker
Waste in Midway Landfill
Landfill Gas Migration
Leaching to Groundwater
Subsurface Soil Gas
Groundwater
Transport through Cover
Transport through Subsurface
Migration in Groundwater
Volatilization from Groundwater
Indoor Air (On-site)
Outdoor Air (On-site)
Utility trenches/ Vaults
Drinking Water
Indoor Air (On-site)
Outdoor Air (On-site)
Utility trenches/ Vaults
Excavations
Inhalation
Inhalation
Inhalation
Ingestion
Inhalation
Inhalation
Inhalation
Inhalation
Dermal
Incidental Ingestion
LEGEND:
● Complete
◐ Potentially Complete
○ Incomplete

Secondary Source	Exposure Point	Exposure Route	On-site Office Worker	Maintenance Shop Worker	Yard Worker	Construction Worker
Subsurface Soil Gas	Indoor Air (On-site)	Inhalation	◐	◐	○	○
Subsurface Soil Gas	Outdoor Air (On-site)	Inhalation	○	◐	◐	◐
Subsurface Soil Gas	Utility trenches/ Vaults	Inhalation	○	○	○	◐
Groundwater	Drinking Water	Ingestion	○	○	○	○
Groundwater	Indoor Air (On-site)	Inhalation	◐	◐	○	○
Groundwater	Outdoor Air (On-site)	Inhalation	○	◐	◐	◐
Groundwater	Utility trenches/ Vaults	Inhalation	○	○	○	◐
	Excavations	Inhalation	○	○	○	◐
	Excavations	Dermal	○	○	○	◐
	Excavations	Incidental Ingestion	○	○	○	◐

FIGURE 1

Preliminary Conceptual Site Model
Exposure Pathway Evaluation for
Midway Landfill

Appendix B: Well Logs

FMX 77-1550-07(3)

GAS WELL DRILLING LOG

WELL No. 7 Coords. N 11,350 E 9723

Landfill name: MIDWAY LANDFILL GAS MIGRATION CONTROL Date 10-2 & 10-3-85

Time drilling 2:44 PM - 5:30 PM 10-2-85
7:00 AM - 3:27 PM 10-3-85

DESCRIPTION OF DRILLING SPOILS:

Cover soil depth: 1.0'

	Description of Spoils
1-19'	PART. DECOMPOSED BLACK WOOD, PAPER, CLOTH, OCCA. TIRE
19-20	SANDY GRAVEL
20-69'	PART. DECOMP. BLACK WOOD (TO 22' ON 10-2-85)
28'	WET " " "
36'	TIRE REMOVED
63'	STEEL CABLE REMOVED
69'-70'	SANDY CLAY

Total depth of well 70' (Diam. 24")

DRILLING CONDITIONS

(Weather, obstructions, etc.)

Drilling company DBM CONTRACTORS, INC

Drilling equipment HENDERSON LL 100,000 lb TRUCK MTD DRILL; 6" KELLY BAR

Operators names CHUCK FENSTERMACKER, MARVINA OLNEY (OILER)

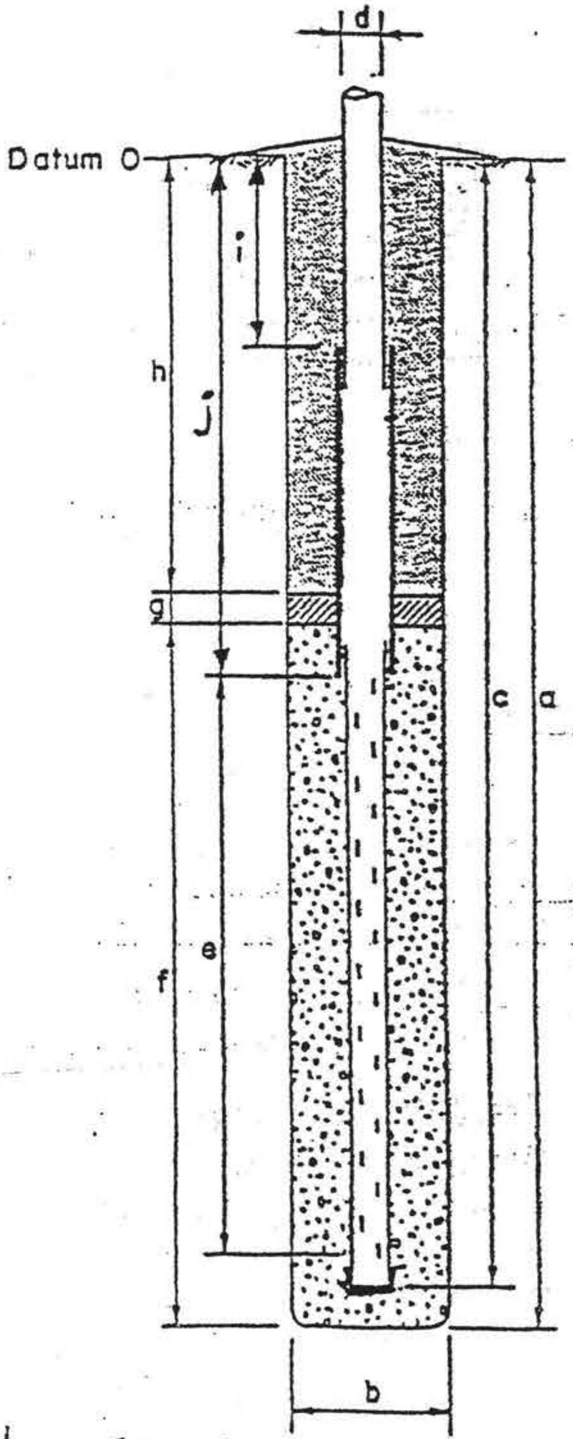
PMX#'5-1550-07(3)

GAS WELL CONSTRUCTION LOG

WELL No. 7 Coord's N 11352 E 9725

Landfill name: MIDWAY GAS MIGRATION Date 10/4/85

I. DIMENSIONS:



a. Total depth of well 76'

b. Diameter of well 24"

c. Well casing interval 68'

d. Diameter of well casing 6"

e. Slotted interval of well casing
from 26' to 68'

f. Permeable material interval 48'

g. Impermeable plug interval 2'

h. Backfill material interval 26'

i. Depth to Top of Slip/Settlement pipe 6'

j. " " Bottom " " " " 26'

II. MATERIALS:

Permeable material 1½" – 3/4" ROUND ROCK

Impermeable plug BENTONITE

Backfill material SILTY CLAY

Casing material (incl. slip joints) 6" & 8" PVC

III. CONSTRUCTION:

Method of placing fill materials: RUBBER TIRE LOADER (CASE 580 BACKHOE, END LOADER)

Method of placing casing: TRUCK MTD HYDRA CRANE

Problems encountered: NONE

PHX 31-1550-14 (18)

GAS WELL CONSTRUCTION LOG

WELL No. 38 Coords N10330.2 E 9864.3

Landfill name: MIDWAY GAS MIGRATION - PHASE II Date ______

I. DIMENSIONS:

a. Total depth of well 112'

b. Diameter of well 24"

LOWER FROM 0 TO 110'
UPPER FROM 0 TO 56'
c. Well casing interval ______

d. Diameter of well casing 6" & 8"

e. Slotted interval of well casing ______
Lower from 68' to 110'
Upper from 26' to 56'

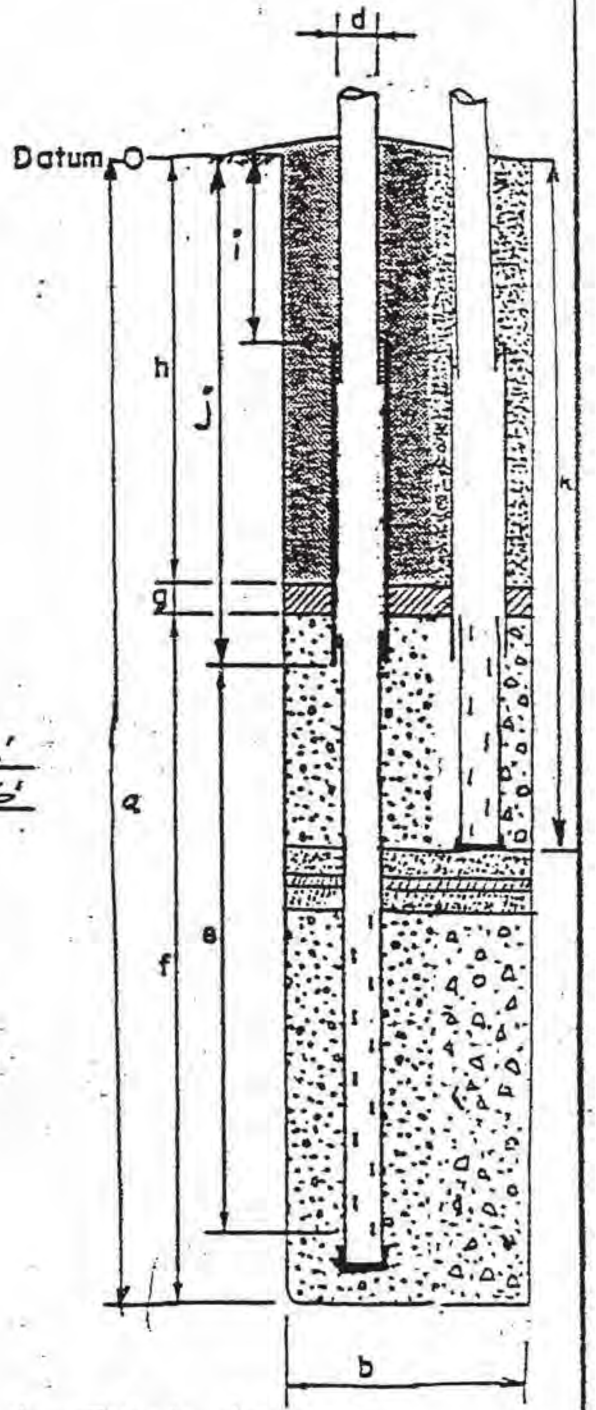
f. Permeable material interval ______
LOWER FROM 64' TO 112'
UPPER FROM 22' TO 58'

g. Impermeable plug interval 2'

h. Backfill material interval 19'

i. Depth to top of slip/settlement pipe 6'

j. " " bottom " / " " " 26'



II. MATERIALS:

Permeable material 1¼" WASHED ROCK

Impermeable plug BENTONITE

Backfill material SILTY CLAY

Casing material (incl. slip joints) SCH. 40 PVC. (6" & 8" DIA.)

III. CONSTRUCTION:

Method of placing fill materials: CAT 931 B TRACK LOADER

Method of placing casing: 30 TON 'LIMA' CRANE w/ 130' TOWER

Problems encountered: ______

GAS WELL DRILLING LOG

WELL No. 38 COORDS N10330.2E 9864.3

Landfill name: MIDWAY GAS MIGRATION - PHASE II Date

Time drilling TWO (2) DAYS

DESCRIPTION OF DRILLING SPOILS:

Cover soil depth:	Description
0 - 3'	SILTY CLAY COVER MATERIAL
3' - 112'	REFUSE (WOOD, PLASTIC, PAPER, ETC.)
112'	GLACIAL TILL, FINE SILT

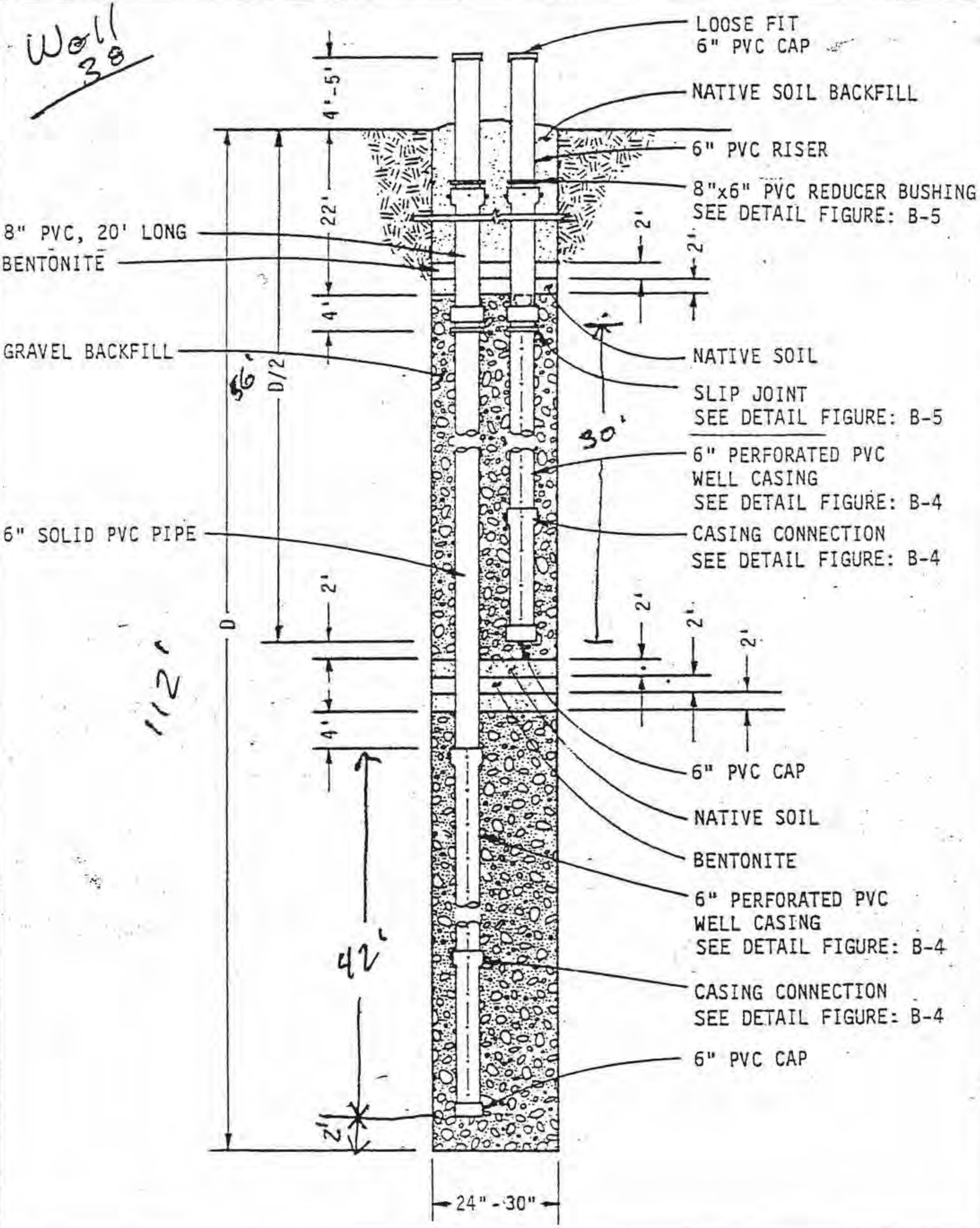
Total depth of well 112' (Diam. 24")

DRILLING CONDITIONS
(Weather, obstructions, etc.) WET & MUDDY

Drilling company DON H. MAHAFFEY DRILLING CO.

Drilling equipment 80 TON 'LIMA' CRANE W/5000 'WATSON' DRILL MOTOR

Operators names JON VIRDELL, DRILLER; RANDY VIRDELL, OILER


Well 38
LOOSE FIT 6" PVC CAP
NATIVE SOIL BACKFILL
6" PVC RISER
8"x6" PVC REDUCER BUSHING SEE DETAIL FIGURE: B-5
8" PVC, 20' LONG
BENTONITE
GRAVEL BACKFILL
NATIVE SOIL
SLIP JOINT SEE DETAIL FIGURE: B-5
6" PERFORATED PVC WELL CASING SEE DETAIL FIGURE: B-4
6" SOLID PVC PIPE
CASING CONNECTION SEE DETAIL FIGURE: B-4
6" PVC CAP
NATIVE SOIL
BENTONITE
6" PERFORATED PVC WELL CASING SEE DETAIL FIGURE: B-4
CASING CONNECTION SEE DETAIL FIGURE: B-4
6" PVC CAP
4'-5'
22'
4'
2'
2'
2'
2'
2'
2'
2'
4'
2'
D/2
D
56'
112'
30'
42'
24"-30"

WELL 38

FIGURE B-3:
MIDWAY LANDFILL
PHASE II
VERTICAL WELL DETAIL

FMX 31-1550-14 (18)

GAS WELL CONSTRUCTION LOG

WELL No. 42 Coords N11225.6 E 9987.5

Landfill name: MIDWAY GAS MIGRATION - PHASE II Date

I. DIMENSIONS:

a. Total depth of well 64'

b. Diameter of well 24".
LOWER FROM 0 TO 62'
UPPER FROM 0 TO 32'

c. Well casing interval

d. Diameter of well casing 6" & 8"

e. Slotted interval of well casing
Lower from 44' to 62'
Upper from 26' to 32'

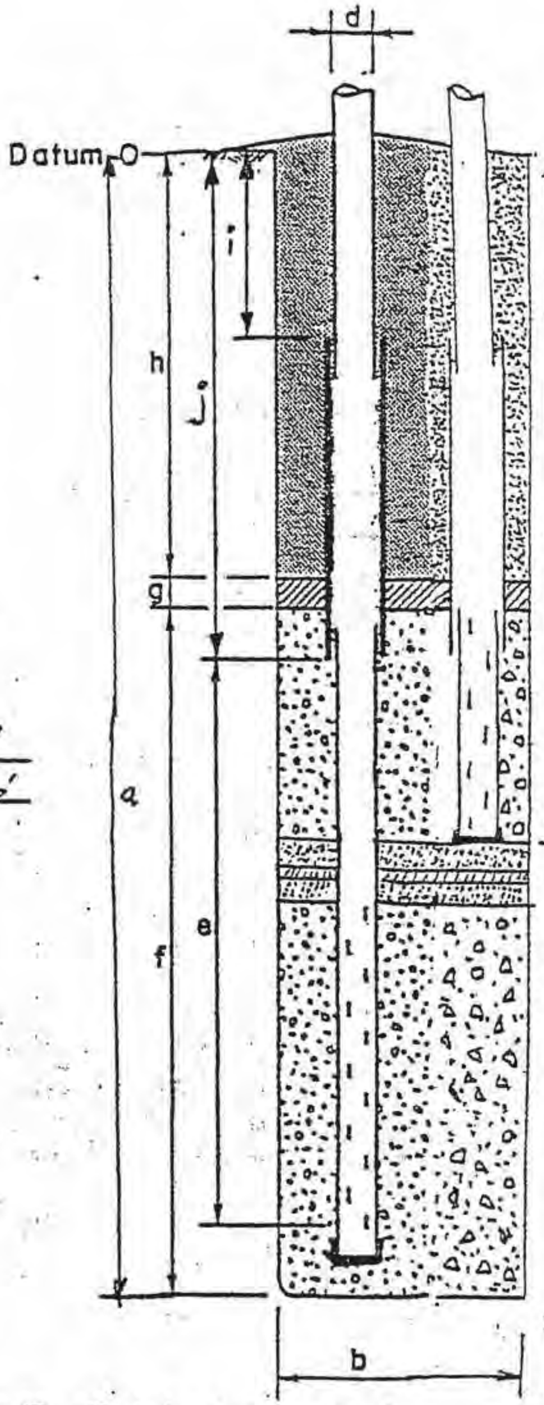
f. Permeable material interval
LOWER FROM 40' TO 64'
UPPER FROM 22' TO 34'

g. Impermeable plug interval 2'

h. Backfill material interval 19'

i. Depth to top of slip/settlement pipe 6'

j. " " bottom "/ " " 26'



II. MATERIALS:

Permeable material 1¼" WASHED ROCK

Impermeable plug BENTONITE

Backfill material SILTY CLAY

Casing material (incl. slip joints) SCH. 40 PVC. (6" & 8" DIA.)

III. CONSTRUCTION:

Method of placing fill materials: CAT 931B TRACK LOADER

Method of placing casing: 80 TON 'LIMA' CRANE W/ 130' TOWER

Problems encountered:

GAS WELL DRILLING LOG

WELL No. 42 COORDS N 11225.6 E 9987.5

Landfill name: MIDWAY GAS MIGRATION – PHASE II Date

Time drilling TWO (2) DAYS

DESCRIPTION OF DRILLING SPOILS:

Cover soil depth:	Description
0 – 3'	SILTY CLAY COVER MATERIAL
3' – 64'	REFUSE (WOOD, PLASTIC, PAPER, ETC)
64'	GLACIAL TILL, FINE SILT

Total depth of well 64' (Diam. 24")

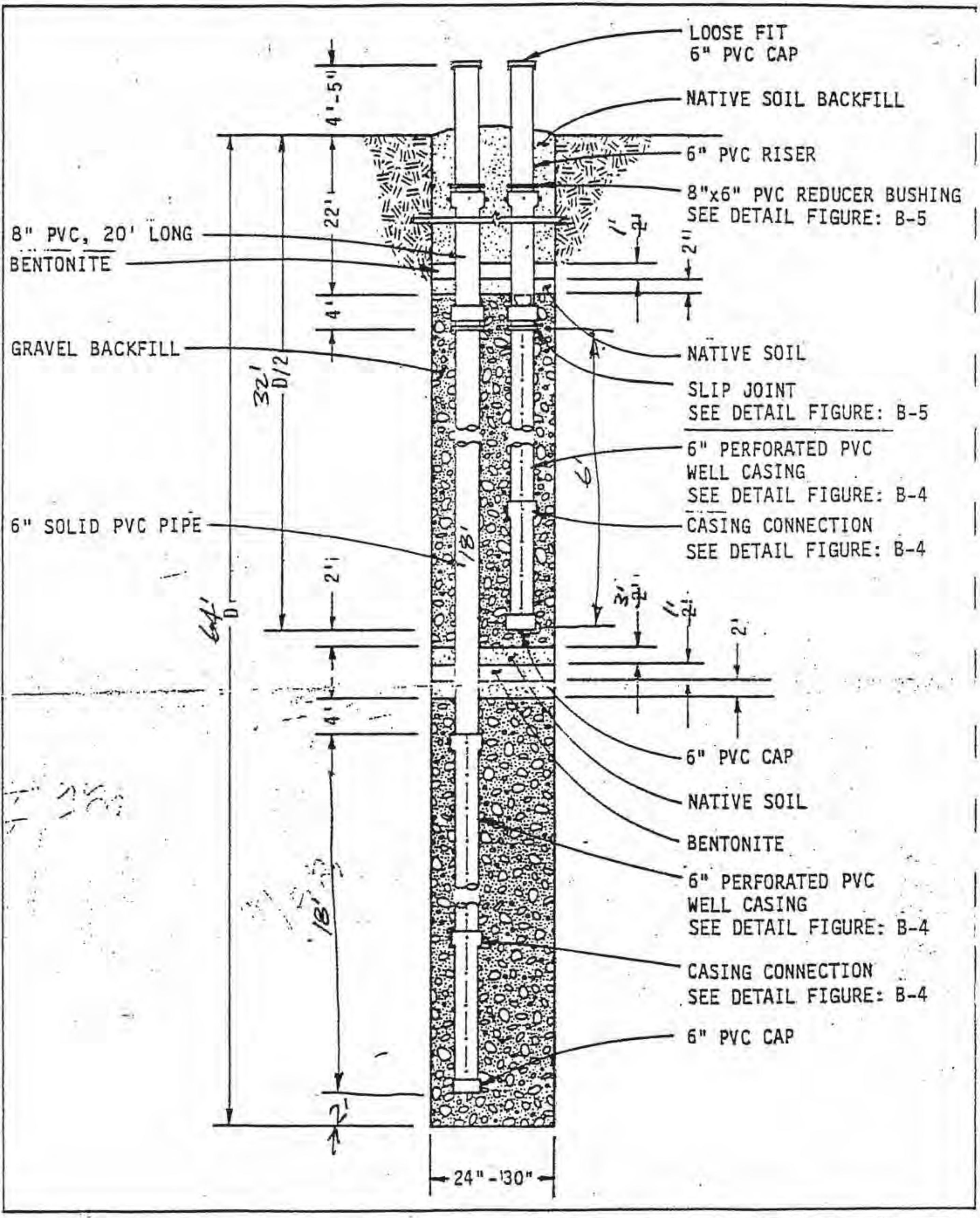
DRILLING CONDITIONS

(Weather, obstructions, etc.) WET & MUDDY

Drilling company DON H. MAHAFFEY DRILLING CO.

Drilling equipment 80 TON 'LIMA' CRANE W/ 5000 'WATSON' DRILL MOTOR

Operators names JON VIRDELL, DRILLER; RANDY VIRDELL, OILER


LOOSE FIT
6" PVC CAP
NATIVE SOIL BACKFILL
6" PVC RISER
8"x6" PVC REDUCER BUSHING
SEE DETAIL FIGURE: B-5
8" PVC, 20' LONG
BENTONITE
GRAVEL BACKFILL
NATIVE SOIL
SLIP JOINT
SEE DETAIL FIGURE: B-5
6" PERFORATED PVC
WELL CASING
SEE DETAIL FIGURE: B-4
CASING CONNECTION
SEE DETAIL FIGURE: B-4
6" SOLID PVC PIPE
6" PVC CAP
NATIVE SOIL
BENTONITE
6" PERFORATED PVC
WELL CASING
SEE DETAIL FIGURE: B-4
CASING CONNECTION
SEE DETAIL FIGURE: B-4
6" PVC CAP
4'-5"
22'
4'
32' D/2
64' D
18'
6'
2'
3'
2'
2'
2'
1'
4'
18'
2'
24"-30"

WELL 42

FIGURE B-3:
MIDWAY LANDFILL
PHASE II
VERTICAL WELL DETAIL

Well Installation Log

Job No. 55-1550-25 Client SEATTLE SWU Location MIDWAY LANDFILL

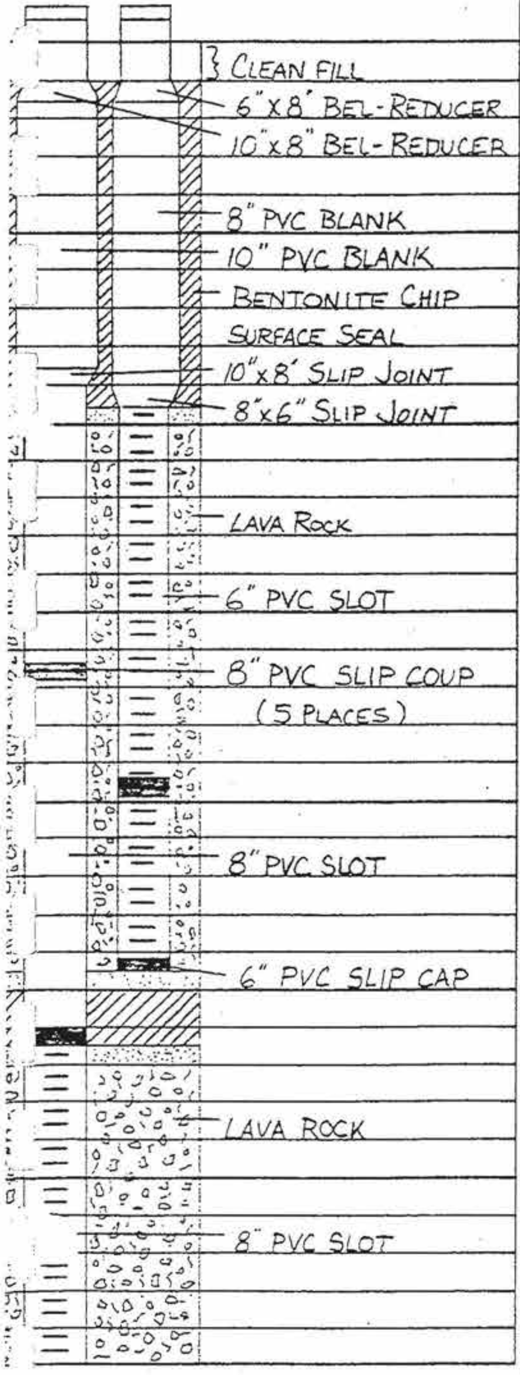
NG TYPE SCH 80 PVC
NGTH
INT TYPE PVC SLIP COUPLING - GLUED & SCREWED
SCREEN TYPE HORIZONTAL SLOT - 0.050"
OT SIZE 0.050
AL TYPE BENTONITE CHIP, PORTLAND CEMENT (BASE)
INSTALL. METHOD BACKHOE / HOPPER / GROUT PUMP
TER VESICULAR LAVA ROCK
STALL
GROUT

DRILLING METHOD CABLE TOOL - 24" CASING
SAMPLING METHOD
HAMMER WT. DROP
DATE 10-2-89
BY J. HICKER
DRILLING CONTR. RAMLO WELL DRILLING
WATER LEVEL
TIME
DATE

WELL NO. 48
SHEET 1 OF 2

START	FINISH
8-30	9-26.

ELL DETAILS


CLEAN FILL
6"x8" BEL-REDUCER
10"x8" BEL-REDUCER
8" PVC BLANK
10" PVC BLANK
BENTONITE CHIP
SURFACE SEAL
10"x8' SLIP JOINT
8"x6" SLIP JOINT
LAVA ROCK
6" PVC SLOT
8" PVC SLIP COUP
(5 PLACES)
8" PVC SLOT
6" PVC SLIP CAP
LAVA ROCK
8" PVC SLOT

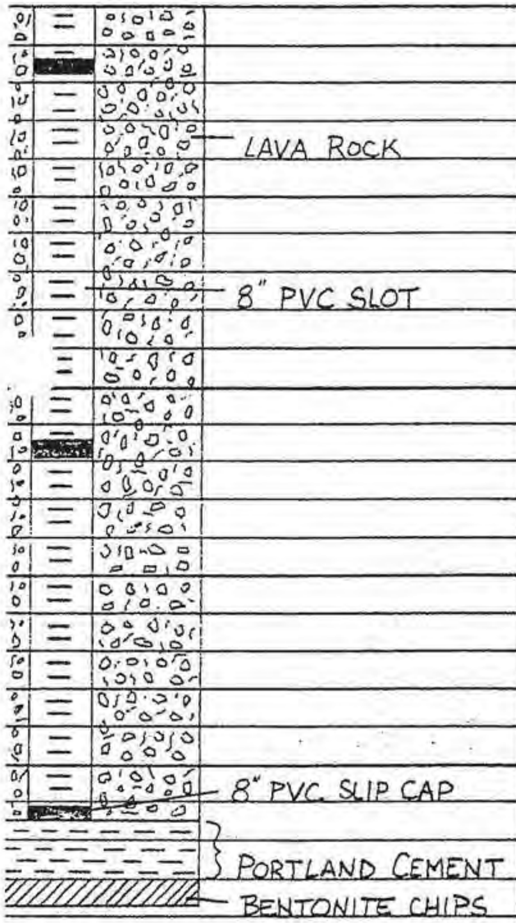
DEPTH	USCS	SOIL DESCRIPTION	INSTALLATION NOTES
		GROUND ELEVATION	
		SUBGRADE FILL - MED BROWN,	
		SILTY SAND W/SOME GRAVEL,	
		COBBLES	
10		GRAY CLAYEY SILT	
		REFUSE - NEWSPAPER, WOOD,	
		CARDBOARD, PLASTIC, ROOFING,	
		REFUSE - WOOD, GRAVEL, METAL,	
20		PLASTIC, AUTO BATTERY, MED WASTE (I.V. DISP)	
		HARDWARE, ELECT. MOTOR	
		REFUSE - WOOD PLASTIC, RAGS, GLASS	
		FOOD CONT'S, PILLS, COUGH SYRUP,	
30		PENCILS, BATTERYS, GRAVEL	
		SYRINGE, MED. CLOTHING	
		SAME W/ MED DISPOSAL BAGS,	
		SYRINGE, LOTS STYROFOAM	
40			
		REFUSE - WOOD, PLASTIC, METAL	
		HARDWARE, STRONG OIL SHEEN	
		POTATO BAGS, PIPE, BRICK, COBBLES	
50		REFUSE - WOOD, RUBBER HOSE,	
		AUTO. HDWR, METAL, GLASS,	
		BEER CANS, ELEC. RAZOR	
		TIRES, FOOD CONT.S	
60		REFUSE - WOOD, PLASTIC, HDWR,	
		MED. TYPE BOTTLE, SAN. DIAPER, DISP. BAGS	
		TIRES, METAL, GRAVEL, GLASS	
70			

Well Installation Log

Job No. ______ Client ______ Location ______

NG TYPE		DRILLING METHOD		WELL NO. 48
LENGTH		SAMPLING METHOD		
JOINT TYPE		HAMMER WT.	DROP	SHEET 2
SCREEN TYPE		DATE		
SLOT SIZE		BY		OF 2
SEAL TYPE		DRILLING CONTR.		START / FINISH
INSTALL. METHOD		WATER LEVEL		
FILTER		TIME		
INSTALL		DATE		
GROUT				

WELL DETAILS



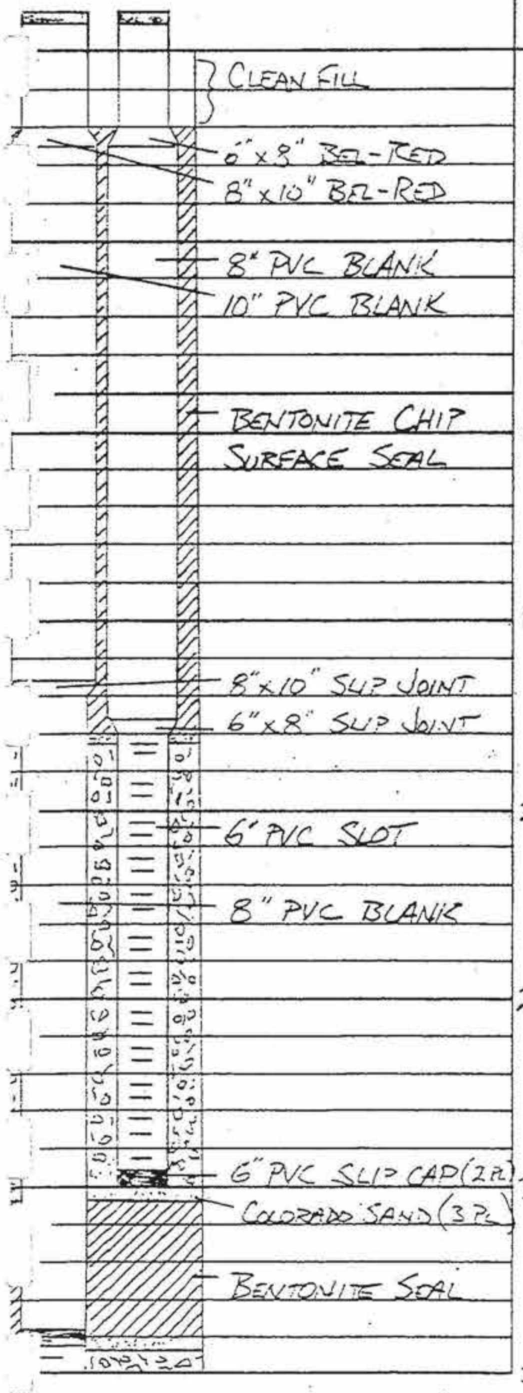
DEPTH	USCS	SOIL DESCRIPTION	INSTALLATION NOTES
		GROUND ELEVATION	
		REFUSE - WOOD, PLASTIC, METAL.	
		BRICK SAND, GRAVEL	
		PLASTIC, TIRES, ELEC, MOTOR, HDWR	
80		REFUSE - WOOD, SAND + GRAVEL,	
		METAL, HARDWARE, PAPER, PLASTIC	
		REFUSE - WOOD, PLASTIC METAL,	
		DOLL, NEWSPAPER (MAR 21, 1968)	
		BRICK, TILE, TRANS SPLINE	
90		BEV. CANS, GLASS, TIRES	
		REFUSE - WOOD, STACK TAR PAPER,	
		FROZEN VEG BAGS, METAL, STACK	
100		TV DINNER, SAND, GRAVEL, PAPER	
		COARSE SAND w/COBBLES	
		SOME REFUSE - WOOD PLASTIC	
		GLASS	
		REFUSE - WOOD PLASTIC, METAL,	
110		GLASS, SHOES	
		BWN-GRAY TO BLUE-BWN SILTY CLAY (1 TO 2 FOOT)	
		SAND + GRAVEL	
		END OF HOLE @ 117.5	
120			

Well Installation Log

Job No. 55-1550-25 Client SEATTLE SOLID WASTE Location MIDWAY LANDFILL

NG TYPE 6", 8' + 10" SCH 80 PVC	DRILLING METHOD 24" CABLE TOOL	WELL NO. 52
NGTH	SAMPLING METHOD	
JINT TYPE SLIP COUPLING - GLUED + SCREWED	HAMMER WT. DROP	SHEET 1
SCREEN TYPE HORIZONTAL SLOT	DATE 8-22-89	OF 2
DT SIZE .050"	BY J. HICKER	
EAL TYPE BENTONITE CHIPS (ENVIROPLUG)	DRILLING CONTR. RAMLO WELL DRILLING	START / FINISH
INSTALL. METHOD BACKHOE/HOPPER	WATER LEVEL	
TER VESICULAR LAVA ROCK	TIME	8-9-89 / 8-16-8
STALL	DATE	
GROUT		

ELL DETAILS



CLEAN FILL
6"x8" BEL-RED
8"x10" BEL-RED
8" PVC BLANK
10" PVC BLANK
BENTONITE CHIP SURFACE SEAL
8"x10" SLIP JOINT
6"x8" SLIP JOINT
6" PVC SLOT
8" PVC BLANK
6" PVC SLIP CAP (2 PC)
COLORADO SAND (3 PC)
BENTONITE SEAL

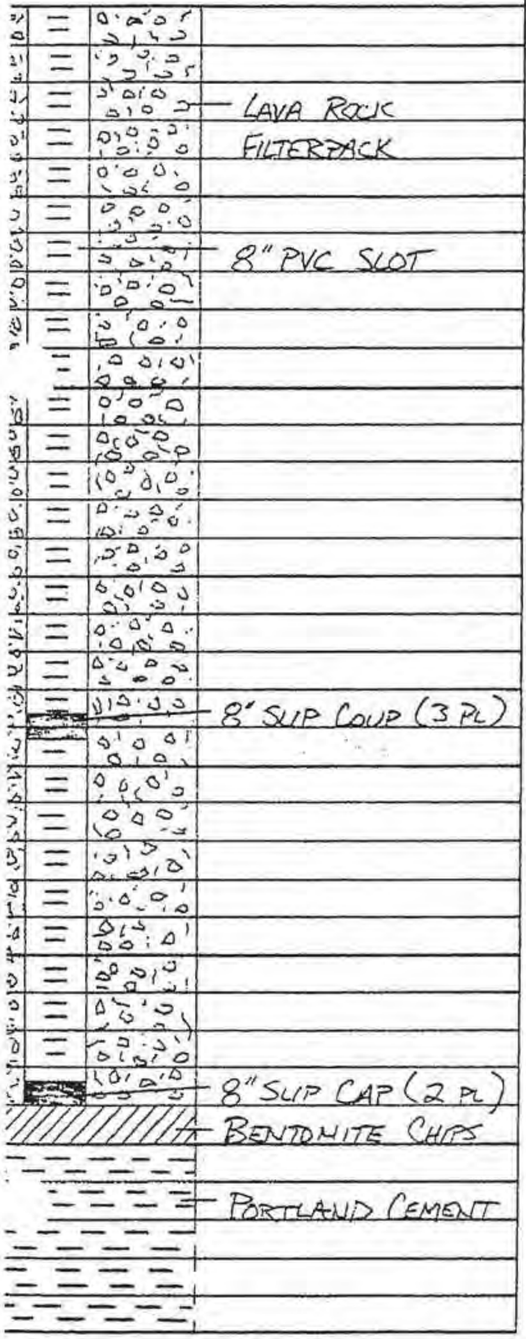
DEPTH	USCS	SOIL DESCRIPTION	INSTALLATION NOTES
		GROUND ELEVATION	
		GRAY-BROWN SILTY SAND W/GRAVEL (SUBGRADE FILL)	
		GRAY SANDY SILT W/REFUSE	
5			
		REFUSE - WOOD, PLASTIC, TIRES, NEWSPAPER	>100% LEL
10			
		REFUSE - WOOD, PLASTIC, METAL	
15			
		REFUSE - BLACK, MULCHED WOOD PLASTIC, METAL, HARDWARE, GRAVEL	
20			
		SAME W/SPOTTY OIL SHEEN	(PCB ✓ = NEG)
		BLACK COARSE SAND w/GRAVEL, COBBLES AND SOME REFUSE	
25			
		REFUSE - BLACK, MULCHED WOOD W/TRACE METAL, GRAVEL, PLASTIC	
30			
		REFUSE - BLACK MULCHED WOOD, PLASTIC TIRES, WIRE, METAL CORD, GRAVEL	
35			

Well Installation Log

Job No. ______ Client ______ Location ______

NG TYPE		DRILLING METHOD	WELL NO. 52
LENGTH		SAMPLING METHOD	
JOINT TYPE		HAMMER WT. DROP	SHEET 2 OF 2
SCREEN TYPE		DATE	
SLOT SIZE		BY	
SEAL TYPE		DRILLING CONTR.	START / FINISH
INSTALL. METHOD		WATER LEVEL	
FILTER		TIME	
INSTALL		DATE	
GROUT			

WELL DETAILS



GROUND ELEVATION

DEPTH	USCS	SOIL DESCRIPTION	INSTALLATION NOTES
		INTERBEDDED COARSE SAND W/GRAVEL, COBBLES	
		REFUSE - WOOD W/METAL, TIRES	
		ELEC, HARDWARE, GRAVEL, PLASTIC	
40		(SAME W/BLUISH OIL SHEEN - PCBS	✓ = NEG)
		REFUSE - WOOD PLASTIC, STEEL	
		CONCRETE, FLOORING, PIPE,	
45			
		REFUSE - WOOD, NEWSPAPER,	
		PLASTIC, HARDWARE, COPPER WIRE	
		SOME GRAVEL	
50		REFUSE - WOOD, GRAVEL, WIRE	
		GLASS	
55			
		REFUSE - WOOD, PLASTIC, BEVERAGE	(DOMESTIC REFUSE)
		CANS, FOOD CONTAINERS, CLOTHING	
60		BOOKS, TIRES, TOYS, MAR '72 NEWSPAPER	
65			
		GRAY SILTY SAND W/GRAVEL	* CASED HOLE TO 67.5'
		COBBLES, TRACE REFUSE -	BAILED TO 72'
		WOOD, WIRE	
		(DECREASING REFUSE ↓)	
70			

Appendix C: QA/QC Review Memorandum and Laboratory

Science & Engineering, Inc.

alta-se.com

988 South Longmont Avenue, Suite 200
Boise, Idaho 83706
Ph: (208) 336-7080; Fax: (208) 908-4980

MEMORANDUM

To:	Sarah Weppner, Alta, Boise
From:	Rachel Gibeault, Alta, Boise
Date:	April 30, 2020
Job Code:	19062-20
Subject:	**QA/QC Review of the April 2020 Sampling of the Tacoma Dome Link Light Rail Data Package**

Section 1 Introduction

This memorandum provides a summary of the third party data validation and data quality assessment performed by Alta Science and Engineering, Inc. (Alta) on the sample results for the additional site characterization efforts conducted by Parametrix for HDR that occurred on April 9, 2020, at the following sample points:

- MAN-1
- MAN-2 (duplicate sample of MAN 1)
- B-2
- B-4
- B-5
- GW-7
- GW-38 (shallow [S] and deep [D] wells)
- GW-42 (S and D)
- GW-48 (S and D)
- GW-52 (S and D)

Sampling procedures and the quality assurance/quality control (QA/QC) review followed guidelines set forth in the following documents:

- *Sampling Instructions for Collecting Samples in Entech Bottle Vacs* (EAS no date) – This sampling procedure is provided in Attachment A. Parametrix followed this sampling procedure in lieu of a Quality Assurance Project Plan (QAPP).
- *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2017a)
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (USEPA 2009)
- *USEPA Guidance on Environmental Data Verification and Data Validation* (USEPA 2002)

This memorandum discusses the data quality assessment and data validation performed for the Work Orders listed in Table 1. Data qualifiers used in this review are defined by the U.S. Environmental Protection Agency (USEPA) (2017a).

Table 1. Work Order Data Validation

Laboratory	Work Orders	Analysis	Matrix	Data Validation Level (USEPA 2009)	Review Conducted by
EAS [a]	220163	VOCs [b] CH_4 and CO_2 [c] hydrogen sulfide [d]	Landfill gas and ambient air	Stage 2A	Alta

[a] Environmental Analytical Service, Inc., San Luis Obispo, California

[b] reduced list volatile organic compounds (VOCs) by USEPA Method TO-15 (1999)

[c] methane (CH_4) and carbon dioxide (CO_2) by ASTM D 1945-14 (2019)

[d] by USEPA M16 (2017b)

Section 2 Data Validation and Quality Assessment Summary of Vapor Results

Alta's Stage 2A validation of the analytical data and review of the field data are summarized in Table 2. Procedures/checks that require further discussion are explained below the table, as necessary.

Table 2. Data Quality Review Summary for Indoor Air and Outdoor Air

Data Validation Procedure or Check	Acceptable Frequency? [a]	Acceptable Performance? [a]	Data Qualified?	Discussion Item Number
Sample condition upon receipt at laboratory	--	Y	N	
Preservation	--	Y	N	
Holding times	--	Y	N	
Canister Pressure	--	N	Y	1
Laboratories followed specified analytical methods	--	Y	N	
Method Blanks	Y	Y	N	
Surrogate Recoveries/Deuterated Monitoring Compounds Recoveries (for VOCs)	Y	Y	N	
Laboratory Control Samples	Y	Y	N	
Matrix Spikes	--	--	--	
Laboratory Control Sample Duplicates	Y	Y	N	
Field Blanks	--	--	--	
Field Replicate	Y	N	N	2

[a] Based on professional judgment of the data validator.

-- = not applicable

Discussion Items

1. Canister Pressure - The samples collected by Entech Bottle Vacs (analyzed for VOCs by Method TO-15 [USEPA 1999], for CH_4 and CO_2 by ASTM D 1945-14 [ASTM 2019], and for hydrogen sulfide by USEPA M16 [USEPA 2017b]) had the following pressures in torr. The samples that had no change in torr are rejected (R) based on insufficient volumes: MAN-1, B-2, and GW-52D (as shown below).

Sample ID	Start Time 4/9/2020	Initial Pressure	Final Pressure (Laboratory measured)
MAN-1	08:29	928 torr	928 torr
B-2	09:19	924 torr	924 torr
GW-7	08:38	222 torr	989 torr
GW-38S	08:55	276 torr	884 torr
GW-38-D	08:56	687 torr	886 torr
GW-48S	09:09	508 torr	896 torr
GW-48D	09:11	383 torr	940 torr
B-4	09:57	565 torr	854 torr
GW-52S	09:33	614 torr	882 torr
GW-52D	09:35	871 torr	871 torr
GW-42S	09:42	221 torr	915 torr
GW-42D	09:44	546 torr	944 torr
B-5	10:48	552 torr	857 torr
MAN-2	10:55	689 torr	911 torr

2. Field Replicate – MAN-2 was collected as a field duplicate of MAN-1. However, as mentioned in discussion item 1, the results from MAN-1 were rejected (R) based on insufficient sample canister volume. Therefore, relative percent differences (RPDs) could not be calculated. No data are qualified in the duplicate sample based on precision.

Section 3 Overall Assessment

3.1 Data Accuracy and Precision

Based on this data quality review, Alta determines the laboratory and field data to be of acceptable quality, with the exception of MAN-1, B-2, and GW-52D, which are rejected (R) based on insufficient sample volume.

3.1.1 Accuracy

Alta's Quality Assurance Officer (QAO) did not qualify any data based on accuracy results (surrogate recoveries and laboratory control samples).

3.1.2 Precision

Alta's QAO did not qualify any data based on precision results (laboratory control sample duplicates).

3.2 Data Sensitivity

All laboratory reporting limits were below screening levels.

3.3 Data Usability

Three samples were rejected (MAN-1, B-2, and GW-52D); therefore, the calculated completeness for this sampling event is 79%.

Section 4 Cited References and Resources Used

ASTM International (ASTM), 2019. ASTM D1945: Standard Test Method for Analysis of Natural Gas by Gas Chromatography.

U.S. Environmental Protection Agency (USEPA), 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air – Second Edition. Compendium Method TO-15 (EPA/625/R-96/010b), January.

USEPA, 2002. USEPA Guidance on Environmental Data Verification and Data Validation. USEPA QA/G-8; November.

USEPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, EPA 540-R-08-005 prepared by the Office of Solid Waste and Emergency Response; January.

USEPA, 2017a. National Functional Guidelines for Organic Superfund Methods Data Review, (SOM02.4), OLEM 9355.0-136, USEPA-540-R-2017-002; January.

USEPA, 2017b. Method 16 – Semicontinuous Determination of Sulfur Emissions from Stationary Sources. August. Available at: https://www.epa.gov/emc/method-16-sulfur-semicontinuous-determination.

Attachment A

Sampling Instructions for Collecting Samples in Entech Bottle Vacs

ENVIRONMENTAL
Analytical Service, Inc.

Sampling Instructions for Collecting Samples in Entech Bottle Vacs

Please Read The Following Important Information Before Starting

- ***The quick connect on the Bottle Vac is important to hold the Bottle Vac vacuum and protect sample integrity. The Quick Connect Adapter is used to open the Bottle Vac and let sample into the bottle.***
- ***The Bottle Vacs are sent under a vacuum of 29.5" Hg. The vacuum is checked in the laboratory before shipment. If you want to check the vacuum in the field, use a vacuum gauge. Put a Quick Connect Adapter on the gauge to connect to the Bottle Vac.***
- ***Remember that once the Quick Connect Adapter is put on the Bottle Vac Quick Connect, the bottle is open and will begin sampling. If using tubing put the tubing on the Quick Connect Adapter before connecting to the Bottle Vac.***

Bottle Vacs are Silco coated and can be used for both ambient air sampling and source sampling for VOC compounds and hydrogen sulfide. The Bottle Vacs should only be filled to a maximum pressure of 5 psig.

PROCEDURE:

- Remove the Bottle Vac from its box and do a visual check to make sure it is not broken. There should be a Quick Connect Adapter (to 1/4" Swagelok) in the box.

- Any sample tubing or sample port should be connected to the Quick Connect Adapter before the Bottle Vac is connected.

- To sample, connect the Quick Connect Adapter to the Bottle Vac Quick Connect and sample will enter the bottle. The sound of air rushing into the canister should be heard. Leave the Quick Connect Adapter attached for about 1 minute.

- Remove the Quick Connect Adapter to stop sampling. The Quick Connect serves as a valve to hold the sample in the bottle. It does not have to be capped.

- Put the Bottle Vac and Quick Connect Adapter back into the box.

- Fill out Sample Custody Sheet with date, time, location, and any additional information you desire.

- Place Bottle Vac box and custody sheet back into the main box and place the shipping label on the outside of box. Send back UPS. The value of the canisters is $250 each and the client is responsible for the canisters until they are delivered to EAS.

When Done:

Ship the Sampler and Canister back to Environmental Analytical Service, Inc.

Environmental Analytical Service, Inc.
173 Cross Street
San Luis Obispo, CA 93401

(805) 781-3585

ENVIRONMENTAL
Analytical Service, Inc.

Laboratory Report

Project Name:

Tacoma Dome Link Light Rail

EAS SDG Number: **220163**

Client Project Manager: Steve Emge

Prepared For:

Parametrix Inc.
719 2nd Ave, Suite 200
Seattle WA 98104

Project Number: 17510
Sample Event Date: 4/9/2020
Received Date: 4/13/2020
Report Date: 4/21/2020

Project Number: 554-1800-019
PO Number: None Given

This is the Laboratory Report for the samples in the indicated Sample Delivery Group (SDG). Each sample received in the group is assigned a Laboratory ID number. The combination of the SDG number and the Lab ID number is an unique identifier for the sample.

This Report Contains:

Laboratory Work Order
Project Sample Media
Laboratory Case Narrative and Chain of Custody
Method Description (when applicable)
Quality Control Reports
Analytical Reports

NELAC Certification: Florida E871125

173 Cross Street, San Luis Obispo, CA 93401 (805) 781-3585

Laboratory Work Order

SDG Number: 220163
Client: Steve Emge
Parametrix

Project Number: 17510
Received: 4/13/2020

SAMPLE DESCRIPTION AND ANALYSIS REQUESTED

Client Sample ID	EAS Lab No.	Analysis Requested	Date Sampled
MAN 1	220163 1	EPA M16 Hydrogen Sulfide	4/9/2020
MAN 1	220163 1	EPA TO-15 Special List	4/9/2020
MAN 1	220163 1	ASTM D1945 CH4, CO2	4/9/2020
B-2	220163 2	ASTM D1945 CH4, CO2	4/9/2020
B-2	220163 2	EPA M16 Hydrogen Sulfide	4/9/2020
B-2	220163 2	EPA TO-15 Special List	4/9/2020
GW-7	220163 3	ASTM D1945 CH4, CO2	4/9/2020
GW-7	220163 3	EPA M16 Hydrogen Sulfide	4/9/2020
GW-7	220163 3	EPA TO-15 Special List	4/9/2020
GW-38S	220163 4	ASTM D1945 CH4, CO2	4/9/2020
GW-38S	220163 4	EPA M16 Hydrogen Sulfide	4/9/2020
GW-38S	220163 4	EPA TO-15 Special List	4/9/2020
GW-38D	220163 5	ASTM D1945 CH4, CO2	4/9/2020
GW-38D	220163 5	EPA M16 Hydrogen Sulfide	4/9/2020
GW-38D	220163 5	EPA TO-15 Special List	4/9/2020
GW-48S	220163 6	ASTM D1945 CH4, CO2	4/9/2020
GW-48S	220163 6	EPA M16 Hydrogen Sulfide	4/9/2020
GW-48S	220163 6	EPA TO-15 Special List	4/9/2020
GW-48D	220163 7	EPA M16 Hydrogen Sulfide	4/9/2020
GW-48D	220163 7	ASTM D1945 CH4, CO2	4/9/2020
GW-48D	220163 7	EPA TO-15 Special List	4/9/2020
B-4	220163 8	EPA M16 Hydrogen Sulfide	4/9/2020
B-4	220163 8	EPA TO-15 Special List	4/9/2020

Client Sample ID	EAS Lab No.	Analysis Requested	Date Sampled
B-4	220163 8	ASTM D1945 CH4, CO2	4/9/2020
GW-52S	220163 9	ASTM D1945 CH4, CO2	4/9/2020
GW-52S	220163 9	EPA M16 Hydrogen Sulfide	4/9/2020
GW-52S	220163 9	EPA TO-15 Special List	4/9/2020
GW-52D	220163 10	ASTM D1945 CH4, CO2	4/9/2020
GW-52D	220163 10	EPA M16 Hydrogen Sulfide	4/9/2020
GW-52D	220163 10	EPA TO-15 Special List	4/9/2020
GW-42S	220163 11	ASTM D1945 CH4, CO2	4/9/2020
GW-42S	220163 11	EPA M16 Hydrogen Sulfide	4/9/2020
GW-42S	220163 11	EPA TO-15 Special List	4/9/2020
GW-42D	220163 12	ASTM D1945 CH4, CO2	4/9/2020
GW-42D	220163 12	EPA M16 Hydrogen Sulfide	4/9/2020
GW-42D	220163 12	EPA TO-15 Special List	4/9/2020
B-5	220163 13	ASTM D1945 CH4, CO2	4/9/2020
B-5	220163 13	EPA M16 Hydrogen Sulfide	4/9/2020
B-5	220163 13	EPA TO-15 Special List	4/9/2020
MAN 2	220163 14	EPA TO-15 Special List	4/9/2020
MAN 2	220163 14	ASTM D1945 CH4, CO2	4/9/2020
MAN 2	220163 14	EPA M16 Hydrogen Sulfide	4/9/2020

Project Sample Media

SDG Number: 220163

The following sample media was used for this Sample Delivery Group (SDG). The Sample Media column identifies the type of media. For canisters, the Sample Media Batch gives the canister number followed by the cleaning batch number, which is a unique identification. Canisters that are received with sub-ambient pressures are pressurized to about 5 psig. The initial pressure of the canister when it is received is recorded along with the final pressure after pressurization. The canister dilution factor is the ratio of the final to initial pressure. The results are adjusted for the can dilution factor.

SDG	Lab ID	Client Sample No.	Sample Media	Batch	Pressure, torr Initial	Pressure, torr Final	Can Factor
220163	1	MAN 1	259	032420A	928	928	1.00
220163	2	B-2	524	032420A	924	924	1.00
220163	3	GW-7	251	032420A	222	989	4.45
220163	4	GW-38S	261	032420A	276	884	3.20
220163	5	GW-38D	255	032420A	687	886	1.29
220163	6	GW-48S	486	032420A	508	896	1.76
220163	7	GW-48D	256	032320A	383	940	2.45
220163	8	B-4	482	032320A	565	854	1.51
220163	9	GW-52S	258	032420A	614	882	1.44
220163	10	GW-52D	253	032420A	871	871	1.00
220163	11	GW-42S	521	032320A	221	915	4.14
220163	12	GW-42D	11736	032320A	546	944	1.73
220163	13	B-5	322	032320A	552	857	1.55
220163	14	MAN 2	252	032320A	689	911	1.32

Laboratory Case Narrative

EAS SDG Number: 220163 **Project Number:** 17510

Client: Parametrix

The Laboratory Case Narrative for the SDG is below. The Chain of Custody form(s) follow the Laboratory Case Narrative.

Sample Control Narrative

The samples were all received in good condition and with proper preservation.

Analytical Methods

The methods used for sample analysis are listed on the Analytyical Report header, and have been modified as described in the EAS Quality Manual..

Case Narrative

QC Narrative

All analyses met EAS method criteria as defined in the Quality Manual, except as noted in the report or QC reports with data qualifiers.

Subcontract Narrative

No sample analysis was subcontracted for this project

Laboratory Certification

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness other than the condition(s) noted above. The Laboratory Report is property of EAS and its client. The entire report has been reviewed and approved.

Date Approved: 4/21/2020

Steven D. Hoyt, Ph.D.
Environmental Analytical Service
Laboratory Director

ENVIRONMENTAL
Analytical Service, Inc.

173 Cross Street
San Luis Obispo, CA 93401
805 781-3585

CHAIN OF CUSTODY RECORD

Project Number 554-1800-019 Project Name MIDWAY

Quote 12355

Requested TAT

REPORT TO:

Attention STEVE EMGE
Company PARAMETRIX
Address 719 2ND, Suite 200
City, State, Zip SEATTLE, WA 98104
Phone/Fax 425-422-6812
e-mail semge@parametrix.com

Matrix
A - Ambient Air
SG - Soil Gas
S - Source
I - Indoor Air

SDG 22063

Analytical Tests

Sample Description	**Sample Date**	**Start Time**	**Stop Date**	**Stop Time**	**Canister Number**	**Flow Reg Number**	**Matrix**	**Initial Pressure**	**Final Pressure**	**Laboratory ID**	TO-15S	H_2S	CH_4	CO_2		**Comments**
MAN 1	4/9/20	829	4/9/20		259		S			01						
B-2		919			524		S			02						
GW-7		838			251		S			03						
GW-38S		855			[illegible]		S			04						
D		856			255		S			05						
GW-48S		909			484		S			06						
D		911			256		S			07						
B-4		957			482		S			08						

Comments

BILLING INFORMATION:

ATTENTION
Company
Address
City, State, Zip
Purchase Order

SAMPLED BY STEVE EMGE
Date/Time 4/9/20

RECEIVED FOR LAB
4/13/2020 13:00

COC Number
Cooler Temp
Airbill

ENVIRONMENTAL
Analytical Service, Inc.

173 Cross Street
San Luis Obispo, CA 93401
805 781-3585

CHAIN OF CUSTODY RECORD

Project Number 554-1800-019 | Project Name MIDWAY | Quote 12355 | Requested TAT

REPORT TO:

Attention	STEVE EMGR
Company	PARAMETRIX
Address	719 2ND, Suite 200
City, State, Zip	SEATTLE, WA 98104
Phone/Fax	425-422-6812
e-mail	semge@parametrix.com

Matrix
A - Ambient Air
SG - Soil Gas
S - Source
I - Indoor Air

SDG 22063

Analytical Tests

Sample Description	Sample Date	Start Time	Stop Date	Stop Time	Canister Number	Flow Reg Number	Matrix	Initial Pressure	Final Pressure	Laboratory ID	TO-15S	H_2S	CH_4	CO_2		Comments
GW-52S	4/9/20	933	4/9/20		258					09						
D		935			253					10						
GW-42S		942			521					11						
D		944			11736					12						
B-5		1048			322					13						
MAN2		1055			452					14						

Comments

BILLING INFORMATION:

ATTENTION	
Company	
Address	
City, State, Zip	
Purchase Order	

SAMPLED BY	Date/Time
STEVE EMGR	4/9/20
RECEIVED FOR LAB	
	4/13/2020 13:00

COC Number	
Cooler Temp	
Airbill	

Quality Control Report

EAS SDG Number 220163

Project Number: 17510

QC Narrative

Samples were anlayzed in a daily analytical batch (DAB) designated by a QC batch number, and were analyzed using EAS standard laboratory QC specified in the EAS Quality Manual which may be different then the referrenced agency method. Any deviations from the EAS QC criteria are flagged in the Laboratory Control Reports or in the sample Analytical Reports.

Standard Laboratory QC Report

Unless project specific QC was requested, this Section containing the standard laboratory QC (Level 2) supplied with the Analytical Reports. Each sample is analyzed in a Daily Analytical Batch (DAB) which includes the method blank, a laboratory control spike (LCS) and a laboratory control duplicate (LCD). A Daily Analytical Batch QC report is supplied for each method requested.

Method Blank

The method blank is a laboratory generated sample which assesses the degree to which laboratory operations cause a false positive. The target analytes in the analytical reports for a daily analytical batch are "B" flagged if their concentrations are present in the Method Blank above the RL, unless the result is greater then ten times the blank value..

Laboratory Control Spike

A laboratory control spike is a well characterized matrix similar to the sample which is spiked and run in duplicate with each Daily Analytical Batch. The laboratory control spike results are reported as a percent recovery. The QC Criteria for the control spike is listed in the Laboratory Control Report. Any results outside the control limits are flagged with a "Q" on the Laboratory Control Report. The control spike contains an abbreviated list of compounds in the method, and may contain compounds not on the target list for the specified report.

Laboratory Control Duplicate

The laboratory control duplicate is a duplicate analysis of the laboratory control spike, a standard, or a sample depending on the method. The results are reported as a relative percent difference (RPD). The criteria for the duplicate is in the Laboratory Control Report for the Daily Analytical Batch. Any results outside the control limits are flagged with a "Q" on the Laboratory Control Report.

METHOD BLANK REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: LABQC

Analytical Method: TO-15

Laboratory ID: B04150

File Name: B04150D.D
Description: METHOD BLANK
Canister:
QC_Batch: 041520-MA1

Date Sampled: Time:
Date Analyzed: 4/15/2020 Time: 13:04
Can Dilution Factor: 1.00
Air Volume: 225.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.12	ND	1.34	2.31	ND	
75-01-4	Vinyl chloride	0.22	1.12	ND	0.57	2.86	ND	
75-00-3	Chloroethane	0.22	1.12	ND	0.59	2.95	ND	
75-69-4	Trichlorofluoromethane	0.35	1.12	ND	1.97	6.29	ND	
75-35-4	1,1-Dichloroethene	0.22	1.10	ND	0.88	4.37	ND	
76-13-1	Freon 113	0.22	1.06	ND	1.70	8.14	ND	
75-09-2	Dichloromethane	0.44	1.07	ND	1.54	3.71	ND	
156-60-5	trans-1,2-Dichloroethene	0.22	0.80	ND	0.88	3.18	ND	
75-34-3	1,1-Dichloroethane	0.22	1.11	ND	0.90	4.49	ND	
108-05-4	Vinyl acetate	0.22	0.98	ND	0.78	3.44	ND	
109-99-9	Tetrahydrofuran	0.44	1.12	ND	1.31	3.29	ND	
156-59-2	cis-1,2-Dichloroethene	0.44	1.20	ND	1.76	4.74	ND	
71-55-6	1,1,1-Trichloroethane	0.22	0.99	ND	1.21	5.38	ND	
107-06-2	1,2-Dichloroethane	0.22	1.01	ND	0.90	4.10	ND	
71-43-2	Benzene	0.44	0.89	ND	1.42	2.84	ND	
79-01-6	Trichloroethene	0.13	1.04	ND	0.72	5.56	ND	
108-10-1	4-Methyl-2-pentanone	0.89	3.36	ND	3.64	13.78	ND	
108-88-3	Toluene	0.44	1.16	ND	1.67	4.37	ND	
127-18-4	Tetrachloroethene	0.13	0.54	ND	0.90	3.67	ND	
108-90-7	Chlorobenzene	0.22	1.01	ND	1.02	4.65	ND	
100-41-4	Ethylbenzene	0.47	1.17	ND	2.04	5.10	ND	
1330-20-7	m,p-Xylenes	0.47	1.18	ND	2.05	5.11	ND	
100-42-5	Styrene	0.46	1.15	ND	1.96	4.90	ND	
95-47-6	o-Xylene	0.46	1.15	ND	1.99	4.97	ND	
79-34-5	1,1,2,2-Tetrachloroethane	0.22	0.55	ND	1.51	3.77	ND	
106-46-7	1,4-Dichlorobenzene	0.44	0.77	ND	2.67	4.62	ND	
95-50-1	1,2-Dichlorobenzene	0.89	1.11	ND	5.34	6.68	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	100	70	130	

METHOD BLANK REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

Analytical Method: TO-15

SDG: LABQC
Laboratory ID: B04160

File Name:	B04160C.D	Date Sampled:		Time:	
Description:	METHOD BLANK	Date Analyzed:	4/16/2020	Time:	13:38
Canister:		Can Dilution Factor:	1.00		
QC_Batch:	041620-MA1	Air Volume:	200.00	ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.26	ND	1.34	2.60	ND	
75-01-4	Vinyl chloride	0.25	1.26	ND	0.64	3.21	ND	
75-00-3	Chloroethane	0.25	1.26	ND	0.66	3.32	ND	
75-69-4	Trichlorofluoromethane	0.35	1.26	ND	1.97	7.08	ND	
75-35-4	1,1-Dichloroethene	0.25	1.24	ND	0.99	4.91	ND	
76-13-1	Freon 113	0.25	1.20	ND	1.92	9.16	ND	
75-09-2	Dichloromethane	0.50	1.20	ND	1.74	4.18	ND	
156-60-5	trans-1,2-Dichloroethene	0.25	0.90	ND	0.99	3.58	ND	
75-34-3	1,1-Dichloroethane	0.25	1.25	ND	1.01	5.05	ND	
108-05-4	Vinyl acetate	0.25	1.10	ND	0.88	3.87	ND	
109-99-9	Tetrahydrofuran	0.50	1.26	ND	1.47	3.71	ND	
156-59-2	cis-1,2-Dichloroethene	0.50	1.35	ND	1.98	5.33	ND	
71-55-6	1,1,1-Trichloroethane	0.25	1.11	ND	1.36	6.05	ND	
107-06-2	1,2-Dichloroethane	0.25	1.14	ND	1.01	4.62	ND	
71-43-2	Benzene	0.50	1.00	ND	1.60	3.19	ND	
79-01-6	Trichloroethene	0.15	1.16	ND	0.81	6.26	ND	
108-10-1	4-Methyl-2-pentanone	1.00	3.79	ND	4.10	15.50	ND	
108-88-3	Toluene	0.50	1.31	ND	1.88	4.91	ND	
127-18-4	Tetrachloroethene	0.15	0.61	ND	1.02	4.12	ND	
108-90-7	Chlorobenzene	0.25	1.14	ND	1.15	5.24	ND	
100-41-4	Ethylbenzene	0.53	1.32	ND	2.29	5.74	ND	
1330-20-7	m,p-Xylenes	0.53	1.32	ND	2.30	5.75	ND	
100-42-5	Styrene	0.52	1.29	ND	2.21	5.51	ND	
95-47-6	o-Xylene	0.52	1.29	ND	2.24	5.59	ND	
79-34-5	1,1,2,2-Tetrachloroethane	0.25	0.62	ND	1.70	4.25	ND	
106-46-7	1,4-Dichlorobenzene	0.50	0.87	ND	3.00	5.20	ND	
95-50-1	1,2-Dichlorobenzene	1.00	1.25	ND	6.01	7.51	ND	

			QC Limits		
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	102	70	130	

METHOD BLANK REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: LABQC
Analytical Method: TO-15
Laboratory ID: B04170

File Name: B04170D.D
Description: METHOD BLANK
Canister:
QC_Batch: 041720-MA1

Date Sampled:
Time:
Date Analyzed: 4/17/2020
Time: 13:54
Can Dilution Factor: 1.00
Air Volume: 5.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	10.0	50.4	ND	20.6	104.0	ND	
75-01-4	Vinyl chloride	10.0	50.3	ND	25.5	128.5	ND	
75-00-3	Chloroethane	10.0	50.3	ND	26.4	132.6	ND	
75-69-4	Trichlorofluoromethane	10.0	50.4	ND	56.2	283.1	ND	
75-35-4	1,1-Dichloroethene	10.0	49.6	ND	39.6	196.5	ND	
76-13-1	Freon 113	10.0	47.8	ND	76.6	366.5	ND	
75-09-2	Dichloromethane	20.0	48.2	ND	69.4	167.2	ND	
156-60-5	trans-1,2-Dichloroethene	10.0	36.1	ND	39.6	143.0	ND	
75-34-3	1,1-Dichloroethane	10.0	49.9	ND	40.5	201.8	ND	
108-05-4	Vinyl acetate	10.0	43.9	ND	35.2	154.6	ND	
109-99-9	Tetrahydrofuran	20.0	50.3	ND	58.9	148.3	ND	
156-59-2	cis-1,2-Dichloroethene	20.0	53.8	ND	79.2	213.1	ND	
71-55-6	1,1,1-Trichloroethane	10.0	44.4	ND	54.5	242.1	ND	
107-06-2	1,2-Dichloroethane	10.0	45.6	ND	40.5	184.6	ND	
71-43-2	Benzene	20.0	40.0	ND	63.9	127.7	ND	
79-01-6	Trichloroethene	6.0	46.6	ND	32.2	250.2	ND	
108-10-1	4-Methyl-2-pentanone	40.0	151.4	ND	163.8	620.2	ND	
108-88-3	Toluene	20.0	52.2	ND	75.3	196.5	ND	
127-18-4	Tetrachloroethene	6.0	24.3	ND	40.7	165.0	ND	
108-90-7	Chlorobenzene	10.0	45.5	ND	46.0	209.5	ND	
100-41-4	Ethylbenzene	21.1	52.9	ND	91.8	229.5	ND	
1330-20-7	m,p-Xylenes	21.2	53.0	ND	92.0	230.1	ND	
100-42-5	Styrene	20.7	51.8	ND	88.2	220.5	ND	
95-47-6	o-Xylene	20.6	51.5	ND	89.5	223.8	ND	
79-34-5	1,1,2,2-Tetrachloroethane	9.9	24.8	ND	67.9	169.8	ND	
106-46-7	1,4-Dichlorobenzene	20.0	34.6	ND	120.2	207.9	ND	
95-50-1	1,2-Dichlorobenzene	40.0	50.0	ND	240.4	300.5	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	102	70	130	

METHOD BLANK REPORT

ASTM D 1945 GC/TCD

Analytical Method:	**D1945**	**SDG:**	**LABQC**
		Laboratory Number:	**B04140**

File Name:	B04140A	**Date Sampled:**		**Time:**	
Description:	METHOD BLANK	**Date Analyzed:**	04/14/20	**Time:**	8:59
Can/Tube#:		**Can Dilution Factor:**	1.00		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	ND	100	300	ND	ND
124-38-9	Carbon Dioxide	0.01	0.03	ND	100	300	ND	ND

METHOD BLANK REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **LABQC**

Analytical Method: **EPA 16**

Laboratory ID: **B04130**

File Name:	B04130A	**Date Sampled:**		**Time:**	
Sample ID	METHOD BALNK	**Date Analyzed:**	04/13/20	**Time:**	9:33
Can/Tube#:		**Can Dilution Factor:**	1.00		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	8.1	24.3	ND	11.3	33.9	ND	

METHOD BLANK REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method:	EPA 16	SDG:	**LABQC**
		Laboratory ID:	**B04140**

File Name:	B04140B	**Date Sampled:**		**Time:**	
Sample ID	METHOD BALNK	**Date Analyzed:**	04/14/20	**Time:**	12:30
Can/Tube#:		**Can Dilution Factor:**	1.00		
QC_Batch:	041420-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	8.1	24.3	ND	11.3	33.9	ND	

QUALITY CONTROL REPORT

Laboratory Control Spike and Spike Duplicate Report

TO15 Volatile Organic Compounds by GC/MS

QC_Batch: 041520-MA1
Date: 04/15/20

		LCS		LCD		Spike Limit			Duplicate	
		Recovery		Recovery		LCL	UCL	Duplicate	Limit	
CAS#	Compound	%	Flag	%	Flag	%	%	%	%	Flag
75-01-4	Vinyl chloride	88		84		70	130	4	25	
75-35-4	1,1-Dichloroethene	85		82		70	130	3	25	
75-09-2	Dichloromethane	88		81		70	130	8	25	
75-34-3	1,1-Dichloroethane	86		84		70	130	2	25	
156-59-2	cis-1,2-Dichloroethene	86		82		70	130	5	25	
67-66-3	Chloroform	83		81		70	130	2	25	
71-55-6	1,1,1-Trichloroethane	92		89		70	130	3	25	
107-06-2	1,2-Dichloroethane	94		88		70	130	7	25	
71-43-2	Benzene	99		94		70	130	5	25	
56-23-5	Carbon tetrachloride	92		88		70	130	4	25	
79-01-6	Trichloroethene	106		102		70	130	4	25	
108-88-3	Toluene	101		98		70	130	2	25	
79-00-5	1,1,2-Trichloroethane	101		93		70	130	8	25	
106-93-4	1,2-Dibromoethane	105		100		70	130	4	25	
127-18-4	Tetrachloroethene	121		119		70	130	2	25	
100-41-4	Ethylbenzene	97		110		70	130	12	25	
1330-20-7	m,p-Xylenes	97		108		70	130	11	25	
95-47-6	o-Xylene	96		109		70	130	12	25	
108-67-8	1,3,5-Trimethylbenzene	100		111		70	130	10	25	
95-63-6	1,2,4-Trimethylbenzene	98		108		70	130	10	25	

LCS - Laboratory Control Spike
LCD - Laboratory Control Duplicate

Flag - Q indicated out of Limits

QUALITY CONTROL REPORT

Laboratory Control Spike and Spike Duplicate Report

TO15 Volatile Organic Compounds by GC/MS

QC_Batch: 041620-MA1
Date: 04/16/20

		LCS		LCD		Spike Limit			Duplicate	
		Recovery		Recovery		LCL	UCL	Duplicate	Limit	
CAS#	Compound	%	Flag	%	Flag	%	%	%	%	Flag
75-01-4	Vinyl chloride	93		112		70	130	18	25	
75-35-4	1,1-Dichloroethene	101		113		70	130	12	25	
75-09-2	Dichloromethane	103		108		70	130	5	25	
75-34-3	1,1-Dichloroethane	108		115		70	130	6	25	
156-59-2	cis-1,2-Dichloroethene	103		111		70	130	7	25	
67-66-3	Chloroform	102		110		70	130	8	25	
71-55-6	1,1,1-Trichloroethane	94		103		70	130	9	25	
107-06-2	1,2-Dichloroethane	100		109		70	130	9	25	
71-43-2	Benzene	101		112		70	130	10	25	
56-23-5	Carbon tetrachloride	89		97		70	130	8	25	
79-01-6	Trichloroethene	98		102		70	130	3	25	
108-88-3	Toluene	101		112		70	130	10	25	
79-00-5	1,1,2-Trichloroethane	103		106		70	130	3	25	
106-93-4	1,2-Dibromoethane	102		111		70	130	8	25	
127-18-4	Tetrachloroethene	107		118		70	130	10	25	
100-41-4	Ethylbenzene	102		129		70	130	23	25	
1330-20-7	m,p-Xylenes	101		127		70	130	22	25	
95-47-6	o-Xylene	101		127		70	130	23	25	
108-67-8	1,3,5-Trimethylbenzene	98		125		70	130	24	25	
95-63-6	1,2,4-Trimethylbenzene	99		125		70	130	23	25	

LCS - Laboratory Control Spike
LCD - Laboratory Control Duplicate

Flag - Q indicated out of Limits

QUALITY CONTROL REPORT

Laboratory Control Spike and Spike Duplicate Report

TO15 Volatile Organic Compounds by GC/MS

QC_Batch: 041720-MA1
Date: 04/17/20

		LCS		LCD		Spike Limit			Duplicate	
		Recovery		Recovery		LCL	UCL	Duplicate	Limit	
CAS#	Compound	%	Flag	%	Flag	%	%	%	%	Flag
75-01-4	Vinyl chloride	105		91		70	130	15	25	
75-35-4	1,1-Dichloroethene	101		96		70	130	6	25	
75-09-2	Dichloromethane	104		93		70	130	12	25	
75-34-3	1,1-Dichloroethane	104		97		70	130	6	25	
156-59-2	cis-1,2-Dichloroethene	103		92		70	130	11	25	
67-66-3	Chloroform	103		93		70	130	10	25	
71-55-6	1,1,1-Trichloroethane	102		94		70	130	8	25	
107-06-2	1,2-Dichloroethane	103		96		70	130	6	25	
71-43-2	Benzene	109		102		70	130	7	25	
56-23-5	Carbon tetrachloride	97		90		70	130	7	25	
79-01-6	Trichloroethene	111		98		70	130	12	25	
108-88-3	Toluene	111		102		70	130	8	25	
79-00-5	1,1,2-Trichloroethane	115		98		70	130	16	25	
106-93-4	1,2-Dibromoethane	117		103		70	130	12	25	
127-18-4	Tetrachloroethene	128		113		70	130	13	25	
100-41-4	Ethylbenzene	102		108		70	130	5	25	
1330-20-7	m,p-Xylenes	101		109		70	130	7	25	
95-47-6	o-Xylene	102		104		70	130	3	25	
108-67-8	1,3,5-Trimethylbenzene	106		110		70	130	4	25	
95-63-6	1,2,4-Trimethylbenzene	104		108		70	130	4	25	

LCS - Laboratory Control Spike
LCD - Laboratory Control Duplicate

Flag - Q indicated out of Limits

Laboratory Control Spike and Laboratory Control Duplicate

ASTM D 1945 GC/TCD

Analytical Method: D1945

QC_Batch: 041420-GCO **Date Analyzed:** 04/14/20

		LCS Recovery		LCD Recovery		Spike Limit			Duplicate Limit	
CAS#	Compound	%	Flag	%	Flag	LCL %	UCL %	Duplicate %	%	Flag
7782-44-7	Oxygen	97		100		70	130	3	25	
7727-37-9	Nitrogen	102		101		70	130	1	25	
74-82-8	Methane	107		107		70	130	0	25	
630-08-0	Carbon Monoxide	94		94		70	130	0	25	
124-38-9	Carbon Dioxide	97		97		70	130	0	25	

QUALITY CONTROL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method: EPA 16

Date: 04/13/20
QC_Batch: 041320-GCP

CAS#	Compound	Standard Recovery	Standard Recovery	LCL %	UCL %	RSD %	RSD Limit
7783-06-4	Hydrogen Sulfide	98	105	80	120	4	15

RSD = Relative standard deviation of triplicate standard analysis
Limits are based on fixed laboratory analysis by GC/FPD

QUALITY CONTROL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method: EPA 16

Date: 04/14/20
QC_Batch: 041420-GCP

CAS#	Compound	Standard Recovery	Standard Recovery	LCL %	UCL %	RSD %	RSD Limit
7783-06-4	Hydrogen Sulfide	103	99	80	120	3	15

RSD = Relative standard deviation of triplicate standard analysis
Limits are based on fixed laboratory analysis by GC/FPD

Analytical Reports

EAS SDG Number 220163

Project Number: 17510

The following pages contain the certified Analytical Reports for the samples submitted in the Sample Delivery Group (SDG) and are in order of the EAS Lab ID number. All of the analytical methods used are modifications of the published methods. Procedural method modifications, QC modifications, QC Criteria modifications, target lists, definitions of detection limits, and flags are all explained in detail in the EAS Quality Manual.

The Analytical Report has columns for the method detection limit (MDL), the reporting limit (RL), and the Amount. The Amount is the concentration of the compound in the sample. The report usually has the results reported with two commonly used units. The MDL, RL, and Amount are adjusted for the canister dilution factor and any dilution caused by sample matrix effects.

NELAC CERTIFICATION

EAS is accredited by the National Environmental Laboratory Accreditation (NELAC) with the Florida Department of Health, one of the NELAC certifying states. EAS is certified for the EPA TO-15, EPA TO-11 and EPA TO-4 methods. A list of accredited compounds is available on request.

DETECTION LIMITS

MDL: The MDL is lowest concentration that can be measured to be statistically above the noise level and is determined using the EPA 2016 method which uses the standard deviation of replicate measurements made over time. The method also incorporates systematic instrumentation blank levels. See Quality Manual for detailed explanation.

RL: The reporting limit (RL) is the lowest concentration that can be reliably reported for each compound that meets the QC Criteria for the method, background levels, or project specific considerations. The QC criteria level for the method blank is to be less then the RL See Quality Manual for more information.

DATA FLAGS

In the standard report, if a compound is not detected above the method detection limit, a "ND" is in the Amount column. The flag column is used for both the not detect flag and for any data flags.

B - This compound was detected in the batch method blank above the reporting limit and is greater then one tenth the amount in the sample.

E - This compound exceeds the calibration range for this sample volume.

J - The amount reported is estimated because it was below the RL and could be below the lowest calibration point, have higher uncertainty, or could be the result of system background

UNITS

PPBV or PPMV: Parts-per-billion (or million) by volume is a mole (volume) ratio of the moles of analyte divided by the moles of air (gas). This is the primary unit used to report air or gas concentrations and is independent of temperature and pressure.

UG/M3 OR MG/M3: The reported result was calculated based on 1 atm pressure and a temperature of 25C. The conversion from PPBV is: UG/M3 = PPBV x MW/24.46 where 24.26 is the gas constant and MW is the Compounds Molecular Weight (sometimes called Formula Weight)

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 01

File Name: 2016301A.D
Description: MAN-1
Canister: 259
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 **Time:** 08:29
Date Analyzed: 4/15/2020 **Time:** 15:42
Can Dilution Factor: 1.00
Air Volume: 225.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.12	ND	1.34	2.31	ND	
75-01-4	Vinyl chloride	0.22	1.12	ND	0.57	2.86	ND	
75-00-3	Chloroethane	0.22	1.12	ND	0.59	2.95	ND	
75-69-4	Trichlorofluoromethane	0.35	1.12	ND	1.97	6.29	ND	
75-35-4	1,1-Dichloroethene	0.22	1.10	ND	0.88	4.37	ND	
76-13-1	Freon 113	0.22	1.06	ND	1.70	8.14	ND	
75-09-2	Dichloromethane	0.44	1.07	ND	1.54	3.71	ND	
156-60-5	trans-1,2-Dichloroethene	0.22	0.80	ND	0.88	3.18	ND	
75-34-3	1,1-Dichloroethane	0.22	1.11	ND	0.90	4.49	ND	
108-05-4	Vinyl acetate	0.22	0.98	ND	0.78	3.44	ND	
109-99-9	Tetrahydrofuran	0.44	1.12	ND	1.31	3.29	ND	
156-59-2	cis-1,2-Dichloroethene	0.44	1.20	ND	1.76	4.74	ND	
71-55-6	1,1,1-Trichloroethane	0.22	0.99	ND	1.21	5.38	ND	
107-06-2	1,2-Dichloroethane	0.22	1.01	ND	0.90	4.10	ND	
71-43-2	Benzene	0.44	0.89	ND	1.42	2.84	ND	
79-01-6	Trichloroethene	0.13	1.04	ND	0.72	5.56	ND	
108-10-1	4-Methyl-2-pentanone	0.89	3.36	ND	3.64	13.78	ND	
108-88-3	Toluene	0.44	1.16	ND	1.67	4.37	ND	
127-18-4	Tetrachloroethene	0.13	0.54	ND	0.90	3.67	ND	
108-90-7	Chlorobenzene	0.22	1.01	ND	1.02	4.65	ND	
100-41-4	Ethylbenzene	0.47	1.17	ND	2.04	5.10	ND	
1330-20-7	m,p-Xylenes	0.47	1.18	ND	2.05	5.11	ND	
100-42-5	Styrene	0.46	1.15	ND	1.96	4.90	ND	
95-47-6	o-Xylene	0.46	1.15	ND	1.99	4.97	ND	
79-34-5	1,1,2,2-Tetrachloroethane	0.22	0.55	ND	1.51	3.77	ND	
106-46-7	1,4-Dichlorobenzene	0.44	0.77	ND	2.67	4.62	ND	
95-50-1	1,2-Dichlorobenzene	0.89	1.11	ND	5.34	6.68	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	96	70	130	

ANALYTICAL REPORT

ASTM D 1945 GC/TCD

SDG: 220163

Analytical Method: D1945

Laboratory Number: 01

File Name: 2016301A
Description: MAN 1
Can/Tube#: 259
QC_Batch: 041420-GCO

Date Sampled: 04/09/20 **Time:** 8:29
Date Analyzed: 04/14/20 **Time:** 9:09
Can Dilution Factor: 1.00

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	ND	100	300	ND	ND
124-38-9	Carbon Dioxide	0.01	0.03	ND	100	300	ND	ND

ANALYTICAL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: 220163

Analytical Method: EPA 16

Laboratory ID: 1

File Name:	2016301A	**Date Sampled:**	04/09/20	**Time:**	8:29
Sample ID	MAN 1	**Date Analyzed:**	04/13/20	**Time:**	15:32
Can/Tube#:	259	**Can Dilution Factor:**	1.00		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	8.1	24.3	ND	11.3	33.9	ND	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 02

File Name: 2016302A.D
Description: B-2
Canister: 524
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 **Time:** 09:19
Date Analyzed: 4/15/2020 **Time:** 13:40
Can Dilution Factor: 1.00
Air Volume: 225.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.12	ND	1.34	2.31	ND	
75-01-4	Vinyl chloride	0.22	1.12	ND	0.57	2.86	ND	
75-00-3	Chloroethane	0.22	1.12	ND	0.59	2.95	ND	
75-69-4	Trichlorofluoromethane	0.35	1.12	ND	1.97	6.29	ND	
75-35-4	1,1-Dichloroethene	0.22	1.10	ND	0.88	4.37	ND	
76-13-1	Freon 113	0.22	1.06	ND	1.70	8.14	ND	
75-09-2	Dichloromethane	0.44	1.07	ND	1.54	3.71	ND	
156-60-5	trans-1,2-Dichloroethene	0.22	0.80	ND	0.88	3.18	ND	
75-34-3	1,1-Dichloroethane	0.22	1.11	ND	0.90	4.49	ND	
108-05-4	Vinyl acetate	0.22	0.98	ND	0.78	3.44	ND	
109-99-9	Tetrahydrofuran	0.44	1.12	ND	1.31	3.29	ND	
156-59-2	cis-1,2-Dichloroethene	0.44	1.20	ND	1.76	4.74	ND	
71-55-6	1,1,1-Trichloroethane	0.22	0.99	ND	1.21	5.38	ND	
107-06-2	1,2-Dichloroethane	0.22	1.01	ND	0.90	4.10	ND	
71-43-2	Benzene	0.44	0.89	ND	1.42	2.84	ND	
79-01-6	Trichloroethene	0.13	1.04	ND	0.72	5.56	ND	
108-10-1	4-Methyl-2-pentanone	0.89	3.36	ND	3.64	13.78	ND	
108-88-3	Toluene	0.44	1.16	0.79	1.67	4.37	2.98	J
127-18-4	Tetrachloroethene	0.13	0.54	ND	0.90	3.67	ND	
108-90-7	Chlorobenzene	0.22	1.01	ND	1.02	4.65	ND	
100-41-4	Ethylbenzene	0.47	1.17	ND	2.04	5.10	ND	
1330-20-7	m,p-Xylenes	0.47	1.18	1.71	2.05	5.11	7.44	
100-42-5	Styrene	0.46	1.15	ND	1.96	4.90	ND	
95-47-6	o-Xylene	0.46	1.15	0.79	1.99	4.97	3.45	J
79-34-5	1,1,2,2-Tetrachloroethane	0.22	0.55	ND	1.51	3.77	ND	
106-46-7	1,4-Dichlorobenzene	0.44	0.77	ND	2.67	4.62	ND	
95-50-1	1,2-Dichlorobenzene	0.89	1.11	ND	5.34	6.68	ND	

	Surrogate Recovery	% Rec.	QC Limits LCL	QC Limits UCL	Flag
2037-26-5	Toluene-d8	97	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method:	D1945	**SDG:**	**220163**
		Laboratory Number:	02

File Name:	2016302A	**Date Sampled:**	04/09/20	**Time:**	9:19
Description:	B-2	**Date Analyzed:**	04/14/20	**Time:**	9:16
Can/Tube#:	524	**Can Dilution Factor:**	1.00		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	ND	100	300	ND	ND
124-38-9	Carbon Dioxide	0.01	0.03	ND	100	300	ND	ND

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: EPA 16

Laboratory ID: **2**

File Name: 2016302A
Sample ID B-2
Can/Tube#: 524
QC_Batch: 041320-GCP

Date Sampled: 04/09/20 **Time:** 9:19
Date Analyzed: 04/13/20 **Time:** 16:04
Can Dilution Factor: 1.00
Air Volume: 10.00 ml

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	8.1	24.3	ND	11.3	33.9	ND	

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 03

File Name: 2016303A.D
Description: GW-7
Canister: 251
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 Time: 08:38
Date Analyzed: 4/15/2020 Time: 16:54
Can Dilution Factor: 4.45
Air Volume: 225.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.99	4.98	ND	2.04	10.29	ND	
75-01-4	Vinyl chloride	0.99	4.97	ND	2.53	12.71	ND	
75-00-3	Chloroethane	0.99	4.97	ND	2.61	13.12	ND	
75-69-4	Trichlorofluoromethane	0.99	4.98	ND	5.55	27.99	ND	
75-35-4	1,1-Dichloroethene	0.99	4.90	ND	3.92	19.43	ND	
76-13-1	Freon 113	0.99	4.73	ND	7.58	36.24	ND	
75-09-2	Dichloromethane	1.98	4.76	ND	6.86	16.53	ND	
156-60-5	trans-1,2-Dichloroethene	0.99	3.57	ND	3.92	14.14	ND	
75-34-3	1,1-Dichloroethane	0.99	4.93	ND	4.00	19.96	ND	
108-05-4	Vinyl acetate	0.99	4.34	ND	3.48	15.29	ND	
109-99-9	Tetrahydrofuran	1.98	4.97	ND	5.83	14.66	ND	
156-59-2	cis-1,2-Dichloroethene	1.98	5.32	ND	7.83	21.07	ND	
71-55-6	1,1,1-Trichloroethane	0.99	4.39	ND	5.39	23.94	ND	
107-06-2	1,2-Dichloroethane	0.99	4.51	ND	4.00	18.26	ND	
71-43-2	Benzene	1.98	3.96	ND	6.31	12.63	ND	
79-01-6	Trichloroethene	0.59	4.61	ND	3.19	24.74	ND	
108-10-1	4-Methyl-2-pentanone	3.96	14.97	ND	16.20	61.33	ND	
108-88-3	Toluene	1.98	5.16	12.09	7.45	19.43	45.51	
127-18-4	Tetrachloroethene	0.59	2.41	ND	4.02	16.31	ND	
108-90-7	Chlorobenzene	0.99	4.50	9.19	4.55	20.71	42.29	
100-41-4	Ethylbenzene	2.09	5.23	8.49	9.08	22.69	36.88	
1330-20-7	m,p-Xylenes	2.10	5.24	9.45	9.10	22.75	41.03	
100-42-5	Styrene	2.05	5.12	ND	8.72	21.81	ND	
95-47-6	o-Xylene	2.04	5.10	3.17	8.85	22.13	13.77	J
79-34-5	1,1,2,2-Tetrachloroethane	0.98	2.45	ND	6.72	16.79	ND	
106-46-7	1,4-Dichlorobenzene	1.98	3.42	ND	11.89	20.56	ND	
95-50-1	1,2-Dichlorobenzene	3.96	4.94	ND	23.77	29.71	ND	

	Surrogate Recovery	% Rec.	QC Limits LCL	QC Limits UCL	Flag
2037-26-5	Toluene-d8	104	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method:	D1945	SDG:	220163
		Laboratory Number:	03

File Name:	2016303A	Date Sampled:	04/09/20	Time:	8:38
Description:	GW-7	Date Analyzed:	04/14/20	Time:	9:23
Can/Tube#:	251	Can Dilution Factor:	4.45		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.04	0.12	0.72	445	1,335	7,176	
124-38-9	Carbon Dioxide	0.04	0.12	11.10	445	1,335	111,024	

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: **EPA 16**

Laboratory ID: **3**

File Name:	2016303A	**Date Sampled:**	04/09/20	**Time:**	8:38
Sample ID	GW-7	**Date Analyzed:**	04/13/20	**Time:**	16:30
Can/Tube#:	251	**Can Dilution Factor:**	4.45		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	36.0	107.9	ND	50.2	150.7	ND	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 04

File Name:	2016304A.D	**Date Sampled:** 4/9/2020	**Time:** 08:55
Description:	GW-38S	**Date Analyzed:** 4/15/2020	**Time:** 18:05
Canister:	261	**Can Dilution Factor:** 3.20	
QC_Batch:	041520-MA1	**Air Volume:** 200.00 ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.80	4.03	ND	1.65	8.32	ND	
75-01-4	Vinyl chloride	0.80	4.02	ND	2.04	10.28	ND	
75-00-3	Chloroethane	0.80	4.02	22.87	2.11	10.61	60.31	
75-69-4	Trichlorofluoromethane	0.80	4.03	3.73	4.49	22.65	20.95	J
75-35-4	1,1-Dichloroethene	0.80	3.97	ND	3.17	15.72	ND	
76-13-1	Freon 113	0.80	3.83	ND	6.13	29.32	ND	
75-09-2	Dichloromethane	1.60	3.85	ND	5.55	13.37	ND	
156-60-5	trans-1,2-Dichloroethene	0.80	2.89	ND	3.17	11.44	ND	
75-34-3	1,1-Dichloroethane	0.80	3.99	ND	3.24	16.15	ND	
108-05-4	Vinyl acetate	0.80	3.51	ND	2.82	12.37	ND	
109-99-9	Tetrahydrofuran	1.60	4.02	40.70	4.72	11.86	119.96	
156-59-2	cis-1,2-Dichloroethene	1.60	4.30	ND	6.34	17.05	ND	
71-55-6	1,1,1-Trichloroethane	0.80	3.55	ND	4.36	19.37	ND	
107-06-2	1,2-Dichloroethane	0.80	3.65	ND	3.24	14.77	ND	
71-43-2	Benzene	1.60	3.20	80.03	5.11	10.22	255.50	
79-01-6	Trichloroethene	0.48	3.73	ND	2.58	20.02	ND	
108-10-1	4-Methyl-2-pentanone	3.20	12.11	ND	13.11	49.61	ND	
108-88-3	Toluene	1.60	4.18	7.59	6.02	15.72	28.56	
127-18-4	Tetrachloroethene	0.48	1.95	ND	3.25	13.20	ND	
108-90-7	Chlorobenzene	0.80	3.64	116.67	3.68	16.76	537.01	
100-41-4	Ethylbenzene	1.69	4.23	146.79	7.34	18.36	637.28	
1330-20-7	m,p-Xylenes	1.70	4.24	33.96	7.36	18.41	147.42	
100-42-5	Styrene	1.66	4.14	ND	7.06	17.64	ND	
95-47-6	o-Xylene	1.65	4.12	19.88	7.16	17.90	86.31	
79-34-5	1,1,2,2-Tetrachloroethane	0.79	1.98	ND	5.43	13.59	ND	
106-46-7	1,4-Dichlorobenzene	1.60	2.77	ND	9.61	16.63	ND	
95-50-1	1,2-Dichlorobenzene	3.20	4.00	ND	19.23	24.04	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	98	70	130	

ASTM D 1945 GC/TCD

Analytical Method:	**D1945**	**SDG:**	**220163**
		Laboratory Number:	**04**

File Name:	2016304A	**Date Sampled:**	04/09/20	**Time:**	8:55
Description:	GW-38S	**Date Analyzed:**	04/14/20	**Time:**	9:30
Can/Tube#:	261	**Can Dilution Factor:**	3.20		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.03	0.09	10.55	320	960	105,550	
124-38-9	Carbon Dioxide	0.03	0.09	13.54	320	960	135,427	

ANALYTICAL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: EPA 16

Laboratory ID: **4**

File Name:	2016304A	**Date Sampled:**	04/09/20	**Time:**	8:55
Sample ID	GW-38S	**Date Analyzed:**	04/13/20	**Time:**	16:56
Can/Tube#:	261	**Can Dilution Factor:**	3.20		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	25.9	77.6	3,113.1	36.1	108.4	4,348.1	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 05

File Name: 2016305A.D
Description: GW-38D
Canister: 255
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 Time: 08:56
Date Analyzed: 4/15/2020 Time: 19:55
Can Dilution Factor: 1.47
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.85	ND	1.34	3.82	ND	
75-01-4	Vinyl chloride	0.37	1.85	91.45	0.94	4.72	233.66	
75-00-3	Chloroethane	0.37	1.85	10.24	0.97	4.87	27.00	
75-69-4	Trichlorofluoromethane	0.37	1.85	ND	2.06	10.39	ND	
75-35-4	1,1-Dichloroethene	0.37	1.82	ND	1.45	7.21	ND	
76-13-1	Freon 113	0.37	1.76	ND	2.81	13.45	ND	
75-09-2	Dichloromethane	0.73	1.77	ND	2.55	6.13	ND	
156-60-5	trans-1,2-Dichloroethene	0.37	1.32	ND	1.45	5.25	ND	
75-34-3	1,1-Dichloroethane	0.37	1.83	ND	1.49	7.41	ND	
108-05-4	Vinyl acetate	0.37	1.61	ND	1.29	5.68	ND	
109-99-9	Tetrahydrofuran	0.73	1.85	134.39	2.16	5.44	396.09	
156-59-2	cis-1,2-Dichloroethene	0.73	1.97	17.68	2.91	7.82	70.05	
71-55-6	1,1,1-Trichloroethane	0.37	1.63	ND	2.00	8.89	ND	
107-06-2	1,2-Dichloroethane	0.37	1.67	ND	1.49	6.78	ND	
79-01-6	Trichloroethene	0.22	1.71	2.07	1.18	9.18	11.14	
108-10-1	4-Methyl-2-pentanone	1.47	5.56	ND	6.01	22.76	ND	
108-88-3	Toluene	0.73	1.92	77.28	2.76	7.21	290.96	
127-18-4	Tetrachloroethene	0.22	0.89	0.87	1.49	6.05	5.88	J
108-90-7	Chlorobenzene	0.37	1.67	163.56	1.69	7.69	752.88	
1330-20-7	m,p-Xylenes	0.78	1.94	276.05	3.38	8.44	1,198.44	
100-42-5	Styrene	0.76	1.90	ND	3.24	8.09	ND	
95-47-6	o-Xylene	0.76	1.89	95.54	3.28	8.21	414.79	
79-34-5	1,1,2,2-Tetrachloroethane	0.36	0.91	ND	2.49	6.23	ND	
106-46-7	1,4-Dichlorobenzene	0.73	1.27	ND	4.41	7.63	ND	
95-50-1	1,2-Dichlorobenzene	1.47	1.84	ND	8.82	11.03	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	96	70	130	

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 05

File Name: 2016305A.D
Description: GW-38D
Canister: 255
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 08:56
Date Analyzed: 4/16/2020 **Time:** 18:04
Can Dilution Factor: 1.47
Air Volume: 25.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
71-43-2	Benzene	5.87	11.74	19.51	18.75	37.49	62.29	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	98	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 05

File Name:	2016305A.D	**Date Sampled:**	4/9/2020	**Time:**	08:56
Description:	GW-38D	**Date Analyzed:**	4/17/2020	**Time:**	18:17
Canister:	255	**Can Dilution Factor:**	1.99		
QC_Batch:	041720-MA1	**Air Volume:**	5.00	ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
100-41-4	Ethylbenzene	42.08	105.20	1,578.10	182.68	456.70	6,851.16	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	98	70	130	

ASTM D 1945 GC/TCD

Analytical Method:	D1945	SDG:	220163
		Laboratory Number:	05

File Name:	2016305A	**Date Sampled:**	04/09/20	**Time:**	8:56
Description:	GW-38D	**Date Analyzed:**	04/14/20	**Time:**	9:52
Can/Tube#:	255	**Can Dilution Factor:**	1.38		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	20.42	138	414	204,202	
124-38-9	Carbon Dioxide	0.01	0.03	15.29	138	414	152,916	

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: 220163

Analytical Method: EPA 16

Laboratory ID: 5

File Name:	2016305A	**Date Sampled:**	04/09/20	**Time:**	8:56
Sample ID	GW-38D	**Date Analyzed:**	04/13/20	**Time:**	17:22
Can/Tube#:	255	**Can Dilution Factor:**	1.29		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	10.4	31.3	4,718.0	14.6	43.7	6,589.7	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 06

File Name:	2016306A.D	**Date Sampled:**	4/9/2020	**Time:**	09:09
Description:	GW-48S	**Date Analyzed:**	4/15/2020	**Time:**	20:31
Canister:	486	**Can Dilution Factor:**	1.98		
QC_Batch:	041520-MA1	**Air Volume:**	200.00	ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	2.49	ND	1.34	5.15	ND	
75-01-4	Vinyl chloride	0.50	2.49	53.57	1.26	6.36	136.86	
75-00-3	Chloroethane	0.50	2.49	113.32	1.31	6.57	298.80	
75-69-4	Trichlorofluoromethane	0.50	2.49	ND	2.78	14.01	ND	
75-35-4	1,1-Dichloroethene	0.50	2.46	ND	1.96	9.73	ND	
76-13-1	Freon 113	0.50	2.37	ND	3.79	18.14	ND	
75-09-2	Dichloromethane	0.99	2.38	ND	3.44	8.27	ND	
156-60-5	trans-1,2-Dichloroethene	0.50	1.79	ND	1.96	7.08	ND	
75-34-3	1,1-Dichloroethane	0.50	2.47	5.71	2.00	9.99	23.09	
108-05-4	Vinyl acetate	0.50	2.17	ND	1.74	7.65	ND	
109-99-9	Tetrahydrofuran	0.99	2.49	104.95	2.92	7.34	309.33	
156-59-2	cis-1,2-Dichloroethene	0.99	2.66	6.19	3.92	10.55	24.53	
71-55-6	1,1,1-Trichloroethane	0.50	2.20	ND	2.70	11.99	ND	
107-06-2	1,2-Dichloroethane	0.50	2.26	ND	2.00	9.14	ND	
71-43-2	Benzene	0.99	1.98	172.07	3.16	6.32	549.36	
79-01-6	Trichloroethene	0.30	2.31	2.21	1.60	12.39	11.85	J
108-10-1	4-Methyl-2-pentanone	1.98	7.49	ND	8.11	30.70	ND	
108-88-3	Toluene	0.99	2.58	46.64	3.73	9.73	175.58	
127-18-4	Tetrachloroethene	0.30	1.20	ND	2.01	8.17	ND	
108-90-7	Chlorobenzene	0.50	2.25	147.03	2.28	10.37	676.79	
100-41-4	Ethylbenzene	1.05	2.62	283.56	4.54	11.36	1,231.06	
1330-20-7	m,p-Xylenes	1.05	2.62	69.90	4.56	11.39	303.47	
100-42-5	Styrene	1.03	2.56	ND	4.37	10.92	ND	
95-47-6	o-Xylene	1.02	2.55	26.49	4.43	11.08	115.02	
79-34-5	1,1,2,2-Tetrachloroethane	0.49	1.23	ND	3.36	8.41	ND	
106-46-7	1,4-Dichlorobenzene	0.99	1.71	ND	5.95	10.29	ND	
95-50-1	1,2-Dichlorobenzene	1.98	2.48	ND	11.90	14.87	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	100	70	130	

ANALYTICAL REPORT

ASTM D 1945 GC/TCD

Analytical Method:	D1945	**SDG:**	**220163**
		Laboratory Number:	**06**

File Name:	2016306A	**Date Sampled:**	04/09/20	**Time:**	9:09
Description:	GW-48S	**Date Analyzed:**	04/14/20	**Time:**	13:54
Can/Tube#:	486	**Can Dilution Factor:**	1.98		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.02	0.06	9.37	198	594	93,746	
124-38-9	Carbon Dioxide	0.02	0.06	16.08	198	594	160,787	

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: **EPA 16**

Laboratory ID: **6**

File Name:	2016306A	**Date Sampled:**	04/09/20	**Time:**	9:09
Sample ID	GW-48S	**Date Analyzed:**	04/14/20	**Time:**	13:55
Can/Tube#:	486	**Can Dilution Factor:**	1.98		
QC_Batch:	041420-GCP	**Air Volume:**	5.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	32.0	96.0	11,661.8	44.7	134.1	16,288.3	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 07

File Name:	2016307A.D	**Date Sampled:**	4/9/2020	**Time:**	09:11
Description:	GW-48D	**Date Analyzed:**	4/15/2020	**Time:**	18:42
Canister:	256	**Can Dilution Factor:**	2.45		
QC_Batch:	041520-MA1	**Air Volume:**	200.00	ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	3.09	ND	1.34	6.37	ND	
75-01-4	Vinyl chloride	0.61	3.08	122.06	1.56	7.87	311.85	
75-00-3	Chloroethane	0.61	3.08	301.96	1.61	8.12	796.18	
75-69-4	Trichlorofluoromethane	0.61	3.09	ND	3.44	17.34	ND	
75-35-4	1,1-Dichloroethene	0.61	3.04	ND	2.43	12.03	ND	
76-13-1	Freon 113	0.61	2.93	ND	4.69	22.45	ND	
75-09-2	Dichloromethane	1.23	2.95	13.53	4.25	10.24	46.96	
156-60-5	trans-1,2-Dichloroethene	0.61	2.21	ND	2.43	8.76	ND	
75-34-3	1,1-Dichloroethane	0.61	3.05	46.95	2.48	12.36	190.02	
108-05-4	Vinyl acetate	0.61	2.69	ND	2.16	9.47	ND	
109-99-9	Tetrahydrofuran	1.23	3.08	94.39	3.61	9.08	278.21	
156-59-2	cis-1,2-Dichloroethene	1.23	3.30	10.90	4.85	13.05	43.17	
71-55-6	1,1,1-Trichloroethane	0.61	2.72	ND	3.34	14.83	ND	
107-06-2	1,2-Dichloroethane	0.61	2.79	ND	2.48	11.31	ND	
79-01-6	Trichloroethene	0.37	2.85	2.69	1.97	15.32	14.44	J
108-10-1	4-Methyl-2-pentanone	2.45	9.27	ND	10.04	37.98	ND	
108-88-3	Toluene	1.23	3.20	197.00	4.61	12.04	741.72	
127-18-4	Tetrachloroethene	0.37	1.49	1.28	2.49	10.10	8.65	J
108-90-7	Chlorobenzene	0.61	2.79	80.45	2.82	12.83	370.29	
1330-20-7	m,p-Xylenes	1.30	3.25	442.71	5.64	14.09	1,922.00	
100-42-5	Styrene	1.27	3.17	ND	5.40	13.51	ND	
95-47-6	o-Xylene	1.26	3.16	313.83	5.48	13.71	1,362.46	
79-34-5	1,1,2,2-Tetrachloroethane	0.61	1.52	ND	4.16	10.40	ND	
106-46-7	1,4-Dichlorobenzene	1.23	2.12	ND	7.36	12.74	ND	
95-50-1	1,2-Dichlorobenzene	2.45	3.06	ND	14.72	18.40	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	91	70	130	

ANALYTICAL REPORT

Environmental
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163
Analytical Method: TO-15
Laboratory ID: 07

File Name: 2016307A.D
Description: GW-48D
Canister: 256
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 09:11
Date Analyzed: 4/16/2020 **Time:** 15:34
Can Dilution Factor: 2.45
Air Volume: 25.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
71-43-2	Benzene	9.80	19.60	532.86	31.29	62.58	1,701.24	
100-41-4	Ethylbenzene	10.36	25.90	3,042.19	44.98	112.45	13,207.35	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	91	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method: D1945

SDG: 220163
Laboratory Number: 07

File Name: 2016307A
Description: GW-48D
Can/Tube#: 256
QC_Batch: 041420-GCO

Date Sampled: 04/09/20 **Time:** 9:11
Date Analyzed: 04/14/20 **Time:** 14:19
Can Dilution Factor: 2.45

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.02	0.06	15.19	245	735	151,879	
124-38-9	Carbon Dioxide	0.02	0.06	16.43	245	735	164,317	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: EPA 16

Laboratory ID: **7**

File Name:	2016307A	**Date Sampled:**	04/09/20	**Time:**	9:11
Sample ID	GW-48D	**Date Analyzed:**	04/14/20	**Time:**	14:19
Can/Tube#:	256	**Can Dilution Factor:**	2.45		
QC_Batch:	041420-GCP	**Air Volume:**	5.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	39.6	118.8	8,949.6	55.3	166.0	12,500.1	

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 08

File Name: 2016308A.D
Description: B-4
Canister: 482
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 **Time:** 09:57
Date Analyzed: 4/15/2020 **Time:** 14:17
Can Dilution Factor: 1.51
Air Volume: 225.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.69	ND	1.34	3.49	ND	
75-01-4	Vinyl chloride	0.34	1.69	ND	0.86	4.31	ND	
75-00-3	Chloroethane	0.34	1.69	ND	0.88	4.45	ND	
75-69-4	Trichlorofluoromethane	0.35	1.69	ND	1.97	9.50	ND	
75-35-4	1,1-Dichloroethene	0.34	1.66	ND	1.33	6.59	ND	
76-13-1	Freon 113	0.34	1.61	ND	2.57	12.30	ND	
75-09-2	Dichloromethane	0.67	1.62	ND	2.33	5.61	ND	
156-60-5	trans-1,2-Dichloroethene	0.34	1.21	ND	1.33	4.80	ND	
75-34-3	1,1-Dichloroethane	0.34	1.67	ND	1.36	6.77	ND	
108-05-4	Vinyl acetate	0.34	1.47	ND	1.18	5.19	ND	
109-99-9	Tetrahydrofuran	0.67	1.69	ND	1.98	4.97	ND	
156-59-2	cis-1,2-Dichloroethene	0.67	1.81	ND	2.66	7.15	ND	
71-55-6	1,1,1-Trichloroethane	0.34	1.49	ND	1.83	8.12	ND	
107-06-2	1,2-Dichloroethane	0.34	1.53	ND	1.36	6.19	ND	
71-43-2	Benzene	0.67	1.34	ND	2.14	4.29	ND	
79-01-6	Trichloroethene	0.20	1.56	ND	1.08	8.40	ND	
108-10-1	4-Methyl-2-pentanone	1.34	5.08	ND	5.50	20.81	ND	
108-88-3	Toluene	0.67	1.75	ND	2.53	6.59	ND	
127-18-4	Tetrachloroethene	0.20	0.82	ND	1.36	5.54	ND	
108-90-7	Chlorobenzene	0.34	1.53	ND	1.54	7.03	ND	
100-41-4	Ethylbenzene	0.71	1.77	ND	3.08	7.70	ND	
1330-20-7	m,p-Xylenes	0.71	1.78	ND	3.09	7.72	ND	
100-42-5	Styrene	0.69	1.74	ND	2.96	7.40	ND	
95-47-6	o-Xylene	0.69	1.73	ND	3.00	7.51	ND	
79-34-5	1,1,2,2-Tetrachloroethane	0.33	0.83	ND	2.28	5.70	ND	
106-46-7	1,4-Dichlorobenzene	0.67	1.16	ND	4.03	6.98	ND	
95-50-1	1,2-Dichlorobenzene	1.34	1.68	ND	8.07	10.08	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	98	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method: D1945

SDG: 220163

Laboratory Number: 08

File Name: 2016308A

Description: B-4

Can/Tube#: 482

QC_Batch: 041420-GCO

Date Sampled: 04/09/20 **Time:** 9:57

Date Analyzed: 04/14/20 **Time:** 10:01

Can Dilution Factor: 1.51

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.02	0.06	ND	151	453	ND	ND
124-38-9	Carbon Dioxide	0.02	0.06	0.08	151	453	761	

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method:	EPA 16	SDG:	220163
		Laboratory ID:	8

File Name:	2016308A	Date Sampled:	04/09/20	Time:	9:57
Sample ID	B-4	Date Analyzed:	04/13/20	Time:	18:37
Can/Tube#:	482	Can Dilution Factor:	1.51		
QC_Batch:	041320-GCP	Air Volume:	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	12.2	36.6	ND	17.0	51.1	ND	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163
Analytical Method: TO-15
Laboratory ID: 09

File Name: 2016309A.D
Description: GW-52S
Canister: 258
QC_Batch: 041520-MA1
Date Sampled: 4/9/2020 **Time:** 09:33
Date Analyzed: 4/15/2020 **Time:** 19:19
Can Dilution Factor: 1.44
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.81	ND	1.34	3.75	ND	
75-01-4	Vinyl chloride	0.36	1.81	21.58	0.92	4.63	55.12	
75-00-3	Chloroethane	0.36	1.81	14.87	0.95	4.77	39.22	
75-69-4	Trichlorofluoromethane	0.36	1.81	2.25	2.02	10.19	12.65	
75-35-4	1,1-Dichloroethene	0.36	1.79	ND	1.43	7.07	ND	
76-13-1	Freon 113	0.36	1.72	ND	2.76	13.19	ND	
75-09-2	Dichloromethane	0.72	1.73	ND	2.50	6.02	ND	
156-60-5	trans-1,2-Dichloroethene	0.36	1.30	ND	1.43	5.15	ND	
75-34-3	1,1-Dichloroethane	0.36	1.80	6.88	1.46	7.27	27.82	
108-05-4	Vinyl acetate	0.36	1.58	ND	1.27	5.57	ND	
109-99-9	Tetrahydrofuran	0.72	1.81	61.78	2.12	5.34	182.10	
156-59-2	cis-1,2-Dichloroethene	0.72	1.94	ND	2.85	7.67	ND	
71-55-6	1,1,1-Trichloroethane	0.36	1.60	ND	1.96	8.72	ND	
107-06-2	1,2-Dichloroethane	0.36	1.64	ND	1.46	6.65	ND	
71-43-2	Benzene	0.72	1.44	60.18	2.30	4.60	192.13	
79-01-6	Trichloroethene	0.22	1.68	2.25	1.16	9.01	12.11	
108-10-1	4-Methyl-2-pentanone	1.44	5.45	ND	5.90	22.33	ND	
108-88-3	Toluene	0.72	1.88	98.74	2.71	7.08	371.75	
127-18-4	Tetrachloroethene	0.22	0.88	1.27	1.46	5.94	8.62	
108-90-7	Chlorobenzene	0.36	1.64	40.97	1.66	7.54	188.61	
1330-20-7	m,p-Xylenes	0.76	1.91	140.52	3.31	8.28	610.04	
100-42-5	Styrene	0.75	1.86	ND	3.18	7.94	ND	
95-47-6	o-Xylene	0.74	1.86	93.49	3.22	8.06	405.87	
79-34-5	1,1,2,2-Tetrachloroethane	0.36	0.89	ND	2.45	6.11	ND	
106-46-7	1,4-Dichlorobenzene	0.72	1.25	ND	4.33	7.49	ND	
95-50-1	1,2-Dichlorobenzene	1.44	1.80	ND	8.65	10.82	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	102	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 09

File Name: 2016309A.D
Description: GW-52S
Canister: 258
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 09:33
Date Analyzed: 4/16/2020 **Time:** 16:53
Can Dilution Factor: 1.44
Air Volume: 50.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
100-41-4	Ethylbenzene	3.04	7.61	249.56	13.22	33.05	1,083.44	

	Surrogate Recovery	% Rec.	QC Limits LCL	QC Limits UCL	Flag
2037-26-5	Toluene-d8	95	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method:	D1945	**SDG:**	**220163**
		Laboratory Number:	**09**

File Name:	2016309A	**Date Sampled:**	04/09/20	**Time:**	9:33
Description:	GW-52S	**Date Analyzed:**	04/14/20	**Time:**	14:42
Can/Tube#:	258	**Can Dilution Factor:**	1.44		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	7.05	144	432	70,484	
124-38-9	Carbon Dioxide	0.01	0.03	6.28	144	432	62,798	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method:	EPA 16	SDG:	220163
		Laboratory ID:	9

File Name:	2016309A	Date Sampled:	04/09/20	Time:	9:33
Sample ID	GW-52S	Date Analyzed:	04/14/20	Time:	14:43
Can/Tube#:	258	Can Dilution Factor:	1.44		
QC_Batch:	041420-GCP	Air Volume:	5.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	23.3	69.8	127.1	32.5	97.5	177.6	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 10

File Name: 2016310A.D
Description: GW-52D
Canister: 253
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 Time: 09:35
Date Analyzed: 4/15/2020 Time: 17:29
Can Dilution Factor: 1.12
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.41	ND	1.34	2.91	ND	
75-01-4	Vinyl chloride	0.28	1.41	ND	0.72	3.60	ND	
75-00-3	Chloroethane	0.28	1.41	ND	0.74	3.71	ND	
75-69-4	Trichlorofluoromethane	0.35	1.41	ND	1.97	7.93	ND	
75-35-4	1,1-Dichloroethene	0.28	1.39	ND	1.11	5.50	ND	
76-13-1	Freon 113	0.28	1.34	ND	2.15	10.26	ND	
75-09-2	Dichloromethane	0.56	1.35	ND	1.94	4.68	ND	
156-60-5	trans-1,2-Dichloroethene	0.28	1.01	ND	1.11	4.00	ND	
75-34-3	1,1-Dichloroethane	0.28	1.40	ND	1.13	5.65	ND	
108-05-4	Vinyl acetate	0.28	1.23	ND	0.99	4.33	ND	
109-99-9	Tetrahydrofuran	0.56	1.41	ND	1.65	4.15	ND	
156-59-2	cis-1,2-Dichloroethene	0.56	1.51	ND	2.22	5.97	ND	
71-55-6	1,1,1-Trichloroethane	0.28	1.24	ND	1.53	6.78	ND	
107-06-2	1,2-Dichloroethane	0.28	1.28	ND	1.13	5.17	ND	
71-43-2	Benzene	0.56	1.12	ND	1.79	3.58	ND	
79-01-6	Trichloroethene	0.17	1.30	ND	0.90	7.01	ND	
108-10-1	4-Methyl-2-pentanone	1.12	4.24	ND	4.59	17.36	ND	
108-88-3	Toluene	0.56	1.46	ND	2.11	5.50	ND	
127-18-4	Tetrachloroethene	0.17	0.68	ND	1.14	4.62	ND	
108-90-7	Chlorobenzene	0.28	1.27	ND	1.29	5.87	ND	
100-41-4	Ethylbenzene	0.59	1.48	1.60	2.57	6.43	6.95	
1330-20-7	m,p-Xylenes	0.59	1.48	5.25	2.58	6.44	22.78	
100-42-5	Styrene	0.58	1.45	ND	2.47	6.17	ND	
95-47-6	o-Xylene	0.58	1.44	2.16	2.51	6.27	9.39	
79-34-5	1,1,2,2-Tetrachloroethane	0.28	0.69	ND	1.90	4.75	ND	
106-46-7	1,4-Dichlorobenzene	0.56	0.97	ND	3.37	5.82	ND	
95-50-1	1,2-Dichlorobenzene	1.12	1.40	ND	6.73	8.41	ND	

	Surrogate Recovery	% Rec.	QC Limits LCL	UCL	Flag
2037-26-5	Toluene-d8	102	70	130	

ANALYTICAL REPORT

ASTM D 1945 GC/TCD

Analytical Method:	D1945	SDG:	220163
		Laboratory Number:	10

File Name:	2016310A	Date Sampled:	04/09/20	Time:	9:35
Description:	GW-52D	Date Analyzed:	04/14/20	Time:	13:23
Can/Tube#:	253	Can Dilution Factor:	1.12		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	ND	112	337	ND	ND
124-38-9	Carbon Dioxide	0.01	0.03	ND	112	337	ND	ND

ANALYTICAL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: **EPA 16**

Laboratory ID: **10**

File Name:	2016310A	**Date Sampled:**	04/09/20	**Time:**	9:35
Sample ID	GW-52D	**Date Analyzed:**	04/14/20	**Time:**	13:00
Can/Tube#:	253	**Can Dilution Factor:**	1.12		
QC_Batch:	041420-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	9.1	27.2	ND	12.7	38.0	ND	

ANALYTICAL REPORT

Environmental
Analytical Service, Inc.

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 11

File Name: 2016311A.D
Description: GW-42S
Canister: 521
QC_Batch: 041520-MA1

Date Sampled: 4/9/2020 **Time:** 09:42
Date Analyzed: 4/15/2020 **Time:** 21:06
Can Dilution Factor: 4.14
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	1.03	5.21	ND	2.13	10.76	ND	
75-01-4	Vinyl chloride	1.03	5.20	83.08	2.64	13.29	212.27	
75-00-3	Chloroethane	1.03	5.20	48.98	2.73	13.71	129.16	
75-69-4	Trichlorofluoromethane	1.03	5.21	15.29	5.81	29.27	85.89	
75-35-4	1,1-Dichloroethene	1.03	5.13	ND	4.10	20.32	ND	
76-13-1	Freon 113	1.03	4.95	ND	7.92	37.90	ND	
75-09-2	Dichloromethane	2.07	4.98	ND	7.18	17.28	ND	
156-60-5	trans-1,2-Dichloroethene	1.03	3.73	ND	4.10	14.79	ND	
75-34-3	1,1-Dichloroethane	1.03	5.16	30.47	4.18	20.87	123.31	
108-05-4	Vinyl acetate	1.03	4.54	ND	3.64	15.99	ND	
109-99-9	Tetrahydrofuran	2.07	5.20	104.16	6.10	15.33	307.00	
156-59-2	cis-1,2-Dichloroethene	2.07	5.56	ND	8.19	22.04	ND	
71-55-6	1,1,1-Trichloroethane	1.03	4.59	ND	5.64	25.04	ND	
107-06-2	1,2-Dichloroethane	1.03	4.72	ND	4.18	19.09	ND	
71-43-2	Benzene	2.07	4.14	172.34	6.60	13.20	550.22	
79-01-6	Trichloroethene	0.62	4.82	ND	3.33	25.87	ND	
108-10-1	4-Methyl-2-pentanone	4.14	15.65	ND	16.94	64.12	ND	
108-88-3	Toluene	2.07	5.40	205.26	7.79	20.32	772.78	
127-18-4	Tetrachloroethene	0.62	2.52	ND	4.20	17.06	ND	
108-90-7	Chlorobenzene	1.03	4.71	69.48	4.76	21.66	319.82	
1330-20-7	m,p-Xylenes	2.19	5.48	343.59	9.52	23.79	1,491.65	
100-42-5	Styrene	2.14	5.35	ND	9.12	22.80	ND	
95-47-6	o-Xylene	2.13	5.33	156.33	9.25	23.14	678.68	
79-34-5	1,1,2,2-Tetrachloroethane	1.02	2.56	ND	7.02	17.56	ND	
106-46-7	1,4-Dichlorobenzene	2.07	3.58	ND	12.43	21.50	ND	
95-50-1	1,2-Dichlorobenzene	4.14	5.17	ND	24.85	31.07	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	101	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS — **SDG:** 220163

Analytical Method: TO-15 — Laboratory ID: 11

File Name: 2016311A.D
Description: GW-42S
Canister: 521
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 09:42
Date Analyzed: 4/16/2020 **Time:** 17:30
Can Dilution Factor: 4.14
Air Volume: 25.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
100-41-4	Ethylbenzene	17.49	43.73	5,914.97	75.94	189.84	25,679.21	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	99	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method:	D1945	SDG:	220163
		Laboratory Number:	11

File Name:	2016311A	Date Sampled:	04/09/20	Time:	9:42
Description:	GW-42S	Date Analyzed:	04/14/20	Time:	15:08
Can/Tube#:	521	Can Dilution Factor:	4.14		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.04	0.12	12.70	414	1,242	127,015	
124-38-9	Carbon Dioxide	0.04	0.12	14.93	414	1,242	149,305	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: **EPA 16**

Laboratory ID: **11**

File Name:	2016311A	**Date Sampled:**	04/09/20	**Time:**	9:42
Sample ID	GW-42S	**Date Analyzed:**	04/14/20	**Time:**	15:09
Can/Tube#:	521	**Can Dilution Factor:**	4.14		
QC_Batch:	041420-GCP	**Air Volume:**	5.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	66.9	200.6	23,123.4	93.4	280.2	32,297.0	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 12

File Name: 2016312A.D
Description: GW-42D
Canister: 11736
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 09:44
Date Analyzed: 4/16/2020 **Time:** 14:56
Can Dilution Factor: 1.73
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	2.18	ND	1.34	4.50	ND	
75-01-4	Vinyl chloride	0.43	2.18	39.50	1.11	5.56	100.92	
75-00-3	Chloroethane	0.43	2.18	33.32	1.14	5.74	87.84	
75-69-4	Trichlorofluoromethane	0.43	2.18	13.88	2.43	12.24	77.95	
75-35-4	1,1-Dichloroethene	0.43	2.15	ND	1.71	8.50	ND	
76-13-1	Freon 113	0.43	2.07	ND	3.31	15.85	ND	
75-09-2	Dichloromethane	0.87	2.08	ND	3.00	7.23	ND	
156-60-5	trans-1,2-Dichloroethene	0.43	1.56	ND	1.71	6.19	ND	
75-34-3	1,1-Dichloroethane	0.43	2.16	9.18	1.75	8.73	37.13	
108-05-4	Vinyl acetate	0.43	1.90	ND	1.52	6.69	ND	
109-99-9	Tetrahydrofuran	0.87	2.18	111.99	2.55	6.41	330.09	
156-59-2	cis-1,2-Dichloroethene	0.87	2.33	3.13	3.43	9.22	12.41	
71-55-6	1,1,1-Trichloroethane	0.43	1.92	ND	2.36	10.47	ND	
107-06-2	1,2-Dichloroethane	0.43	1.97	ND	1.75	7.98	ND	
71-43-2	Benzene	0.87	1.73	167.62	2.76	5.52	535.16	
79-01-6	Trichloroethene	0.26	2.01	ND	1.39	10.82	ND	
108-10-1	4-Methyl-2-pentanone	1.73	6.55	ND	7.09	26.82	ND	
108-88-3	Toluene	0.87	2.26	70.54	3.26	8.50	265.59	
127-18-4	Tetrachloroethene	0.26	1.05	ND	1.76	7.13	ND	
108-90-7	Chlorobenzene	0.43	1.97	85.76	1.99	9.06	394.75	
1330-20-7	m,p-Xylenes	0.92	2.29	284.37	3.98	9.95	1,234.56	
100-42-5	Styrene	0.90	2.24	ND	3.82	9.54	ND	
95-47-6	o-Xylene	0.89	2.23	133.04	3.87	9.68	577.59	
79-34-5	1,1,2,2-Tetrachloroethane	0.43	1.07	ND	2.94	7.34	ND	
106-46-7	1,4-Dichlorobenzene	0.87	1.50	ND	5.20	8.99	ND	
95-50-1	1,2-Dichlorobenzene	1.73	2.16	ND	10.40	13.00	ND	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	93	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 12

File Name: 2016312B.D
Description: GW-42D
Canister: 11736
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 **Time:** 09:44
Date Analyzed: 4/16/2020 **Time:** 18:39
Can Dilution Factor: 1.73
Air Volume: 25.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
100-41-4	Ethylbenzene	7.32	18.29	2,286.49	31.76	79.41	9,926.53	

			QC Limits		
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	108	70	130	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

ASTM D 1945 GC/TCD

Analytical Method:	D1945	SDG:	220163
		Laboratory Number:	12

File Name:	2016312A	**Date Sampled:**	04/09/20	**Time:**	9:44
Description:	GW-42D	**Date Analyzed:**	04/14/20	**Time:**	15:33
Can/Tube#:	11736	**Can Dilution Factor:**	1.73		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.02	0.06	13.07	173	519	130,718	
124-38-9	Carbon Dioxide	0.02	0.06	15.50	173	519	155,021	

ANALYTICAL REPORT

ENVIRONMENTAL
Analytical Service, Inc.

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: EPA 16

Laboratory ID: **12**

File Name: 2016312A
Sample ID GW-42D
Can/Tube#: 11736
QC_Batch: 041420-GCP

Date Sampled: 04/09/20 **Time:** 9:44
Date Analyzed: 04/14/20 **Time:** 15:34
Can Dilution Factor: 1.73
Air Volume: 5.00 ml

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	28.0	83.9	12,938.8	39.1	117.2	18,071.9	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 13

File Name:	2016313A.D	**Date Sampled:** 4/9/2020	**Time:** 10:48
Description:	B-5	**Date Analyzed:** 4/15/2020	**Time:** 15:06
Canister:	322	**Can Dilution Factor:** 1.55	
QC_Batch:	041520-MA1	**Air Volume:** 200.00 ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.95	ND	1.34	4.03	ND	
75-01-4	Vinyl chloride	0.39	1.95	ND	0.99	4.98	ND	
75-00-3	Chloroethane	0.39	1.95	ND	1.02	5.14	ND	
75-69-4	Trichlorofluoromethane	0.39	1.95	ND	2.18	10.97	ND	
75-35-4	1,1-Dichloroethene	0.39	1.92	ND	1.53	7.61	ND	
76-13-1	Freon 113	0.39	1.85	ND	2.97	14.20	ND	
75-09-2	Dichloromethane	0.78	1.87	ND	2.69	6.48	ND	
156-60-5	trans-1,2-Dichloroethene	0.39	1.40	ND	1.53	5.54	ND	
75-34-3	1,1-Dichloroethane	0.39	1.93	ND	1.57	7.82	ND	
108-05-4	Vinyl acetate	0.39	1.70	ND	1.36	5.99	ND	
109-99-9	Tetrahydrofuran	0.78	1.95	ND	2.28	5.75	ND	
156-59-2	cis-1,2-Dichloroethene	0.78	2.08	ND	3.07	8.26	ND	
71-55-6	1,1,1-Trichloroethane	0.39	1.72	ND	2.11	9.38	ND	
107-06-2	1,2-Dichloroethane	0.39	1.77	ND	1.57	7.15	ND	
71-43-2	Benzene	0.78	1.55	ND	2.47	4.95	ND	
79-01-6	Trichloroethene	0.23	1.80	ND	1.25	9.70	ND	
108-10-1	4-Methyl-2-pentanone	1.55	5.87	ND	6.35	24.03	ND	
108-88-3	Toluene	0.78	2.02	2.73	2.92	7.62	10.28	
127-18-4	Tetrachloroethene	0.23	0.94	ND	1.58	6.39	ND	
108-90-7	Chlorobenzene	0.39	1.76	ND	1.78	8.12	ND	
100-41-4	Ethylbenzene	0.82	2.05	2.98	3.56	8.89	12.94	
1330-20-7	m,p-Xylenes	0.82	2.05	6.15	3.57	8.92	26.71	
100-42-5	Styrene	0.80	2.01	ND	3.42	8.55	ND	
95-47-6	o-Xylene	0.80	2.00	2.63	3.47	8.67	11.44	
79-34-5	1,1,2,2-Tetrachloroethane	0.38	0.96	ND	2.63	6.58	ND	
106-46-7	1,4-Dichlorobenzene	0.78	1.34	ND	4.66	8.06	ND	
95-50-1	1,2-Dichlorobenzene	1.55	1.94	ND	9.31	11.64	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	100	70	130	

ANALYTICAL REPORT

ASTM D 1945 GC/TCD

Analytical Method:	**D1945**	**SDG:**	**220163**
		Laboratory Number:	**13**

File Name:	2016313A	**Date Sampled:**	04/09/20	**Time:**	10:48
Description:	B-5	**Date Analyzed:**	04/14/20	**Time:**	10:08
Can/Tube#:	322	**Can Dilution Factor:**	1.55		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.02	0.06	ND	155	465	ND	ND
124-38-9	Carbon Dioxide	0.02	0.06	0.07	155	465	708	

ANALYTICAL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

SDG: **220163**

Analytical Method: EPA 16

Laboratory ID: **13**

File Name:	2016313A	**Date Sampled:**	04/09/20	**Time:**	10:48
Sample ID	B-5	**Date Analyzed:**	04/13/20	**Time:**	20:37
Can/Tube#:	322	**Can Dilution Factor:**	1.55		
QC_Batch:	041320-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	12.5	37.6	ND	17.5	52.5	ND	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 14

File Name: 2016314A.D
Description: MAN 2
Canister: 252
QC_Batch: 041620-MA1

Date Sampled: 4/9/2020 Time: 10:55
Date Analyzed: 4/16/2020 Time: 14:17
Can Dilution Factor: 1.32
Air Volume: 200.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
74-87-3	Chloromethane	0.65	1.66	ND	1.34	3.43	ND	
75-01-4	Vinyl chloride	0.33	1.66	87.82	0.84	4.24	224.38	
75-00-3	Chloroethane	0.33	1.66	28.12	0.87	4.38	74.16	
75-69-4	Trichlorofluoromethane	0.35	1.66	4.77	1.97	9.34	26.81	
75-35-4	1,1-Dichloroethene	0.33	1.64	ND	1.31	6.48	ND	
76-13-1	Freon 113	0.33	1.58	ND	2.53	12.10	ND	
75-09-2	Dichloromethane	0.66	1.59	ND	2.29	5.52	ND	
156-60-5	trans-1,2-Dichloroethene	0.33	1.19	ND	1.31	4.72	ND	
75-34-3	1,1-Dichloroethane	0.33	1.65	7.11	1.34	6.66	28.79	
108-05-4	Vinyl acetate	0.33	1.45	ND	1.16	5.10	ND	
109-99-9	Tetrahydrofuran	0.66	1.66	101.62	1.95	4.89	299.52	
156-59-2	cis-1,2-Dichloroethene	0.66	1.78	14.12	2.61	7.03	55.94	
71-55-6	1,1,1-Trichloroethane	0.33	1.47	ND	1.80	7.99	ND	
107-06-2	1,2-Dichloroethane	0.33	1.51	ND	1.34	6.09	ND	
71-43-2	Benzene	0.66	1.32	154.01	2.11	4.21	491.72	
79-01-6	Trichloroethene	0.20	1.54	ND	1.06	8.26	ND	
108-10-1	4-Methyl-2-pentanone	1.32	5.00	ND	5.41	20.47	ND	
127-18-4	Tetrachloroethene	0.20	0.80	2.18	1.34	5.44	14.80	
108-90-7	Chlorobenzene	0.33	1.50	115.34	1.52	6.91	530.92	
100-42-5	Styrene	0.68	1.71	ND	2.91	7.28	ND	
79-34-5	1,1,2,2-Tetrachloroethane	0.33	0.82	ND	2.24	5.60	ND	
106-46-7	1,4-Dichlorobenzene	0.66	1.14	ND	3.97	6.86	ND	
95-50-1	1,2-Dichlorobenzene	1.32	1.65	ND	7.93	9.92	ND	

	Surrogate Recovery	% Rec.	QC LCL	Limits UCL	Flag
2037-26-5	Toluene-d8	93	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 14

File Name:	2016314B.D	**Date Sampled:**	4/9/2020	**Time:**	10:55
Description:	MAN 2	**Date Analyzed:**	4/16/2020	**Time:**	19:14
Canister:	252	**Can Dilution Factor:**	1.32		
QC_Batch:	041620-MA1	**Air Volume:**	25.00	ml	

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
108-88-3	Toluene	5.28	13.78	827.88	19.88	51.88	3,116.97	
1330-20-7	m,p-Xylenes	5.60	13.99	1,845.77	24.30	60.74	8,013.21	
95-47-6	o-Xylene	5.44	13.61	408.67	23.63	59.07	1,774.18	

			QC	Limits	
	Surrogate Recovery	% Rec.	LCL	UCL	Flag
2037-26-5	Toluene-d8	102	70	130	

ANALYTICAL REPORT

EPA Method TO-15 Modified Full Scan GC/MS

SDG: 220163

Analytical Method: TO-15

Laboratory ID: 14

File Name: 2016314A.D
Description: MAN 2
Canister: 252
QC_Batch: 041720-ma1

Date Sampled: 4/9/2020 **Time:** 10:55
Date Analyzed: 4/17/2020 **Time:** 18:52
Can Dilution Factor: 2.21
Air Volume: 5.00 ml

CAS#	Compound	MDL PPBV	RL PPBV	Amount PPBV	MDL UG/M3	RL UG/M3	Amount UG/M3	Flag
100-41-4	Ethylbenzene	46.73	116.83	3,077.72	202.88	507.19	13,361.59	

	Surrogate Recovery	% Rec.	QC Limits LCL	QC Limits UCL	Flag
2037-26-5	Toluene-d8	108	70	130	

ANALYTICAL REPORT

ASTM D 1945 GC/TCD

Analytical Method:	D1945	**SDG:**	220163
		Laboratory Number:	14

File Name:	2016313A	**Date Sampled:**	04/09/20	**Time:**	10:55
Description:	MAN 2	**Date Analyzed:**	04/14/20	**Time:**	13:30
Can/Tube#:	252	**Can Dilution Factor:**	1.32		
QC_Batch:	041420-GCO				

CAS#	Compound	MDL %	RL %	Result %	MDL ppmv	RL ppmv	Result ppmV	Flag
74-82-8	Methane	0.01	0.03	13.48	132	396	134,843	
124-38-9	Carbon Dioxide	0.01	0.03	14.99	132	396	149,921	

ANALYTICAL REPORT

EPA Method 16 Modified Hydrogen Sulfide GC/FPD

Analytical Method:	EPA 16	SDG:	**220163**
		Laboratory ID:	**14**

File Name:	2016314A	**Date Sampled:**	04/09/20	**Time:**	10:55
Sample ID	MAN 2	**Date Analyzed:**	04/14/20	**Time:**	13:26
Can/Tube#:	252	**Can Dilution Factor:**	1.32		
QC_Batch:	041420-GCP	**Air Volume:**	10.00 ml		

CAS#	Compound	MDL ppbv	RL ppbv	Amount ppbv	MDL ug/m3	RL ug/m3	Amount ug/m3	Flag
7783-06-4	Hydrogen Sulfide	10.7	32.0	88.4	14.9	44.7	123.5	

Appendix D: Hydrogen Sulfide Toxicological Profile

Toxicological Profile for Hydrogen Sulfide

Hydrogen sulfide is a flammable, colorless gas with a characteristic odor of rotten eggs. In a landfill, anaerobic bacteria produce hydrogen sulfide, along with methane and carbon dioxide, as a byproduct of digestion of waste. Ambient air concentrations of hydrogen sulfide from natural sources range between 0.00011 parts per million (ppm) (0.15332 micrograms per cubic meter [$\mu g/m^3$]) and 0.00033 ppm (0.45997 $\mu g/m^3$). Concentrations of hydrogen sulfide in urban areas are generally less than 0.001 ppm. The general population is primarily exposed to hydrogen sulfide via the inhalation route. Information on the toxicity of hydrogen sulfide in humans comes from case reports, occupational studies, and community studies. The human data suggest that the respiratory tract and nervous system are the most sensitive targets of hydrogen sulfide toxicity. The most commonly reported non-lethal effect found in individuals acutely exposed to high concentrations of hydrogen sulfide is unconsciousness followed by apparent recovery. Although there is an apparent recovery, many individuals report permanent or persistent neurological effects including headaches, poor concentration ability and attention span, impaired short-term memory, and impaired motor functions. Respiratory distress or arrest and pulmonary edema are also associated with exposure to very high concentrations of hydrogen sulfide (about 500 ppm for less than 1 hour). It is believed that these respiratory effects are secondary to central nervous system depression or due to tissue hypoxia. Cardiovascular effects (e.g., irregular heartbeats or abnormally rapid heart rates) have also been observed following an acute exposure to high concentrations of hydrogen sulfide (ATSDR 2016).

Exposure to lower concentrations of hydrogen sulfide can results in less severe neurological and respiratory effects. Reported neurological effects include loss of coordination, poor memory, hallucinations, personality changes and the loss of sense of smell. The respiratory effects include nasal symptoms, sore throat, cough, and difficult or labored breathing (ATSDR 2016).

The reference concentration (RfC) for hydrogen sulfide is $2\text{x}10^{-3}$ milligrams per cubic meter (mg/m^3). The information has been reviewed but a reference dose (RfD) value has not been estimated. Data are inadequate of an assessment of human carcinogenic potential (IRIS 2003).

In the atmosphere, hydrogen sulfide may be oxidized by oxygen and ozone to produce sulfur dioxide, and ultimately sulfate compounds. Sulfur dioxide and sulfates are eventually removed from the atmosphere through absorption by plants, deposition on and sorption by soils, or through precipitation. A residence time of approximately 1.7 days at an ozone concentration of 0.05 mg/m^3 has been calculated for hydrogen sulfide. The lifetime of hydrogen sulfide in air is estimated to range from approximately 1 day in summer to 42 days in the winter (ATSDR 2016).

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix G1: Transportation Technical Report

SOUND TRANSIT
140A
Link
154B
SOUND

Federal Transit Administration

SOUNDTRANSIT

June 2024

Summary

The following technical report discusses the anticipated construction and operation transportation impacts of the proposed Operations and Maintenance Facility (OMF) South. It meets the requirements of the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA) to support the OMF South Final Environmental Impact Statement (Final EIS).

This report includes an analysis evaluating the transportation impacts associated with construction and operation of the facility. Impacts are evaluated for multiple modes, including automobile, transit, bicycle, pedestrian, and freight. Operational impacts were forecast based on estimated employee volumes accessing the site during peak travel periods. Each alternative assumes an equal number of employees; however, the built transportation infrastructure, planned jurisdictional improvements, growth projections, acquisitions, preliminary site layouts, and changes to the transportation network resulting from development of OMF South result in different impacts for each site. Construction impacts were qualitatively evaluated based on the number of estimated truck trips as a percentage of daily traffic volumes along anticipated haul routes.

Operational traffic impacts were determined for arterials and local streets by comparing the overall intersection level of service (LOS) for the project alternatives. Impacts would occur if a Build Alternative results in traffic operations performing below the acceptable LOS or volume/capacity (v/c) ratio when the intersection or roadway segment would operate at or above the acceptable LOS or v/c ratio for the roadway under the No-Build Alternative. Impacts may also occur if the build alternative traffic operations reduce the LOS from E to F or if the delay in an LOS F condition is worsened by more than 10 seconds. This approach outlines the process for consideration of mitigation to address possible impacts.

Operational impacts for state highways of statewide significance, such as State Route (SR) 99, would occur if the roadway segment in the build alternatives would increase traffic operations to a LOS E or worse condition when the roadway segment would operate at LOS D or better under the No-Build Alternative. Impacts may also occur if the build alternative traffic operations reduce the LOS from E to F or if the delay in an LOS F condition is worsened by more than 10 seconds. This approach outlines the process for consideration of mitigation to address possible impacts.

For all alternatives, the operational impacts to arterials, local streets, and state highway operations are forecast to be minimal. During the AM peak period, 69 vehicles are forecast to travel to the facility and 11 are forecast to leave it. Similar activity is forecast for the PM peak period, with 57 vehicles leaving the site and zero vehicles arriving. Almost all ingress and egress activity was assumed to occur at a single point for each alternative. The only location forecast to result in impacts is the entrance to the Midway Landfill Alternative at SR 99 and S 246th Street during the AM peak period. These impacts could be mitigated through modifications to the intersection or by allowing employees to access the site through all three access points rather than only two.

During construction, the greatest transportation impacts would be from truck trips to export and import fill material for the Midway Landfill Alternative Hybrid and Full Excavation subsurface construction design options (the Platform subsurface construction design option would keep existing fill in place). The Hybrid subsurface construction design option is estimated to have slightly higher peak daily truck trips than the Full Excavation subsurface construction design option, up to 564 round trip truck trips daily, with site preparation activities lasting up to 5 years and 7 months. These truck trips would range from 7.7 percent to 12.8 percent of existing single-direction traffic along arterials of the anticipated haul route, but up to 22.7 percent of single-direction traffic on I-5 on- and off-ramps. While I-5 and the arterials surrounding the Midway Landfill Alternative should accommodate the additional truck traffic, the number of daily truck trips could exacerbate existing congestion in some locations.

Table of Contents

1 INTRODUCTION G1-1
- 1.1 Project Description G1-1
- 1.2 Organization of this Technical Report G1-7

2 APPROACH AND METHODS G1-8
- 2.1 Relevant Plans, Policies, and Coordination G1-8
  - 2.1.1 Guiding Regulations, Plans, and/or Policies G1-8
  - 2.1.2 Agency Coordination G1-9

3 AFFECTED ENVIRONMENT G1-10
- 3.1 Study Areas G1-10
- 3.2 Arterial and Local Street Operations G1-13
  - 3.2.1 Roadway Network G1-13
  - 3.2.2 Study Intersections G1-16
  - 3.2.3 Traffic Volumes G1-20
- 3.3 Freight G1-33
- 3.4 Transit G1-36
- 3.5 Nonmotorized Facilities G1-39
  - 3.5.1 Pedestrian Facilities G1-39
  - 3.5.2 Bicycle Facilities G1-39
  - 3.5.3 Pedestrian and Bicycle Volumes G1-42
- 3.6 Parking G1-44
- 3.7 Safety G1-44
  - 3.7.1 Collisions by Severity G1-45
  - 3.7.2 Collisions by Type G1-49

4 TRANSPORTATION IMPACTS G1-54
- 4.1 No-Build Alternative G1-54
  - 4.1.1 Arterial and Local Street Operations G1-54
  - 4.1.2 Freight G1-66
  - 4.1.3 Transit G1-66
  - 4.1.4 Nonmotorized Facilities G1-66
  - 4.1.5 Parking G1-67
  - 4.1.6 Safety G1-67
- 4.2 Long-Term Impacts G1-68
  - 4.2.1 Long-Term Impacts Common to all Build Alternatives G1-68
  - 4.2.2 Preferred Alternative G1-72
  - 4.2.3 South 344th Street Alternative G1-82
  - 4.2.4 Midway Landfill Alternative G1-92
- 4.3 Construction Impacts G1-101

4.3.1 Preferred Alternative G1-101
4.3.2 South 344th Street Alternative G1-109
4.3.3 Midway Landfill Alternative G1-116
4.4 Avoidance and Minimization of Impacts G1-124
4.5 Indirect Impacts G1-125
4.6 Cumulative Impacts G1-125
4.7 Long-Term Mitigation Measures G1-126
5 REFERENCES G1-127

Figures

Figure G1.1-1 Project Vicinity: OMF South Alternatives G1-2
Figure G1.1-2 Conceptual Layout: Preferred Alternative G1-3
Figure G1.1-3 Conceptual Layout: South 344th Street Alternative G1-4
Figure G1.1-4 Conceptual Layout: Midway Landfill Alternative G1-5
Figure G1.1-5 Mainline Track Options G1-6
Figure G1.3-1 Transportation Study Area: Preferred and South 344th Street Alternatives G1-11
Figure G1.3-2 Transportation Study Area: Midway Landfill Alternative G1-12
Figure G1.3-3 Street Network Classifications: Preferred and South 344th Street Alternatives G1-14
Figure G1.3-4 Street Network Classifications: Midway Landfill Alternative G1-15
Figure G1.3-5 Study Area Analysis Intersections: Preferred and South 344th Street Alternatives G1-18
Figure G1.3-6 Study Area Analysis Intersections: Midway Landfill Alternative G1-19
Figure G1.3-7 Existing AM and PM Traffic Volumes: Preferred and South 344th Street Alternatives G1-21
Figure G1.3-8 Existing AM and PM Traffic Volumes: Midway Landfill Alternative G1-22
Figure G1.3-9 Existing AM Peak Hour Traffic Operations: Preferred and South 344th Street Alternatives G1-25
Figure G1.3-10 Existing AM Peak Hour Traffic Operations: Midway Landfill Alternative ... G1-26
Figure G1.3-11 Existing PM Peak Hour Traffic Operations: Preferred and South 344th Street Alternatives G1-27
Figure G1.3-12 Existing PM Peak Hour Traffic Operations: Midway Landfill Alternative ... G1-28
Figure G1.3-13 Existing Freight Access Routes: Preferred and South 344th Street Alternatives G1-34
Figure G1.3-14 Existing Freight Access Routes: Midway Landfill Alternative G1-35
Figure G1.3-15 Existing Transit Routes: Preferred and South 344th Street Alternatives .. G1-37
Figure G1.3-16 Existing Transit Routes: Midway Landfill Alternative G1-38
Figure G1.3-17 Existing Bicycle and Pedestrian Facilities: Preferred and South 344th Street Alternatives G1-40

Figure G1.3-18 Existing Bicycle and Pedestrian Facilities: Midway Landfill Alternative G1-41

Figure G1.3-19 2016–2018 Collision Locations by Severity: Preferred and South 344th Street Alternatives G1-47

Figure G1.3-20 2016 – 2018 Collision Locations by Severity: Midway Landfill Alternative G1-48

Figure G1.3-21 2016–2018 Collision Locations by Type: Preferred and South 344th Street Alternatives G1-52

Figure G1.3-22 2016–2018 Collision Locations by Type: Midway Landfill Alternative G1-53

Figure G1.4-1 2042 No-Build Alternative AM and PM Traffic Volumes: Preferred and South 344th Street Alternatives G1-56

Figure G1.4-2 2042 No-Build Alternative AM and PM Traffic Volumes: Midway Landfill Alternative G1-57

Figure G1.4-3 2042 No-Build Alternative AM Peak Hour Traffic Operations: Preferred and South 344th Street Alternatives G1-62

Figure G1.4-4 2042 No-Build Alternative AM Peak Hour Traffic Operations: Midway Landfill Alternative G1-63

Figure G1.4-5 2042 No-Build Alternative PM Peak Hour Traffic Operations: Preferred and South 344th Street Alternatives G1-64

Figure G1.4-6 2042 No-Build Alternative PM Peak Hour Traffic Operations: Midway Landfill Alternative G1-65

Figure G1.4-7 2042 Build Alternative AM and PM Removed Trips: Preferred Alternative G1-73

Figure G1.4-8 2042 Build Alternative AM and PM Rerouted Trips: Preferred Alternative G1-74

Figure G1.4-9 2042 Build Alternative AM and PM Vehicle Trips: Preferred Alternative.... G1-75

Figure G1.4-10 2042 Build Alternative AM and PM Traffic Volumes: Preferred Alternative G1-76

Figure G1.4-11 2042 Build Alternative AM Peak Hour Traffic Operations: Preferred Alternative G1-78

Figure G1.4-12 2042 Build Alternative PM Peak Hour Traffic Operations: Preferred Alternative G1-80

Figure G1.4-13 2042 Build Alternative AM and PM Removed Trips: South 344th Street Alternative G1-83

Figure G1.4-14 2042 Build Alternative AM and PM Rerouted Trips: South 344th Street Alternative G1-84

Figure G1.4-15 2042 Build Alternative AM and PM Vehicle Trips: South 344th Street Alternative G1-85

Figure G1.4-16 2042 Build Alternative AM and PM Traffic Volumes: South 344th Street Alternative G1-86

Figure G1.4-17 2042 Build Alternative AM Peak Hour Traffic Operations: South 344th Street Alternative G1-88

Figure G1.4-18 2042 Build Alternative PM Peak Hour Traffic Operations: South 344th Street Alternative G1-90

Figure G1.4-19 2042 Build Alternative AM and PM Vehicle Trips: Midway Landfill Alternative G1-93

Figure G1.4-20 2042 Build Alternative AM and PM Traffic Volumes: Midway Landfill Alternative G1-94
Figure G1.4-21 2042 Build Alternative AM Peak Hour Traffic Operations: Midway Landfill Alternative G1-97
Figure G1.4-22 2042 Build Alternative PM Peak Hour Traffic Operations: Midway Landfill Alternative G1-99
Figure G1.4-23 Construction Impact Area: Preferred Alternative G1-102
Figure G1.4-24 Construction Access and Truck Routes: Preferred Alternative G1-104
Figure G1.4-25 Existing Annual Average Daily Traffic Along Truck Haul Routes: Preferred Alternative G1-107
Figure G1.4-26 Construction Impact Area: South 344th Street Alternative G1-110
Figure G1.4-27 Construction Access and Truck Routes: South 344th Street Alternative G1-112
Figure G1.4-28 Existing Annual Average Daily Traffic along Truck Haul Routes: South 344th Street Alternative G1-114
Figure G1.4-29 Construction Impact Area: Midway Landfill Alternative G1-117
Figure G1.4-30 Construction Access and Truck Routes: Midway Landfill Alternative G1-120
Figure G1.4-31 Existing Annual Average Daily Traffic along Truck Haul Routes: Midway Landfill Alternative G1-123

Tables

Table G1.3-1 Preferred and South 344th Street Alternatives Study Area Street Network Classifications G1-13
Table G1.3-2 Midway Landfill Alternative Study Area Street Network Classifications G1-13
Table G1.3-3 Preferred and South 344th Street Alternatives Study Area Intersections G1-16
Table G1.3-4 Midway Landfill Alternative Study Area Intersections G1-17
Table G1.3-5 Preferred and South 344th Street Alternatives Study Area Average Daily Traffic Volumes G1-20
Table G1.3-6 Midway Landfill Alternative Study Area Average Daily Traffic Volumes G1-20
Table G1.3-7 Average Control Delay Used in Level of Service G1-23
Table G1.3-8 Planning and Operational Level of Service G1-23
Table G1.3-9 Existing AM Peak Hour Traffic Operations for Preferred and South 344th Street Alternatives Study Area Intersections G1-29
Table G1.3-10 Existing AM Peak Hour Traffic Operations for Midway Landfill Alternative Study Area Intersections G1-30
Table G1.3-11 Existing PM Peak Hour Traffic Operations for Preferred and South 344th Street Alternatives Study Area Intersections G1-31
Table G1.3-12 Existing PM Peak Hour Traffic Operations for Midway Landfill Alternative Study Area Intersections G1-32
Table G1.3-13 Freight Goods Transportation System Classification System G1-33
Table G1.3-14 Study Areas Existing Transit Service G1-36

Table G1.3-15 Existing AM Peak Hour Pedestrian and Bicycle Volumes for Preferred and South 344th Street Alternatives Study Area Intersections G1-42
Table G1.3-16 Existing PM Peak Hour Pedestrian and Bicycle Volumes for Preferred and South 344th Street Alternatives Study Area Intersections G1-43
Table G1.3-17 Existing AM Peak Hour Pedestrian and Bicycle Volumes for Midway Landfill Alternative Study Area Intersections G1-43
Table G1.3-18 Existing PM Peak Hour Pedestrian and Bicycle Volumes for Midway Landfill Alternative Study Area Intersections G1-44
Table G1.3-19 Existing Collisions by Severity for Preferred and South 344th Street Alternatives Study Area Intersections and Roadway Segments G1-45
Table G1.3-20 Existing Collisions by Severity for Midway Landfill Alternative Study Area Intersections and Roadway Segments G1-46
Table G1.3-21 Existing Collisions by Type (January 2016 to December 2018) for Preferred and South 344th Street Alternatives Study Area Intersections...G1-49
Table G1.3-22 Existing Collisions by Type (January 2016 to December 2018) for Midway Landfill Alternative Study Area Intersections G1-50
Table G1.4-1 Preferred and South 344th Street Alternatives Study Area No-Build Alternative 2042 AM Peak Hour Traffic Operations G1-58
Table G1.4-2 Midway Landfill Alternative Study Area No-Build Alternative 2042 AM Peak Hour Traffic Operations G1-59
Table G1.4-3 Preferred and South 344th Street Alternatives Study Area No-Build Alternative 2042 PM Peak Hour Traffic Operations G1-60
Table G1.4-4 Midway Landfill Alternative Study Area No-Build Alternative 2042 PM Peak Hour Traffic Operations G1-61
Table G1.4-5 Recommended Bicycle and Pedestrian LOS Standards for Nonmotorized Facilities in the Midway Landfill Alternative Study Area.....G1-67
Table G1.4-6 OMF South, MOW, and Link System-Wide Storage Facility Staffing Calculations G1-68
Table G1.4-7 System Peak Hours for the Cities of Federal Way and Kent G1-69
Table G1.4-8 Forecast Auto Volumes for the Build Alternatives 2042 AM and PM Peak Hours G1-69
Table G1.4-9 Forecast Gate Capacity G1-70
Table G1.4-10 Estimated On-Site Parking Needed for Build Alternatives G1-71
Table G1.4-11 Preferred Alternative 2042 AM Peak Hour Traffic Operations G1-77
Table G1.4-12 Preferred Alternative 2042 PM Peak Hour Traffic Operations G1-79
Table G1.4-13 South 344th Street Alternative 2042 AM Peak Hour Traffic Operations ...G1-87
Table G1.4-14 South 344th Street Alternative 2042 PM Peak Hour Traffic Operations ...G1-89
Table G1.4-15 Midway Landfill Alternative 2042 AM Peak Hour Traffic Operations.........G1-96
Table G1.4-16 Midway Landfill Alternative 2042 PM Peak Hour Traffic Operations.........G1-98
Table G1.4-17 Truck Activity Associated with Site Preparation for the Preferred Alternative G1-103
Table G1.4-18 Hourly Truck Activity Associated with Preferred Alternative Development Approaches...G1-105

Table G1.4-19 Estimated Hourly Truck Activity at the Preferred Alternative Compared with Existing AADT G1-105
Table G1.4-20 Truck Activity Associated with Site Preparation for South 344th Street Alternative Development Approaches G1-111
Table G1.4-21 Hourly Truck Activity Associated with South 344th Street Alternative Development Approaches G1-111
Table G1.4-22 Estimated Hourly Truck Activity at the South 344th Street Alternative Compared with Existing AADT G1-113
Table G1.4-23 Truck Activity Associated with Site Preparation for Midway Landfill Alternative Subsurface Construction Design Options G1-119
Table G1.4-24 Hourly Truck Activity Associated with Midway Landfill Alternative Subsurface Construction Design Options G1-121
Table G1.4-25 Estimated Daily Truck Activity for the Midway Landfill Alternative Compared with Existing AADT G1-122

Attachments

Attachment G1-1 Transportation Technical Analysis Methodology Memorandum

Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
AASHTO	American Association of State and Highway Transportation Officials
ADA	Americans with Disabilities Act
BAT	business access transit
BPA	Bonneville Power Administration
CIP	capital improvement program
CTMP	construction transportation management plan
EIS	environmental impact statement
FWLE	Federal Way Link Extension
GMA	Growth Management Act
HCM	Highway Capacity Manual
HOV	high-occupancy vehicle
I-5	Interstate 5
LOS	level of service
LRV	light rail vehicle
Metro	King County Metro
MOW	Maintenance of Way
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
PCE	passenger car equivalent
PSRC	Puget Sound Regional Council
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SR	State Route
Sound Transit 3	Sound Transit 3: The Regional Transit System Plan for Central Puget Sound
TWSC	two-way stop controlled
v/c	volume-to-capacity
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility (OMF) in its South Corridor (OMF South) to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy approximately 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire Link light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way (MOW) building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

Three site alternatives for the OMF South project are evaluated in the Draft Environmental Impact Statement (EIS): two in Federal Way and one in Kent (Figure G1.1-1). These alternatives are named the Preferred Alternative (referred to as the South 336th Street Alternative in the 2021 Draft EIS), the South 344th Street Alternative, and the Midway Landfill Alternative, respectively. Figures G1.1-2 through G1.1-4 show the conceptual site layout for each alternative.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which in southern King County is the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by alternative. The Preferred Alternative would require the construction of approximately 1.4 miles of mainline tracks and the South 344th Street Alternative would require approximately 1.8 miles of mainline tracks. The Midway Landfill Alternative is adjacent to FWLE and would connect by lead tracks directly to the FWLE mainline tracks. The Preferred and South 344th Street alternative mainlines include tail tracks that extend approximately 1,000 feet past the site to allow trains to turn around and access the site from the south if the northern lead tracks were out of service.

The Preferred and South 344th Street alternative would also include a test track to prepare new vehicles for service. The test track would run east of and parallel to the mainline connecting the sites to FWLE. Figure G1.1-5 shows the mainline track options. The Midway Landfill Alternative would not include a test track because the varying grades of the existing mainline tracks make it infeasible. Due to this, this analysis assumes that LRV testing would occur on the mainline tracks.

In addition to the features identified above, the Preferred Alternative includes the extension of 18th Place S between S 340th Street and S 336th Street to replace the functions of 20th Avenue S, which would be vacated, and the extension of 21st Ave S south to S 344th Street to meet Federal Way code requirements.

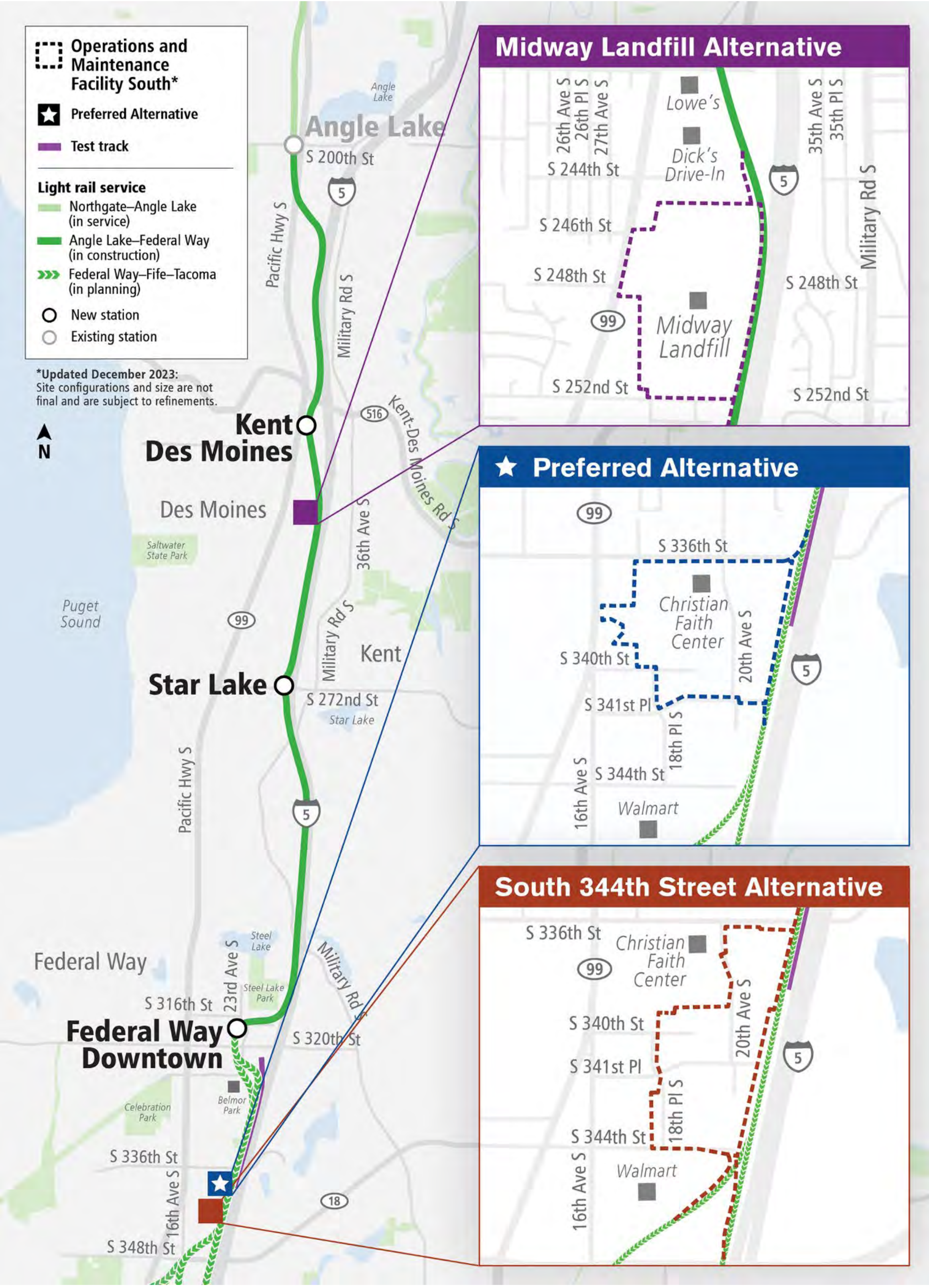
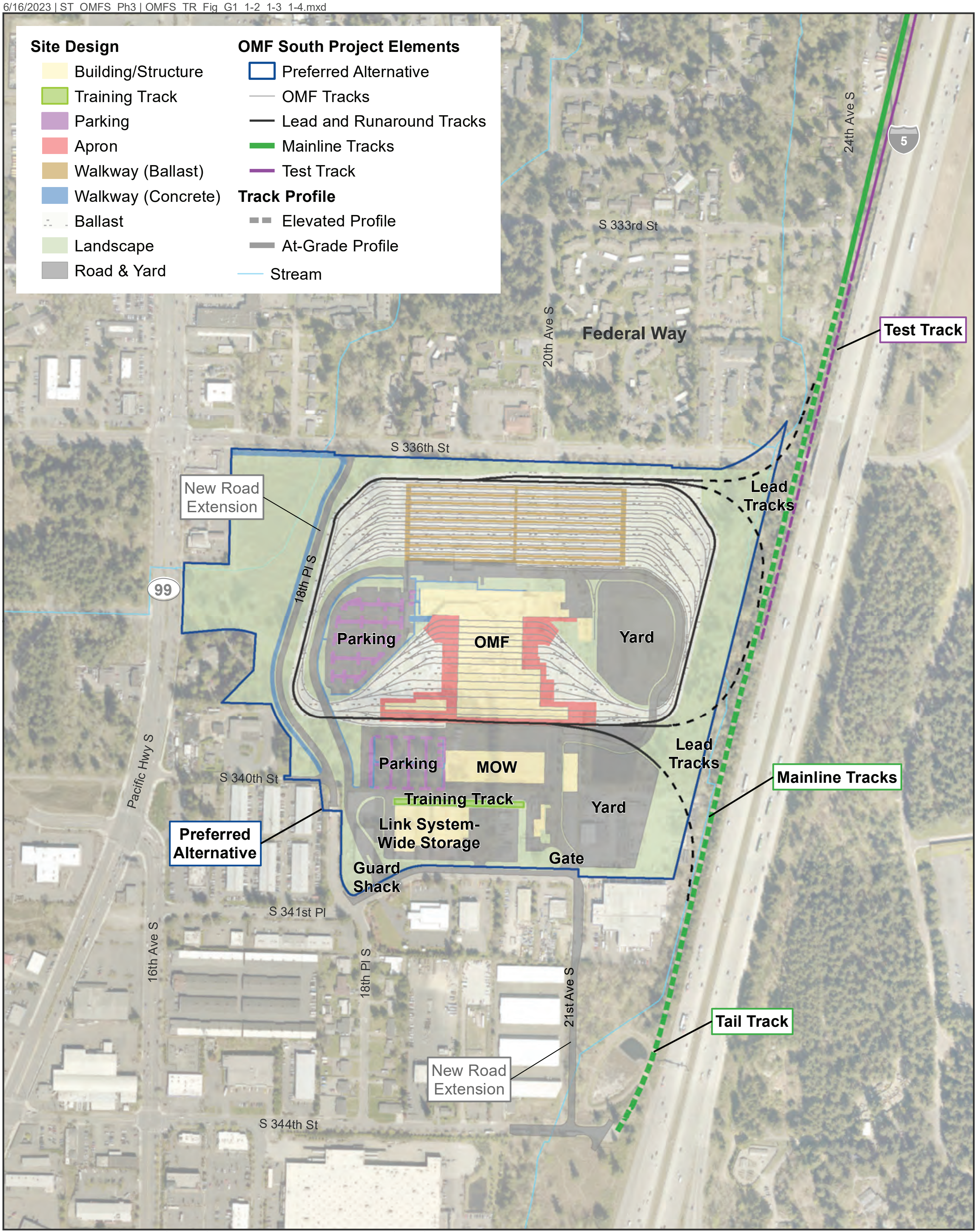

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
S 200th St
Pacific Hwy S
Military Rd S
Kent Des Moines
Des Moines
Saltwater State Park
Puget Sound
Kent-Des Moines Rd S
36th Ave S
Kent
Star Lake
S 272nd St
Federal Way
Steel Lake
Steel Lake Park
S 316th St
23rd Ave S
Federal Way Downtown
S 320th St
Belmor Park
Celebration Park
S 336th St
16th Ave S
S 348th St
Midway Landfill Alternative
26th Ave S
26th Pl S
27th Ave S
Lowe's
Dick's Drive-In
35th Ave S
35th Pl S
S 244th St
S 246th St
S 248th St
Midway Landfill
S 252nd St
Preferred Alternative
S 336th St
Christian Faith Center
20th Ave S
S 340th St
S 341st Pl
18th Pl S
S 344th St
Walmart
South 344th Street Alternative

Figure G1.1-1 Project Vicinity: OMF South Alternatives


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
24th Ave S
5
S 333rd St
20th Ave S
Federal Way
Test Track
S 336th St
New Road Extension
Lead Tracks
99
18th Pl S
Parking
OMF
Yard
Pacific Hwy S
S 340th St
Parking
MOW
Lead Tracks
Mainline Tracks
Training Track
Yard
Preferred Alternative
Link System-Wide Storage
Gate
Guard Shack
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

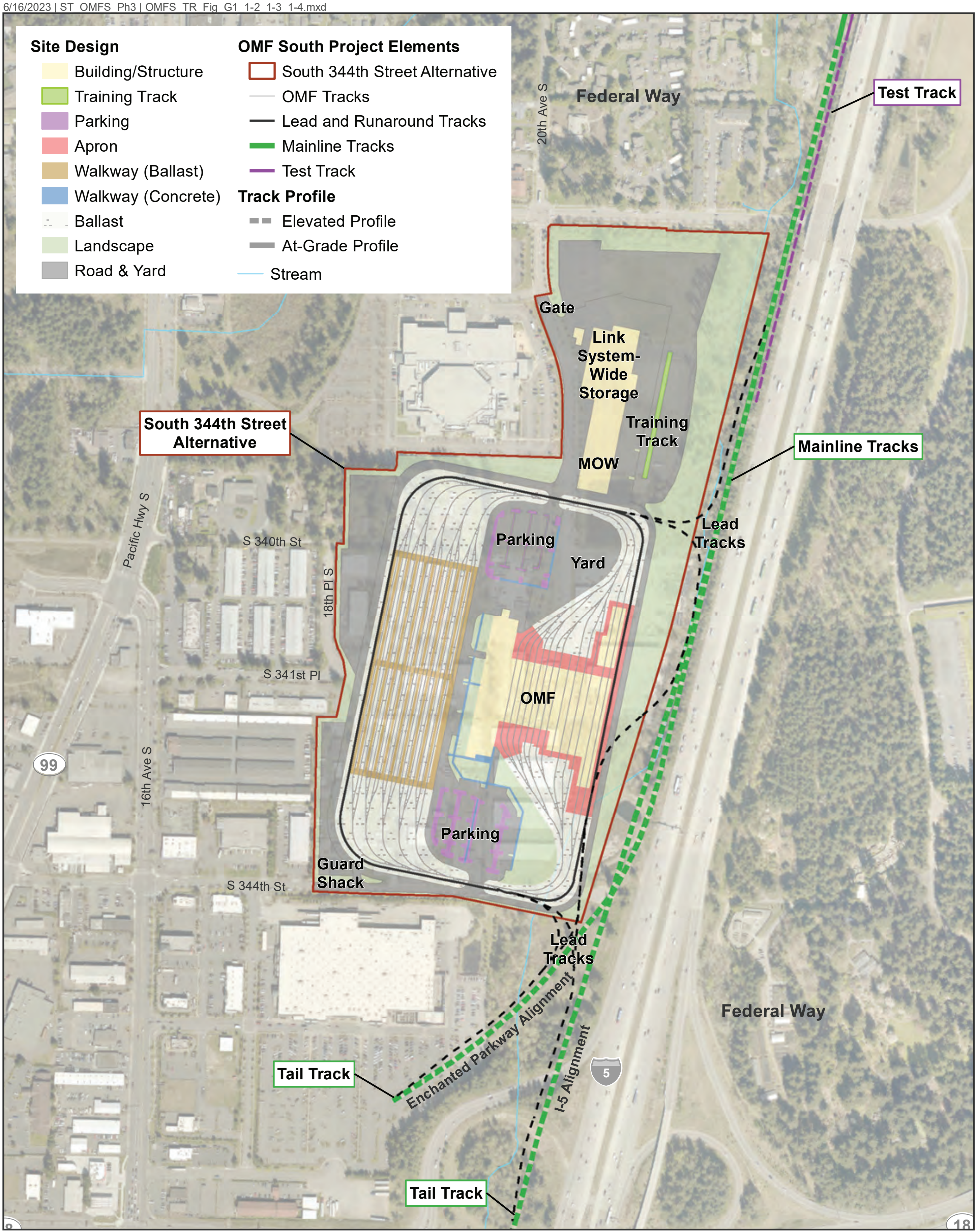
FIGURE G1.1-2
Conceptual Layout
Preferred Alternative

OMF South

N

0 500 1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
20th Ave S
Federal Way
Test Track
Gate
Link System-Wide Storage
Training Track
MOW
South 344th Street Alternative
Mainline Tracks
Lead Tracks
Parking
Yard
Pacific Hwy S
S 340th St
18th Pl S
S 341st Pl
OMF
99
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
Enchanted Parkway Alignment
I-5 Alignment
5
Federal Way
Tail Track
Tail Track
18

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

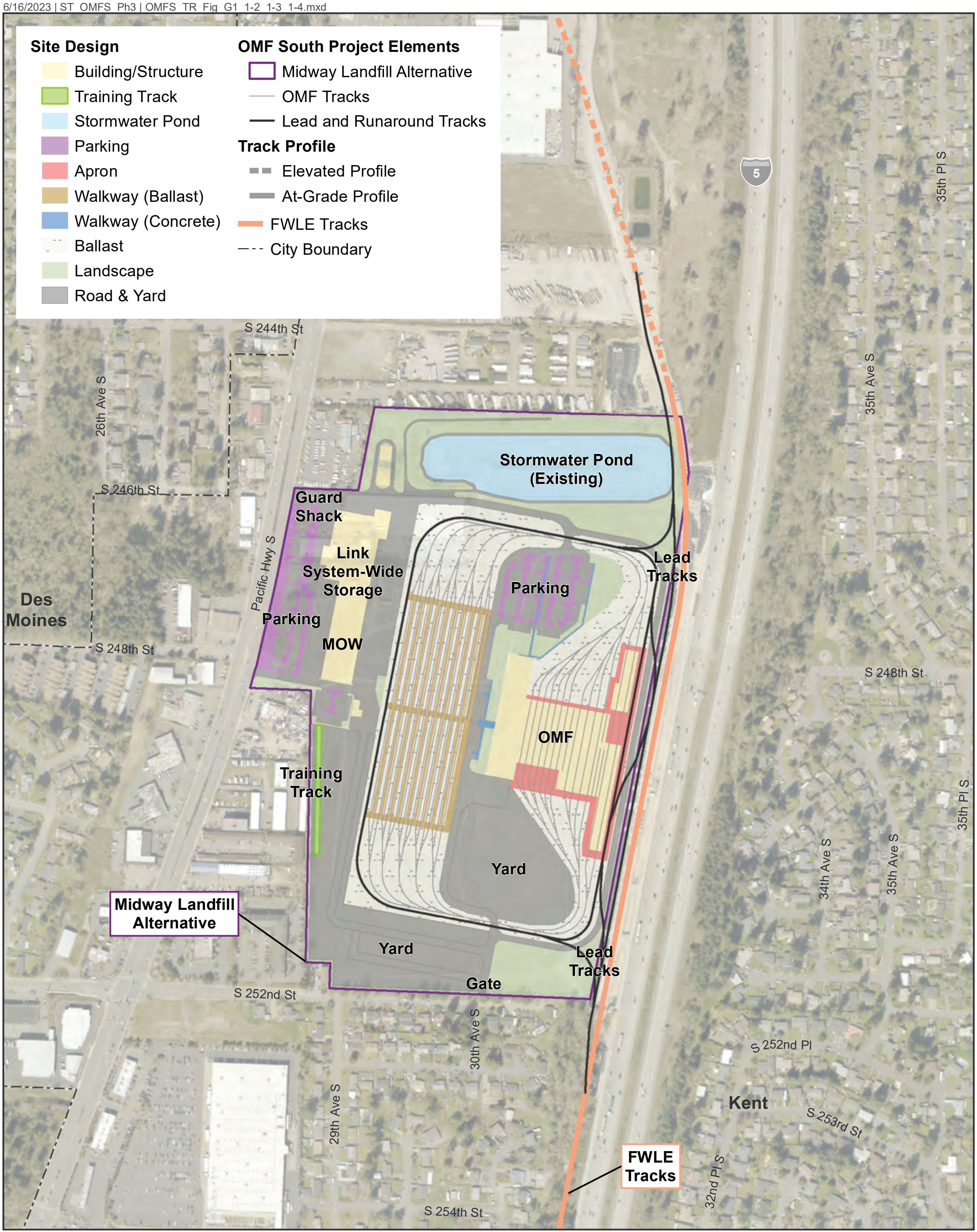
FIGURE G1.1-3
Conceptual Layout
South 344th Street Alternative

OMF South

N

0 500 1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Site Design
Building/Structure
Training Track
Stormwater Pond
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Midway Landfill Alternative
OMF Tracks
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
5
35th Pl S
S 244th St
26th Ave S
35th Ave S
Stormwater Pond (Existing)
S 246th St
Guard Shack
Lead Tracks
Pacific Hwy S
Link System-Wide Storage
Parking
Des Moines
Parking
S 248th St
MOW
S 248th St
OMF
Training Track
35th Pl S
34th Ave S
35th Ave S
Yard
Midway Landfill Alternative
Yard
Lead Tracks
Gate
S 252nd St
30th Ave S
S 252nd Pl
Kent
S 253rd St
29th Ave S
FWLE Tracks
32nd Pl S
S 254th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

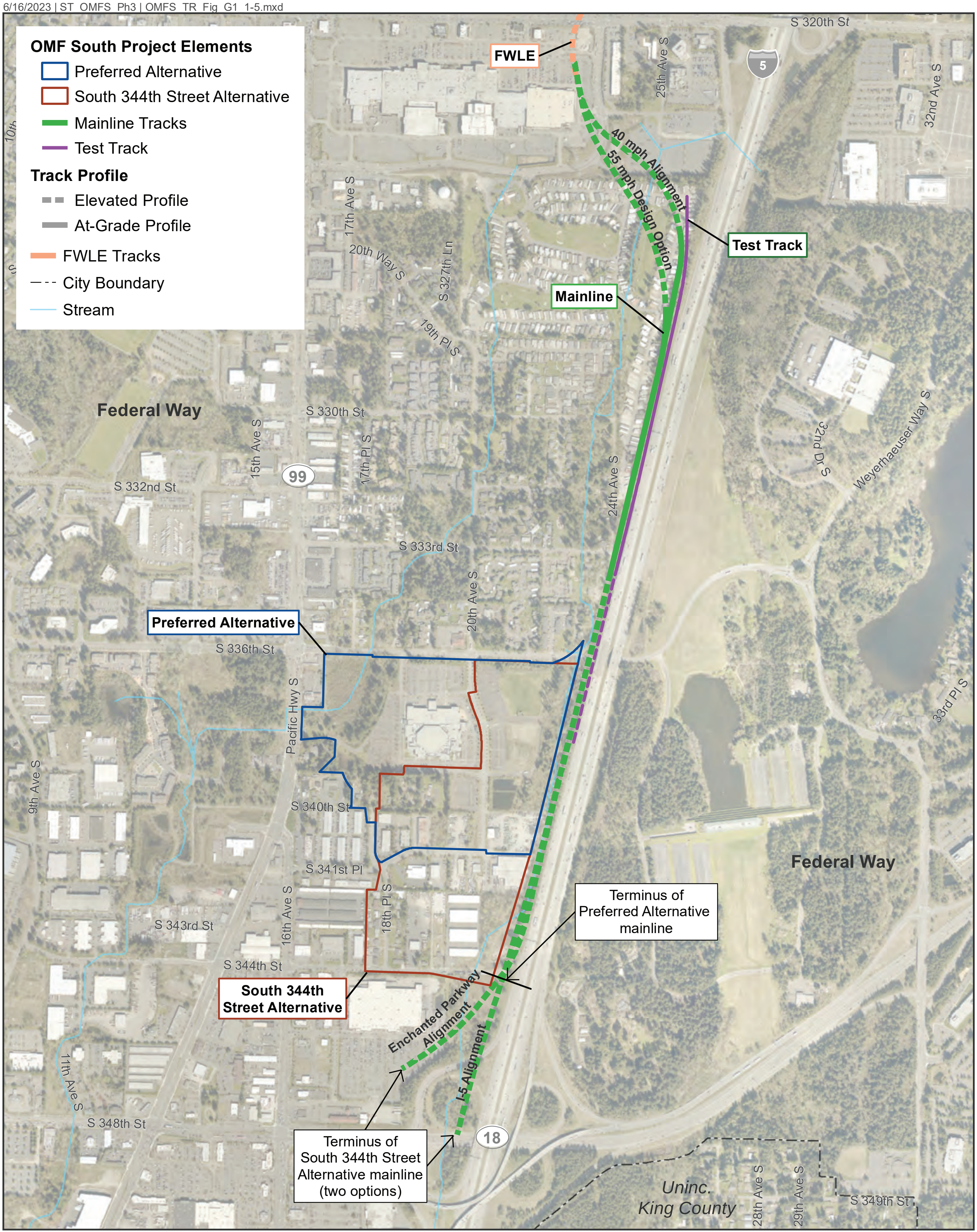
FIGURE G1.1-4
Conceptual Layout
Midway Landfill Alternative

OMF South

N

0 500 1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
S 320th St
25th Ave S
5
32nd Ave S
10th
40 mph Alignment
55 mph Design Option
17th Ave S
20th Way S
S 327th Ln
Test Track
Mainline
19th Pl S
Federal Way
S 330th St
15th Ave S
17th Pl S
99
32nd Dr S
Weyerhaeuser Way S
S 332nd St
24th Ave S
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
Pacific Hwy S
33rd Pl S
9th Ave S
S 340th St
S 341st Pl
Federal Way
Terminus of Preferred Alternative mainline
16th Ave S
18th Pl S
S 343rd St
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 348th St
18
Terminus of South 344th Street Alternative mainline (two options)
Uninc. King County
28th Ave S
29th Ave S
S 349th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE G1.1-5

Mainline Track Options
Preferred and South 344th Street Alternatives

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

1.2 Organization of this Technical Report

In addition to Section 1, Introduction, this report includes the following chapters:

Section 2, Methods and Assumptions, summarizes the analysis methods used to assess the build alternatives in this report, and includes a section on guiding regulations, plans, and policies, including agency participation in the planning and analysis process.

Section 3, Affected Environment, discusses the existing transportation conditions.

Section 4, Impacts, describes:

- long-term impacts on all modes of travel – for the No-Build Alternative and for the build alternatives for the design year (2042)
- expected impacts due to project construction activities
- indirect impacts
- cumulative impacts

Section 5, Potential Mitigation Measures, describes the measures that could be implemented to mitigate the potential effects of the project.

2 APPROACH AND METHODS

The methodology and assumptions used to analyze the transportation impacts for the alternatives are discussed in detail in the Transportation Technical Analysis Methodology Memorandum (Attachment G1-1). The Environmental Methodology Report (Sound Transit 2020a) includes the following information concerning the transportation analysis:

- Summary of the transportation methodology, including study area selection, years of analysis, intersections analyzed, and study time periods
- Description of the relevant policies, laws, and regulations that governed or influenced the transportation analysis
- Description of data collected to establish the affected environment
- Description of the analysis methods (qualitative and/or quantitative) used to assess property access and local circulation, nonmotorized facilities and modes, transit, construction, and safety
- Summary of traffic operations analysis methods, including agency level of service (LOS) thresholds, and analysis tools
- Description of the thresholds used to identify mitigation measures

2.1 Relevant Plans, Policies, and Coordination

2.1.1 Guiding Regulations, Plans, and/or Policies

Analysis of the local transportation impacts was guided by the policy direction established in the numerous plans or policy documents adopted by jurisdictions within the project corridor. These include, but are not limited to:

- Sound Transit 3: the Regional Transit System Plan for Central Puget Sound (Sound Transit 3)
- WSDOT Synchro and SimTraffic Protocol (WSDOT 2018a)
- WSDOT Traffic Analysis Guidebook (WSDOT 2019a)
- City of Kent Transportation Plan (City of Kent 2021) and Federal Way Comprehensive Plan (City of Federal Way 2015) and Capital Improvement Programs (CIPs)
- Level of Service Standards for the city of Kent (Comprehensive Plan, Chapter 4), the city of Federal Way (Comprehensive Plan, Chapter 3) (City of Kent 2015), and Washington State Highways (RCW 47.06.140(2))
- City of Kent and city of Federal Way environmental policies and comprehensive plans
- Washington Transportation Plan, Phase 2 – Implementation 2017–2040 (WSDOT 2018b)
- WSDOT Traffic Manual M 51-02 (WSDOT 2018c)
- Washington State Department of Transportation (WSDOT) environmental policies and SEPA rules (WAC 468-12)
- Transportation Research Board Highway Capacity Manual (Transportation Research Board 2016)

- American Association of State and Highway Transportation Officials (AASHTO) Highway Safety Manual (AASHTO 2014)
- WSDOT Protocol for Vissim Simulation (WSDOT 2014)
- WSDOT Sidra Policy Settings (WSDOT 2019b)
- Federal Highway Administration (FHWA) Guidelines for Applying Traffic Microsimulation Modeling Software (FHWA 2019)
- WSDOT Design Manual (WSDOT 2019c)
- Puget Sound Regional Council (PSRC), VISION 2050 (PSRC 2020)
- King County Metro, Strategic Plan for Public Transportation, 2011–2021 (King County Metro 2015)
- Pierce Transit Strategic Plan 2015–2020 (Pierce Transit 2015)

2.1.2 Agency Coordination

The transportation planning and analysis process involved local jurisdictions, state agencies, federal agencies, transit agencies, PSRC, and other interested parties. The cities of Federal Way and Kent were consulted to confirm planned improvements in the study areas.

3 AFFECTED ENVIRONMENT

This chapter discusses the affected environment for the transportation analysis by defining the study area and describing the existing transportation facilities, service types, and conditions in the study areas, including:

- Roadway network (intersections, traffic volumes, and operations)
- Freight
- Transit
- Nonmotorized facilities
- Parking
- Safety

3.1 Study Areas

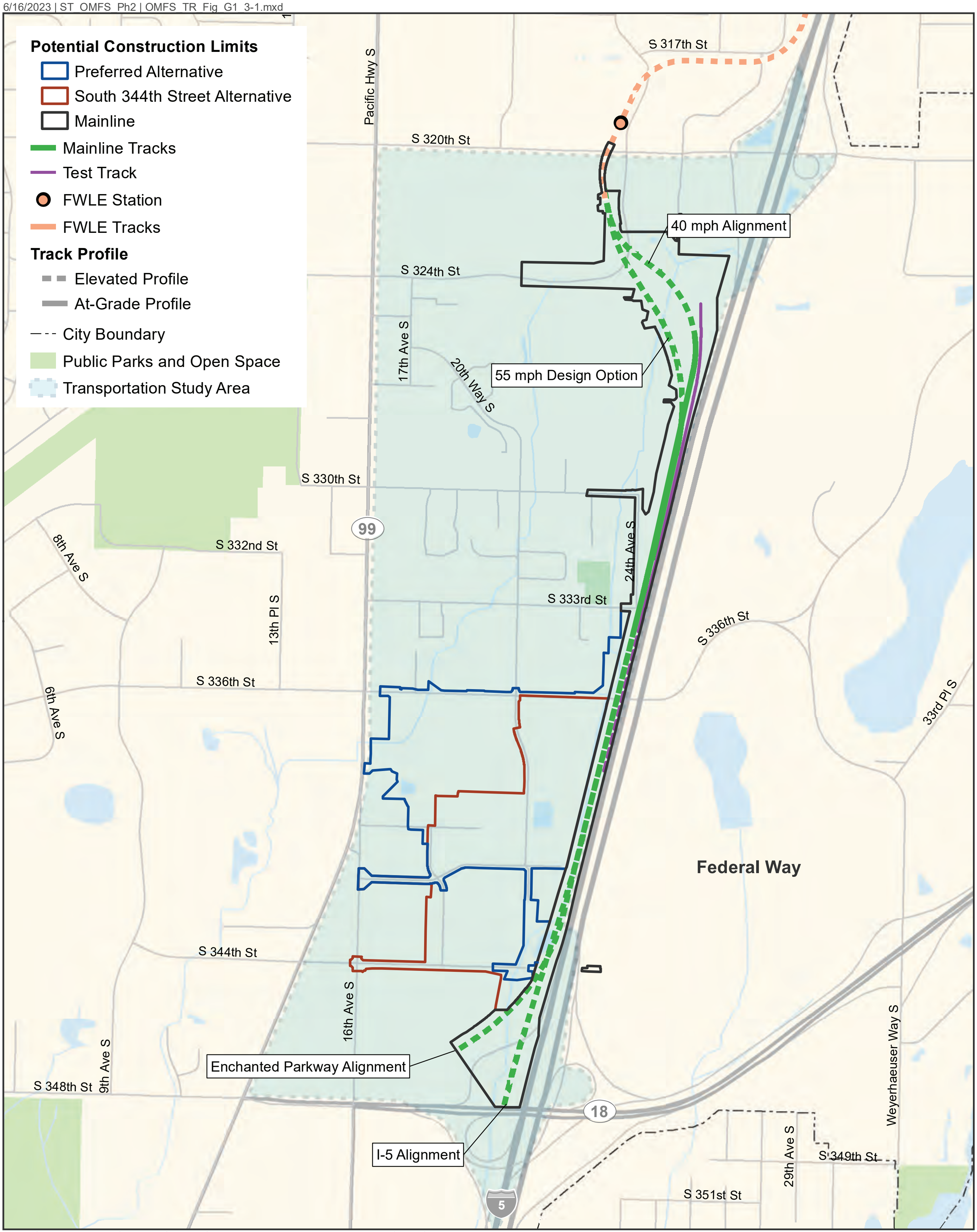
The focus of the transportation analysis was evaluation of potential operational and construction impacts at the facility, including the traffic activity resulting from employees coming to and departing the site and truck trips and haul routes needed during construction. For the transportation analysis, two study areas were defined: the Preferred and South 344th Street alternatives study area and the Midway Landfill Alternative study area. The study areas are shown in Figures G1.3-1 and G1.3-2.

Due to their close proximity and anticipated impacts to similar intersections, a single study area was identified for the Preferred and South 344th Street alternatives. While the Preferred and South 344th Street study area encompasses several intersections, only those intersections potentially impacted by the Build alternatives were evaluated. The study intersections for the Preferred and South 344th Street alternatives include nine key intersections between SR 99 to the west, I-5 to the east, S 336th Street to the north, and S 344th Street to the south. The study area for the Preferred and South 344th Street alternatives incorporates the area of the mainline in addition to the facility. The elevated mainline track for the Preferred and South 344th Street alternatives would cross several roadways within the study area. Because all of these crossings would be grade separated from the mainline, there would not be impacts to operations.

The Midway Landfill Alternative study area encompasses nine key intersections between SR 99 to the west, I-5 to the east, S 240th Street to the north, and S 260th Street to the south. In response to comments from the city of Kent, intersections #2 through #4 were removed from Section 3.2, Transportation, in the Final EIS because they include commercial driveways on the east side of SR 99 and thus are not subject to the Kent's LOS standards. However, the analysis of these three intersections is retained in this Transportation Technical Report.

The boundaries of the study areas were defined based on the location of potential impacts and in consultation with WSDOT, King County, and the cities of Federal Way and Kent. The approach to the analysis and study areas for each build alternative reflects federal, state, and local laws and regulations. The analysis of transportation impacts associated with construction included the full boundaries of the study area. The analysis of long-term operational impacts from the project is limited to the facilities within the study area that would experience those impacts.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-1.mxd


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
S 317th St
Pacific Hwy S
S 320th St
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
99
8th Ave S
S 332nd St
24th Ave S
S 333rd St
S 336th St
13th Pl S
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
Weyerhaeuser Way S
9th Ave S
S 348th St
Enchanted Parkway Alignment
18
I-5 Alignment
29th Ave S
S 349th St
S 351st St
5

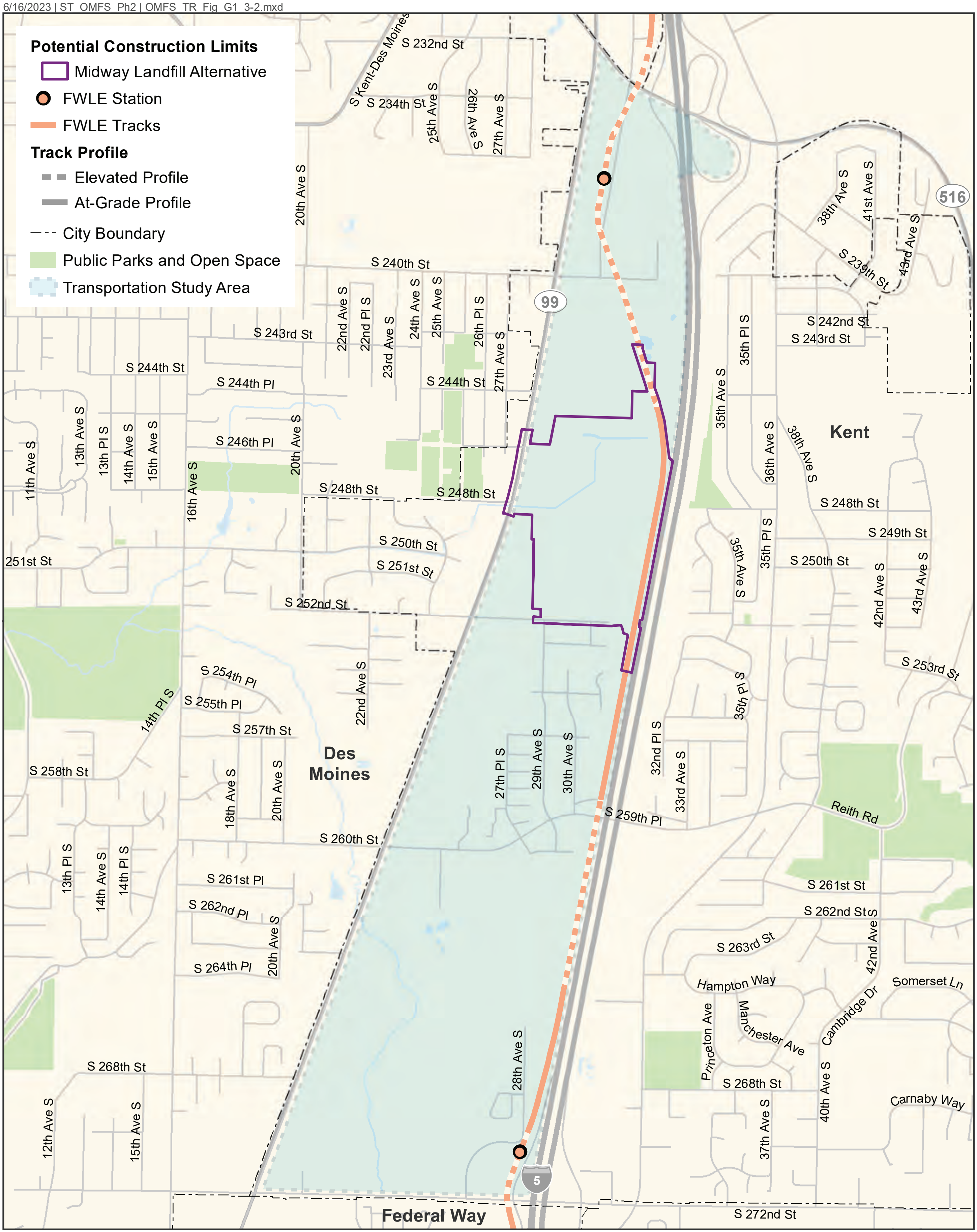
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-1
Transportation Study Area
Preferred and
South 344th Street Alternatives
OMF South

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-2.mxd



Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
20th Ave S
516
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 240th St
99
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 243rd St
S 244th St
S 244th Pl
S 244th St
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
Kent
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
S 246th Pl
20th Ave S
S 248th St
S 248th St
S 248th St
S 249th St
S 250th St
S 250th St
S 251st St
251st St
35th Ave S
35th Pl S
42nd Ave S
43rd Ave S
S 252nd St
S 253rd St
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
35th Pl S
Des Moines
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
Reith Rd
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 261st St
S 262nd Pl
S 262nd St
20th Ave S
42nd Ave S
S 263rd St
S 264th Pl
Hampton Way
Somerset Ln
Manchester Ave
Cambridge Dr
Princeton Ave
28th Ave S
S 268th St
S 268th St
40th Ave S
Carnaby Way
12th Ave S
15th Ave S
37th Ave S
5
Federal Way
S 272nd St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-2
Transportation Study Area
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.2 Arterial and Local Street Operations

3.2.1 Roadway Network

The street network and classifications in the study areas include arterial, collector, and local streets, which are summarized in Tables G1.3-1 and G1.3-2 and Figures G1.3-3 and G1.3-4. Although S 244th Street is located in the city of Des Moines, the intersection of S 244th Street and SR 99, which is one of the intersections evaluated, is located in the city of Kent. All streets in the Preferred and South 344th Street alternatives study area are in the city of Federal Way.

Table G1.3-1 Preferred and South 344th Street Alternatives Study Area Street Network Classifications

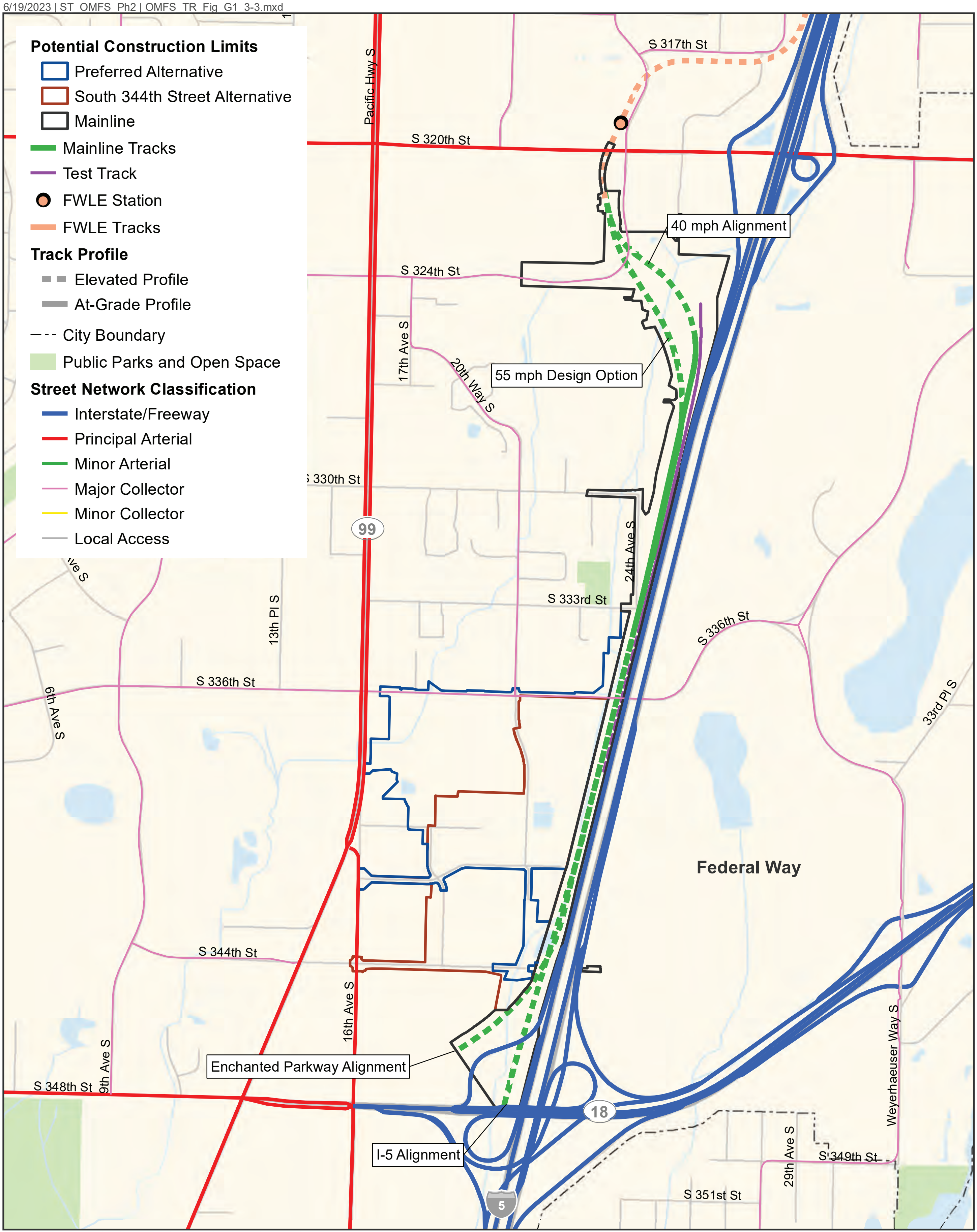
Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)
S 320th Street	Principal Arterial	6	35
S 324th Street	Principal Collector	4	30
S 333rd Street	Minor Collector	2	25
S 336th Street	Minor Arterial	3	35
S 340th Street	Local Street	2	25
S 341st Place	Minor Collector	2	25
S 344th Street	Minor Collector	2	25
SR 99	Principal Arterial	6	40
16th Avenue S	Principal Arterial	5	35
18th Place S	Local Street	2	25
20th Avenue S	Minor Collector	2	25
21st Avenue S	Local Street	2	25
24th Avenue S	Minor Collector	2	25
Interstate 5	Interstate/Freeway	11	60

Sources: City of Federal Way (2015); Google Maps (2020).

Table G1.3-2 Midway Landfill Alternative Study Area Street Network Classifications

Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)
S 240th Street	Residential Collector/Local Access	2	25
S 242nd Street	Local Access	2	25
S 244th Street	Local (City of Des Moines)	2	25
S 246th Street	Local Access	2	25
S 248th Street	Local Access	2	25
S 252nd Street	Local Access	2	25
S 253rd Street	Local Access	2	25
S 254th Street	Local Access	2	25
S 256th Street	Local Access	2	25
S 257th Place	Local Access	2	25
S 258th Street	Local Access	2	25
S 258th Place	Local Access	2	25
S 259th Street	Local Access	2	25
S 259th Place	Minor Arterial	2	35
S 260th Street	Minor Arterial	2	35
Pacific Highway S (SR 99 and SR 509)	Principal Arterial and Highway of Statewide Significance	6	45
27th Place S	Local Access	2	25
29th Avenue S	Local Access	2	25
30th Avenue S	Local Access	2	25
Interstate 5	Interstate/Freeway and Highway of Statewide Significance	10	60

Sources: City of Kent (2008); City of Des Moines (2009); Google Maps (2020).

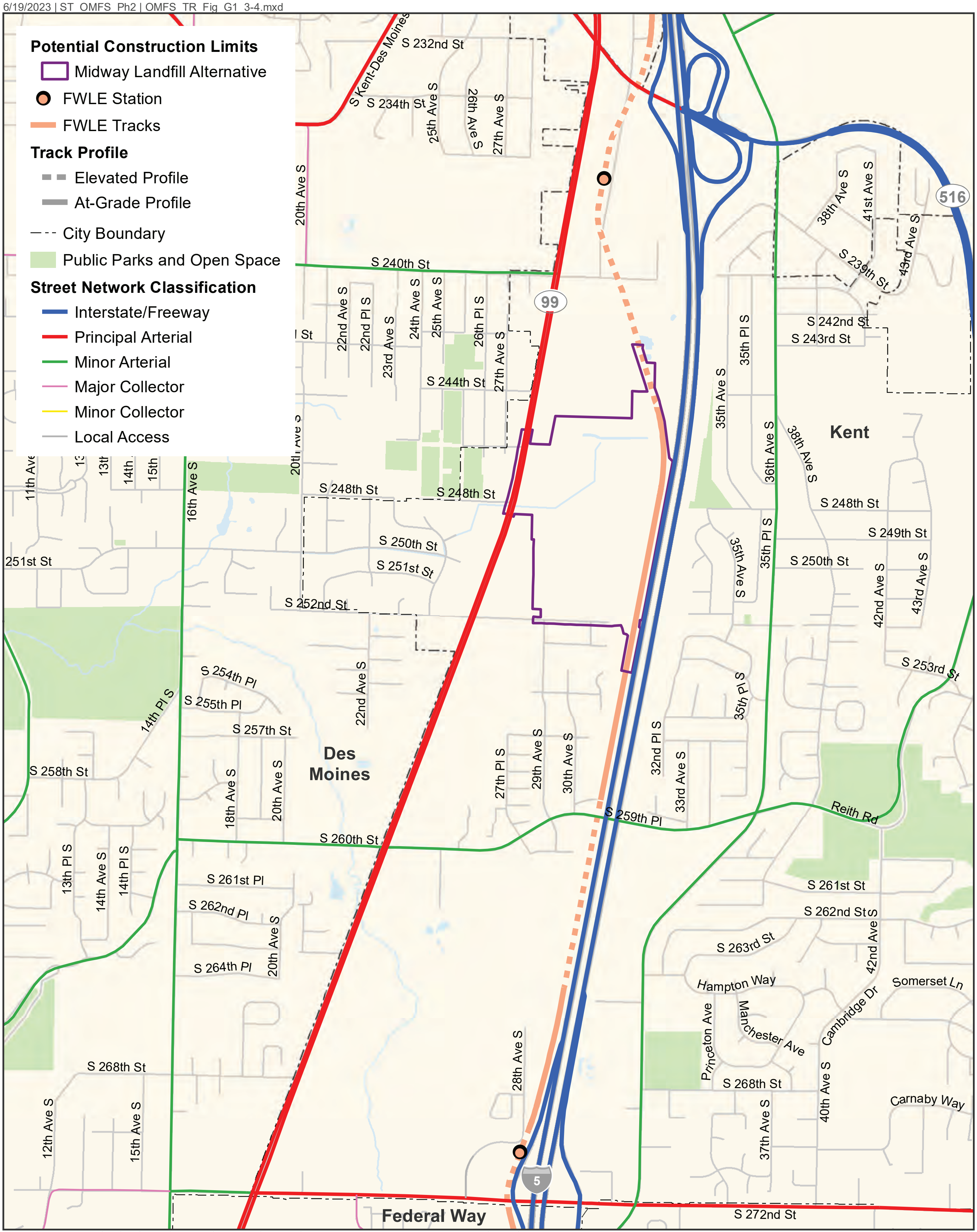

Potential Construction Limits
▭ Preferred Alternative
▭ South 344th Street Alternative
▭ Mainline
Mainline Tracks
Test Track
● FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
🟩 Public Parks and Open Space
Street Network Classification
Interstate/Freeway
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local Access
S 317th St
Pacific Hwy S
S 320th St
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
99
24th Ave S
S 333rd St
S 336th St
13th Pl S
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
S 348th St
Enchanted Parkway Alignment
18
I-5 Alignment
5
29th Ave S
S 349th St
Weyerhaeuser Way S
S 351st St

Data Sources: WSDOT (2023); King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G1.3-3
Street Network Classifications
Preferred and
South 344th Street Alternatives
OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Street Network Classification
Interstate/Freeway
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local Access
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
20th Ave S
S 240th St
99
516
5
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
Kent
11th Ave
16th Ave S
20th Ave S
S 248th St
S 248th St
S 248th St
S 249th St
S 250th St
S 251st St
S 250th St
251st St
S 252nd St
35th Ave S
35th Pl S
42nd Ave S
43rd Ave S
S 253rd St
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
35th Pl S
Des Moines
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
Reith Rd
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 262nd Pl
20th Ave S
S 264th Pl
S 261st St
S 262nd St
S 263rd St
42nd Ave S
Hampton Way
Manchester Ave
Cambridge Dr
Somerset Ln
Princeton Ave
S 268th St
S 268th St
28th Ave S
12th Ave S
15th Ave S
37th Ave S
40th Ave S
Carnaby Way
Federal Way
S 272nd St

Data Sources: WSDOT (2023); King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-4
Street Network Classification
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.2.2 Study Intersections

A total of 18 intersections (nine in each study area) were analyzed for this technical report. In the Preferred and South 344th Street alternatives study area, four intersections are located on SR 99. While the Preferred and South 344th Street alternatives study area encompasses many intersections, only those intersections potentially impacted by the Build alternatives were evaluated. The elevated mainline track for the Preferred and South 344th Street alternatives intersects with several roadways within the study area. Because all of these intersections would be grade separated from the mainline, there would not be impacts to operations.

In the Midway Landfill Alternative study area, seven intersections are located on SR 99. In response to comments from the city of Kent, intersections #2 through #4 were removed from Section 3.2, Transportation, in the Final EIS because they include commercial driveways on the east side of SR 99 for which impacts do not need to be evaluated. However, the analysis of these three intersections is retained in this Transportation Technical Report.

The intersections are listed in Tables G1.3-3 and G1.3-4 and are shown in Figures G1.3-5 and G1.3-6. Tables G1.3-3 and G1.3-4 indicate whether the intersection is controlled by a traffic signal or stop signs or whether it is uncontrolled. Intersections with stop signs were all classified as two-way stop controlled (TWSC), meaning that only one street comprising the intersection is stop controlled. There are no intersections that are four-way stop controlled in either of the study areas. Intersections were chosen based on their potential to be directly affected, such as by a change in channelization, signal control, or OMF trips, as well as their potential to be indirectly affected by changes in volume due to trips accessing the system. All intersection peak hour operations were analyzed in the AM and PM peak periods.

Table G1.3-3 Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection Location	Existing Control
1	S 336th Street/20th Avenue S	Signal
2	SR 99/S 336th Street	Signal
3	SR 99/S 340th Street	TWSC
4	SR 99/16th Avenue S	Signal
5	16th Avenue S/S 341st Place	TWSC
6	18th Place S/S 341st Place	Uncontrolled
7	SR 99/S 344th Street	Signal
8	S 344th Street/16th Avenue S	Signal
9	S 344th Street/18th Place S	Uncontrolled

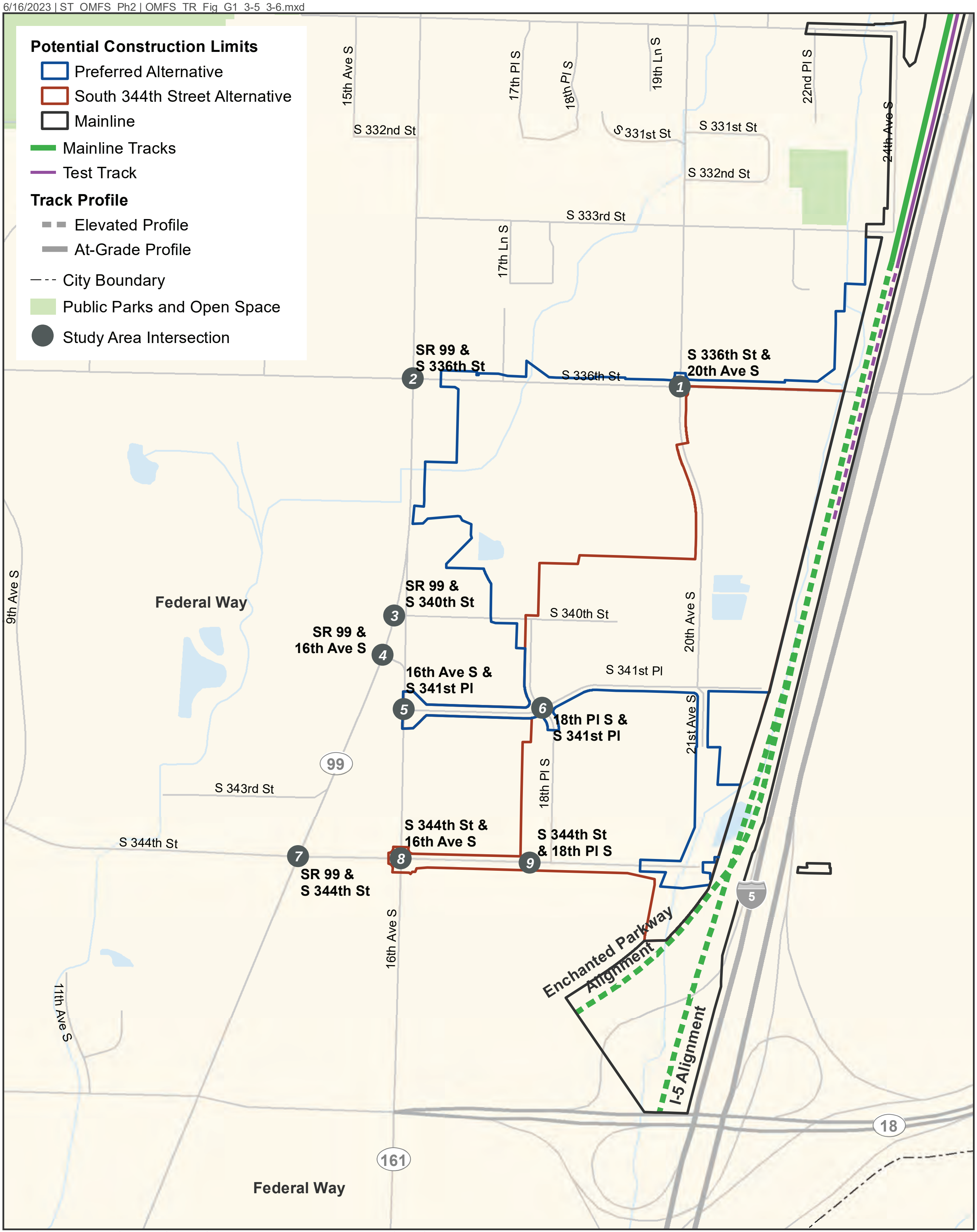
Source: Google Maps (2020).

Table G1.3-4 Midway Landfill Alternative Study Area Intersections

ID	Intersection Location	Existing Control
1	SR 99/S 240th Street	Signal
2	SR 99/S 244th Street	TWSC
3	SR 99/Midway Mobile Home Park Driveway	TWSC
4	SR 99/S 246th Street	TWSC
5	SR 99/S 248th Street	TWSC
6	SR 99/S 252nd Street	Signal
7	SR 99/S 260th Street	Signal
8	29th Avenue S/S 252nd Street	TWSC
9	29th Avenue S/S 259th Street	TWSC

Source: Google Maps street (2020).

Note: In response to comments from the city of Kent, intersections #2 through #4 were removed from Section 3.2, Transportation, in the Final EIS, but the analysis of these three intersections is retained in this Transportation Technical Report.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 & S 336th St
2
S 336th St
S 336th St & 20th Ave S
1
Federal Way
9th Ave S
SR 99 & S 340th St
3
S 340th St
20th Ave S
SR 99 & 16th Ave S
4
16th Ave S & S 341st Pl
5
S 341st Pl
6
18th Pl S & S 341st Pl
21st Ave S
99
18th Pl S
S 343rd St
S 344th St
7
SR 99 & S 344th St
S 344th St & 16th Ave S
8
S 344th St & 18th Pl S
9
5
Enchanted Parkway Alignment
16th Ave S
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

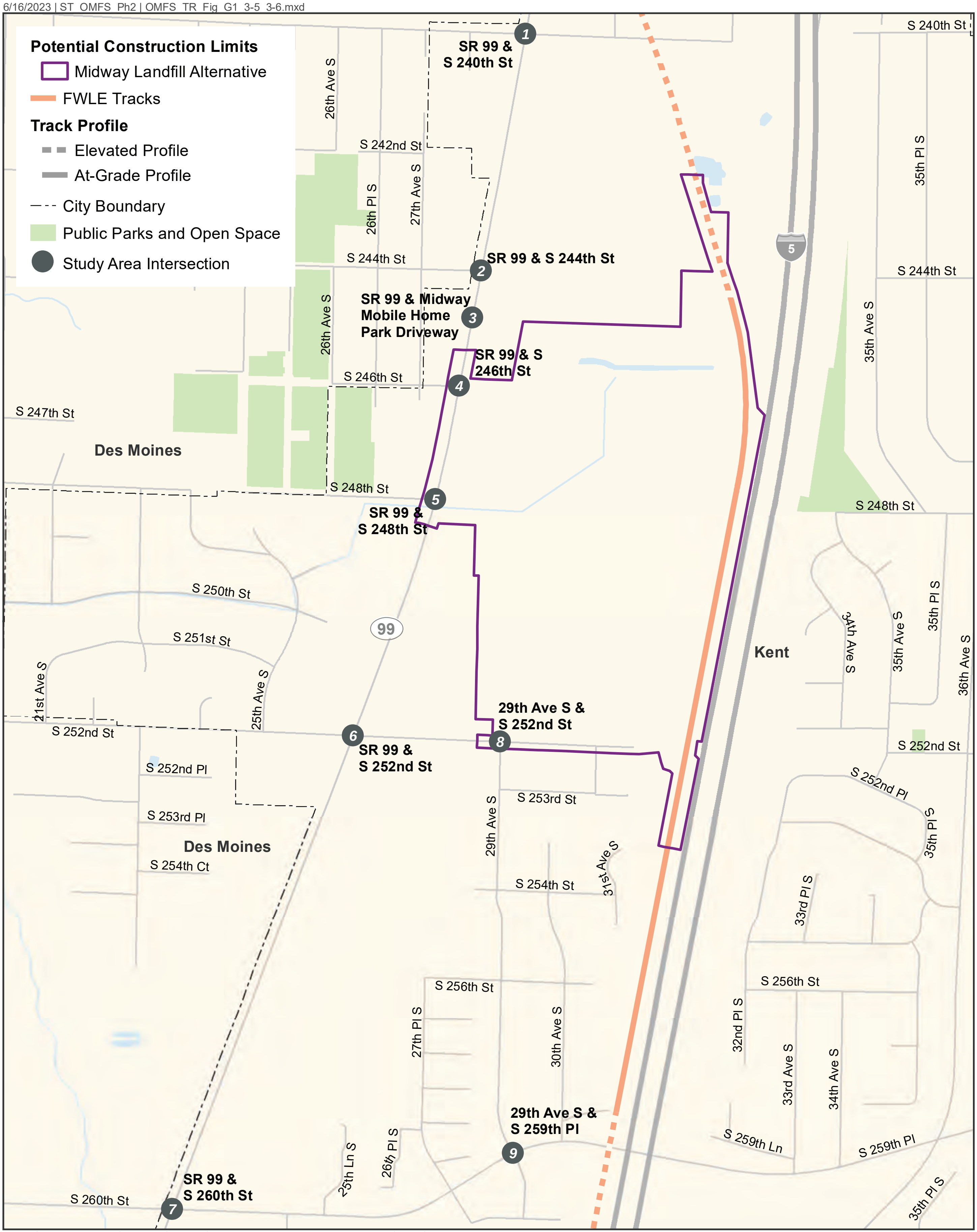
FIGURE G1.3-5

Study Area Analysis Intersections
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST OMFS Ph2 | OMFS TR Fig G1 3-5 3-6.mxd


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
1
SR 99 & S 240th St
2
SR 99 & S 244th St
3
SR 99 & Midway Mobile Home Park Driveway
4
SR 99 & S 246th St
5
SR 99 & S 248th St
6
SR 99 & S 252nd St
7
SR 99 & S 260th St
8
29th Ave S & S 252nd St
9
29th Ave S & S 259th Pl
S 240th St
26th Ave S
S 242nd St
26th Pl S
27th Ave S
S 244th St
26th Ave S
S 246th St
S 247th St
Des Moines
S 248th St
S 250th St
99
S 251st St
21st Ave S
25th Ave S
S 252nd St
S 252nd Pl
S 253rd Pl
Des Moines
S 254th Ct
S 260th St
25th Ln S
26th Pl S
27th Pl S
S 256th St
29th Ave S
S 253rd St
S 254th St
31st Ave S
30th Ave S
5
35th Pl S
S 244th St
35th Ave S
S 248th St
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
S 252nd St
S 252nd Pl
35th Pl S
33rd Pl S
S 256th St
32nd Pl S
33rd Ave S
34th Ave S
S 259th Ln
S 259th Pl
35th Pl S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-6
Study Area Analysis Intersections
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.2.3 Traffic Volumes

This section describes the existing AM and PM peak period daily counts as well as weekday turning movement counts at intersections. Daily (24-hour) traffic counts were provided by the cities of Federal Way and Kent. Table G1.3-5 and Table G1.3-6 summarize the average daily traffic volumes. This data informed the decision regarding times to collect turning movement count data for more detailed traffic operations analysis.

Weekday turning movement counts were collected over a 1-day period (September 24, 2019) in the AM peak period between 6 and 9 a.m. and in the PM peak period between 3 and 6 p.m. The turning movement counts included the total number of general-purpose vehicles, medium and large freight vehicles, pedestrians, and bicycles. Additional turning movement counts were collected by the city of Federal Way during the PM peak period between 4 and 6 p.m. on November 16, 2022. Counts were collected at three study intersections in the Preferred Alternative study area: intersection #2 (SR 99/S 336th Street), intersection #4 (SR 99/16th Avenue S), and intersection #7 (SR 99/S 344th Street). Overall, the peak hour intersection volumes were 10 percent lower in 2022 than in 2019, but there were some movements where there were up to 50 more vehicles per hour in 2022 than in 2019. For these movements, the additional volume was added to the 2019 PM peak hour volumes to account for the larger 2022 volumes. This additional volume was distributed through the roadway system as applicable, meaning that this additional volume would not impact every intersection or movement. Volumes between intersections where there are no driveways were also balanced. Figures G1.3-7 and G1.3-8 show existing AM and PM peak hour intersection turning movements for the common peak hours of 7:45 to 8:45 a.m. and 4:30 to 5:30 p.m. for the Preferred and South 344th Street alternatives study area and 7:15 to 8:15 a.m. and 4:30 to 5:30 p.m. in the Midway Landfill Alternative study area.

Table G1.3-5 Preferred and South 344th Street Alternatives Study Area Average Daily Traffic Volumes

Location	Average Daily Traffic Volumes
S 336th Street: East of SR 99	11,900
SR 99: South of S 336th Street	31,300
16th Avenue S: South of S 344th Street	25,700
20th Avenue S: S 336th Street to S 344th Street[1]	2,040

Source: City of Federal Way 2019 – personal communication.

Note:

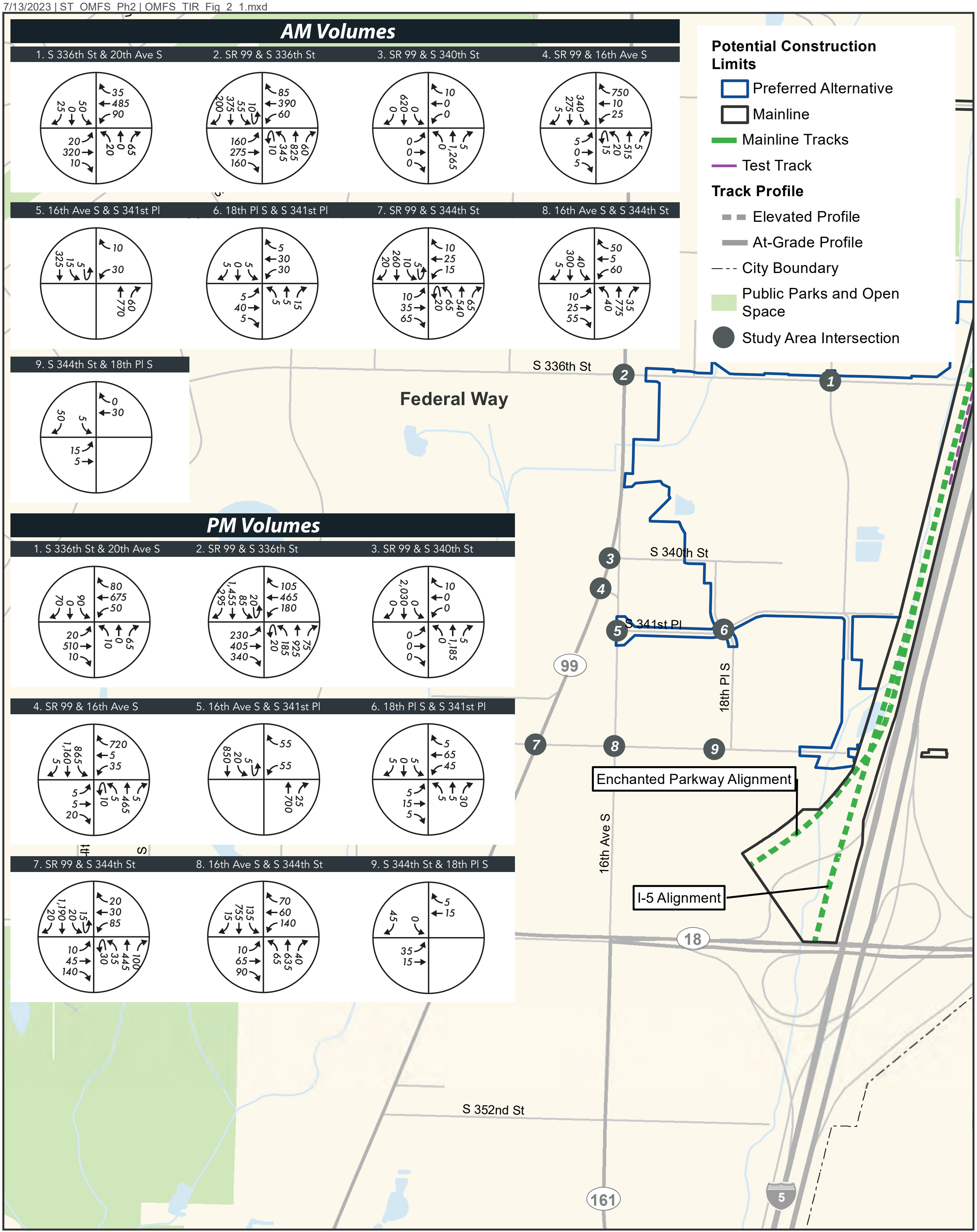
(1) Daily traffic for 20th Avenue S estimated using field data counts at 20th Avenue S combined with daily distribution from adjacent corridor.

Table G1.3-6 Midway Landfill Alternative Study Area Average Daily Traffic Volumes

Location	Average Daily Traffic Volumes
SR 99: S 240th Street to S 260th Street	37,000
29th Avenue S: S 256th Street to S 259th Street	1,000

Source: City of Kent 2019 – personal communication.

7/13/2023 | ST_OMFS_Ph2 | OMFS_TIR_Fig_2_1.mxd


AM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
PM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
S 336th St
Federal Way
S 340th St
S 341st Pl
18th Pl S
16th Ave S
S 352nd St
Enchanted Parkway Alignment
I-5 Alignment
99
18
161
5
1
2
3
4
5
6
7
8
9

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

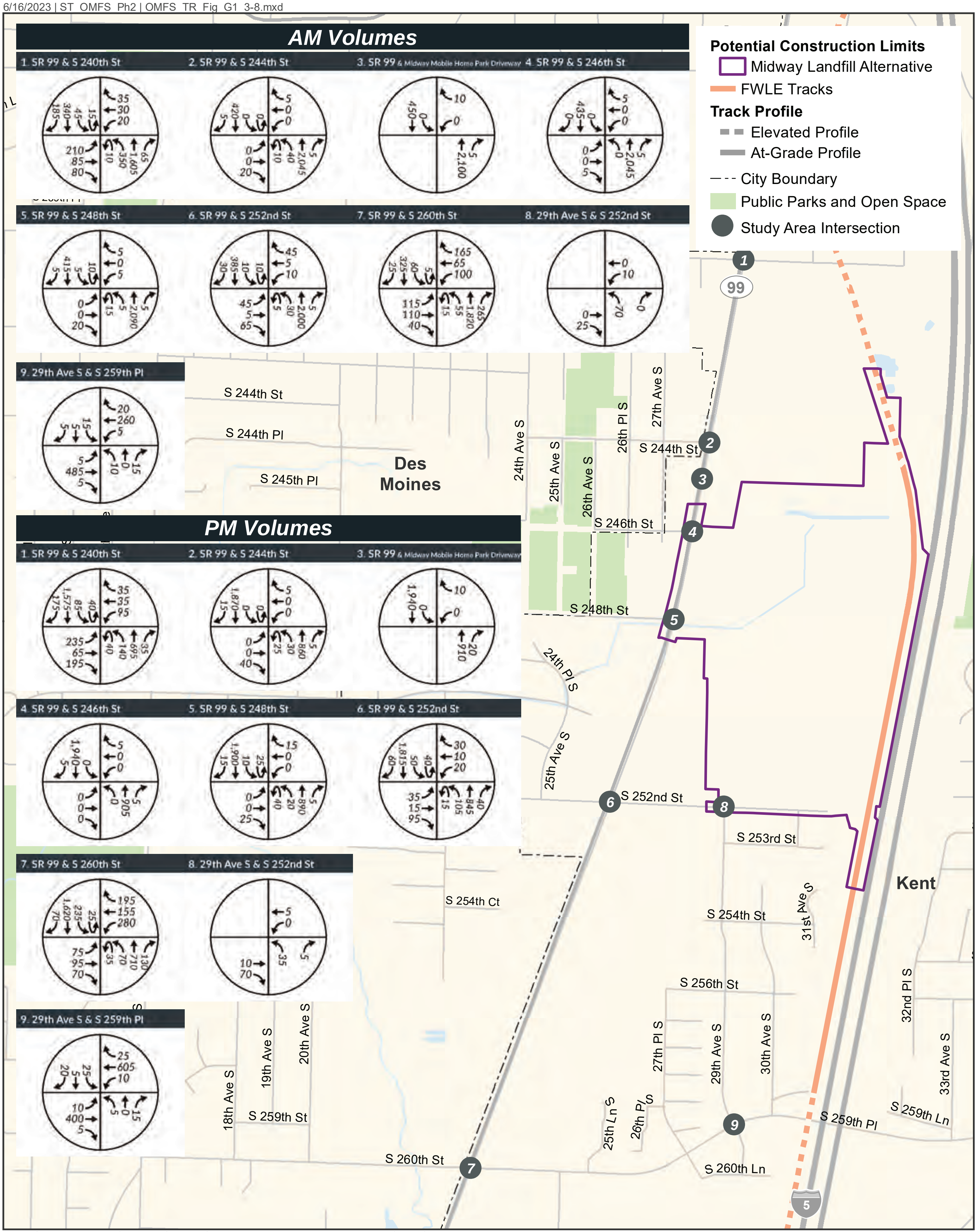
FIGURE G1.3-7

Existing AM and PM Traffic Volumes
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-8.mxd


AM Volumes
1. SR 99 & S 240th St
185 340 45 15
35 30 20
210 85 80
10 350 1,605 65
2. SR 99 & S 244th St
5 420 0 0
5 0 0
0 0 20
10 40 2,045 5
3. SR 99 & Midway Mobile Home Park Driveway
450 0
10 0
2,100 5
4. SR 99 & S 246th St
0 435 0 0
5 0 0
0 0 5
0 2,045 5
5. SR 99 & S 248th St
5 415 5 10
5 0 5
0 0 20
15 5 2,090 5
6. SR 99 & S 252nd St
30 385 10 10
45 5 10
45 5 65
5 30 2,000 5
7. SR 99 & S 260th St
25 325 60 5
165 65 100
115 110 40
15 55 1,820 265
8. 29th Ave S & S 252nd St
0 10
0 25
70 0
9. 29th Ave S & S 259th Pl
5 15 5 5
20 260 5
5 485 5
10 0 15
PM Volumes
1. SR 99 & S 240th St
175 1,575 85 40
35 35 95
235 65 195
40 140 695 35
2. SR 99 & S 244th St
15 1,870 0 0
5 0 0
0 0 40
25 30 860 5
3. SR 99 & Midway Mobile Home Park Driveway
1,940 0
10 0
910 20
4. SR 99 & S 246th St
5 1,940 0
5 0 0
0 0 0
0 905 5
5. SR 99 & S 248th St
15 1,900 10 25
15 0 0
0 0 25
40 20 890 5
6. SR 99 & S 252nd St
60 1,815 50 40
30 10 20
35 15 95
15 105 845 40
7. SR 99 & S 260th St
70 1,620 235 25
195 155 280
75 95 70
35 70 710 130
8. 29th Ave S & S 252nd St
5 0
10 70
35 5
9. 29th Ave S & S 259th Pl
20 5 25 5
25 605 10
10 400 5
5 0 15
Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
1
2
3
4
5
6
7
8
9
99
5
S 244th St
S 244th Pl
S 245th Pl
Des Moines
24th Ave S
25th Ave S
26th Ave S
26th Pl S
27th Ave S
S 244th St
S 246th St
S 248th St
24th Pl S
25th Ave S
S 252nd St
S 253rd St
S 254th Ct
S 254th St
31st Ave S
Kent
S 256th St
32nd Pl S
33rd Ave S
27th Pl S
29th Ave S
30th Ave S
18th Ave S
19th Ave S
20th Ave S
S 259th St
25th Ln S
26th Pl S
S 259th Pl
S 259th Ln
S 260th St
S 260th Ln

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-8
Existing AM and PM Traffic Volumes
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

3.2.3.1 Intersection Operations

Traffic operations are commonly measured using the LOS method, which is defined in terms of average intersection delay on a scale ranging from A to F, depending on the delay conditions at the intersection. LOS A represents the best conditions with minimal delay, and LOS F represents the worst conditions with severe congestion. Two factors determine delay: (1) the capacity of the intersection as defined by the number of lanes, traffic volumes, lane widths, pedestrian volumes, and other features; and (2) signal timing. Capacity, delay, and LOS are calculated for each traffic movement or group of traffic movements at an intersection. The weighted average delay across all traffic movements determines the overall LOS for a signalized intersection.

The LOS at unsignalized intersections that are stop controlled on one or two approaches is also defined in terms of delay, but only for the worst stop-controlled approach, which is typically the minor street. For unsignalized intersections that are stop controlled on each approach, the average intersection delay is reported. The delay thresholds are lowered for stop-controlled intersections because driver behavior considerations make delays at stop-controlled intersections more onerous. For example, at signalized intersections, drivers may relax during the red interval while waiting for the green interval, but drivers on the stopped approach of a stop-controlled intersection must remain attentive to identifying acceptable gaps in traffic. Table G1.3-7 summarizes the criteria used to define LOS.

Table G1.3-7 Average Control Delay Used in Level of Service

LOS[1]	Signalized Intersections (seconds per vehicle)	Unsignalized Intersections (seconds per vehicle)	Traffic Flow Characteristics (seconds per vehicle)
A	< 10	< 10	Virtually free flow; completely unimpeded
B	> 10 and < 20	> 10 and < 15	Stable flow with slight delays; less freedom to maneuver
C	> 20 and < 35	> 15 and < 25	Stable flow with delays; less freedom to maneuver
D	> 35 and < 55	> 25 and < 35	High density but stable flow
E	> 55 and < 80	> 35 and < 50	Operating conditions at or near capacity; unstable flow
F	> 80	> 50	Forced flow; breakdown conditions

Source: Transportation Research Board (2016).

Note:

(1) The LOS criteria are based on control delay, which includes initial deceleration delay, final deceleration delay, stopped delay, and queue move-up time.

Another common method of measuring traffic operations is volume-to-capacity (v/c) ratio, defined as a fraction representing the ratio of traffic volume to the capacity of a given roadway. The v/c ratio is measured on a decimal scale, with 0.0 representing excessive capacity and anything greater than 1.0 representing congestion, where volume has exceeded roadway capacity. A v/c ratio can be calculated for either the intersection as a whole or by approach. Table G1.3-8 shows the relationship between v/c ratio and the aforementioned LOS analysis procedure by average vehicle delay.

Table G1.3-8 Planning and Operational Level of Service

Analysis Procedure	A	B	C	D	E	F
Planning (v/c ratio)	0.00-0.60	0.61-0.70	0.71-0.80	0.81-0.90	0.91-1.00	>1.00
Operational delay (seconds per vehicle)	0-10	10-20	20-40	40-60	60-80	>80

Source: Transportation Research Board (1980, 2016).

An analysis was prepared using Synchro (version 11.1) software for the existing AM and PM peak-hour LOS at signalized and unsignalized intersections and reviewed against LOS or v/c ratio standards to determine whether the intersections operate at an acceptable LOS or v/c ratio. The Highway Capacity Manual (HCM) report from the Synchro software was used to summarize average intersection delay, LOS, and critical queue lengths. The LOS at a signalized intersection was defined in terms of average intersection delay. To provide consistent comparison between build alternatives, the signal timing for the No-Build Alternative and the build alternatives was optimized in the Synchro software to provide optimal levels of delay. Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.[1]

Impact Thresholds

Traffic impacts were determined for arterials and local streets by comparing the overall intersection LOS for the No-Build Alternative and the build alternatives. Impacts would occur if the build alternatives would result in traffic operations performing below the acceptable LOS when the intersection or roadway segment would operate at or above the acceptable LOS under the No-Build Alternative. Impacts may also occur if traffic operations under the build alternative reduce the LOS from E to F or if the delay in an LOS F condition is worsened by more than 10 seconds.

Washington State Department of Transportation

For highways of statewide significance, such as SR 99, impacts would occur if the roadway segment in the build alternatives would increase traffic operations to a LOS E or worse condition when the roadway segment would operate at LOS D or better under the No-Build Alternative. Impacts may also occur if the build alternative traffic operations reduce the LOS on highways of statewide significance from E to F or if the delay in an LOS F condition is worsened by more than 10 seconds.

City of Federal Way

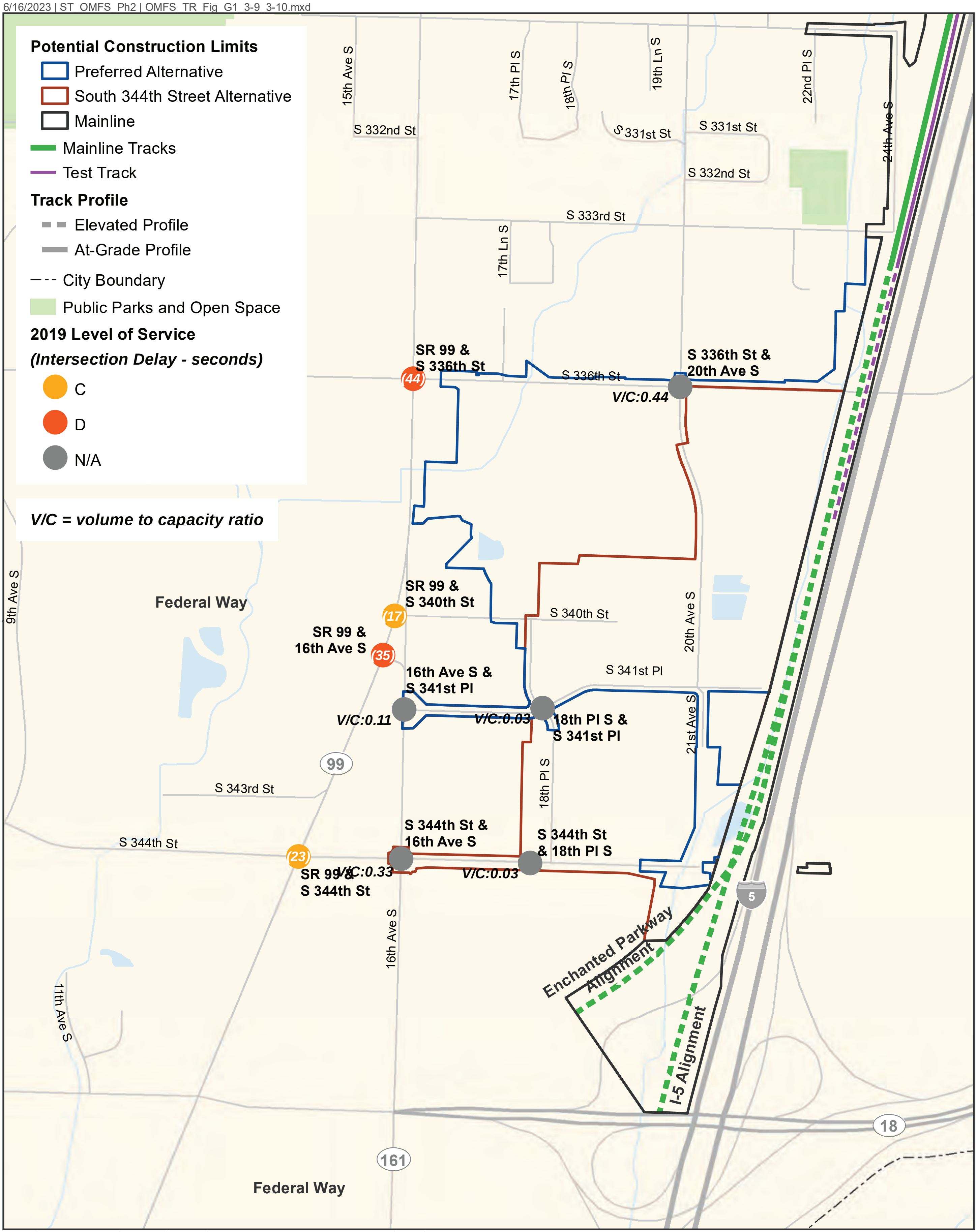
Within the Preferred and South 344th Street alternatives study area, the city of Federal Way has adopted the following v/c ratio standards for its street and highway system (City of Federal Way, 2015) for the PM peak hour:

- Signalized intersections outside of the City Center will experience a 1.2 or lower v/c ratio.
- Unsignalized intersections outside of the City Center will experience a 1.0 or lower v/c ratio.
- The City Center area will experience an average of 1.1 or lower v/c ratio.

Federal Way does not have LOS or v/c ratio standards for AM peak period operations. No intersections evaluated as part of this analysis are located in the Federal Way City Center. Figures G1.3-9 through G1.3-12 show existing AM and PM peak hour operations at the study intersections.

---

[1] Uncontrolled intersections were analyzed as TWSC intersections.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2019 Level of Service
(Intersection Delay - seconds)
C
D
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
44
S 336th St
S 336th St &
20th Ave S
V/C:0.44
Federal Way
9th Ave S
SR 99 &
S 340th St
17
S 340th St
20th Ave S
SR 99 &
16th Ave S
35
16th Ave S &
S 341st Pl
S 341st Pl
V/C:0.11
V/C:0.03
18th Pl S &
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
S 344th St
23
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
SR 99 &
S 344th St
V/C:0.33
V/C:0.03
5
Enchanted Parkway
Alignment
16th Ave S
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

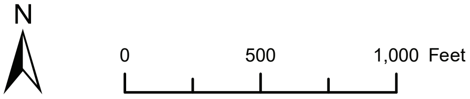

N
0
500
1,000 Feet

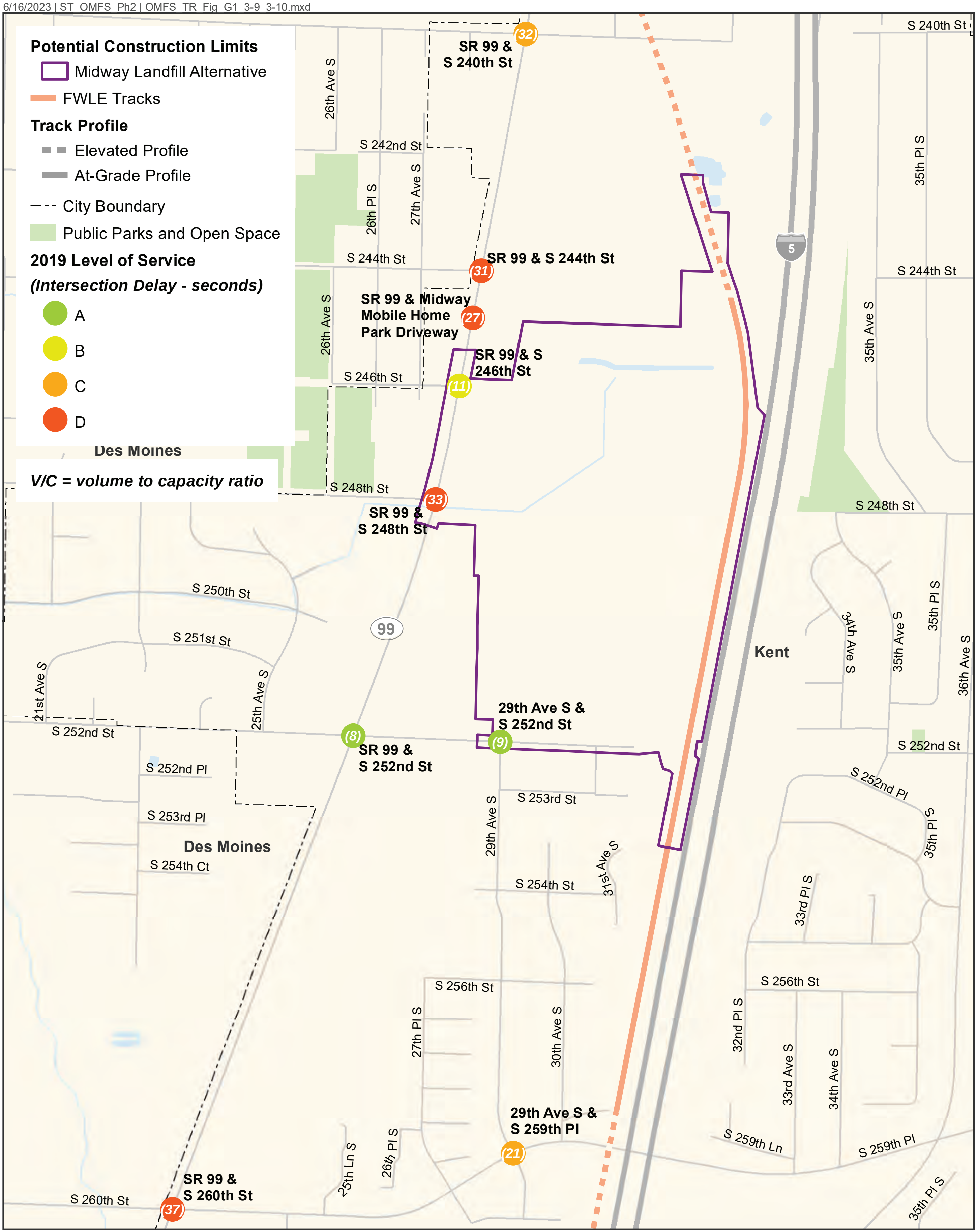
FIGURE G1.3-9

Existing AM Peak Hour Traffic Operations
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST OMFS Ph2 | OMFS TR Fig G1 3-9 3-10.mxd

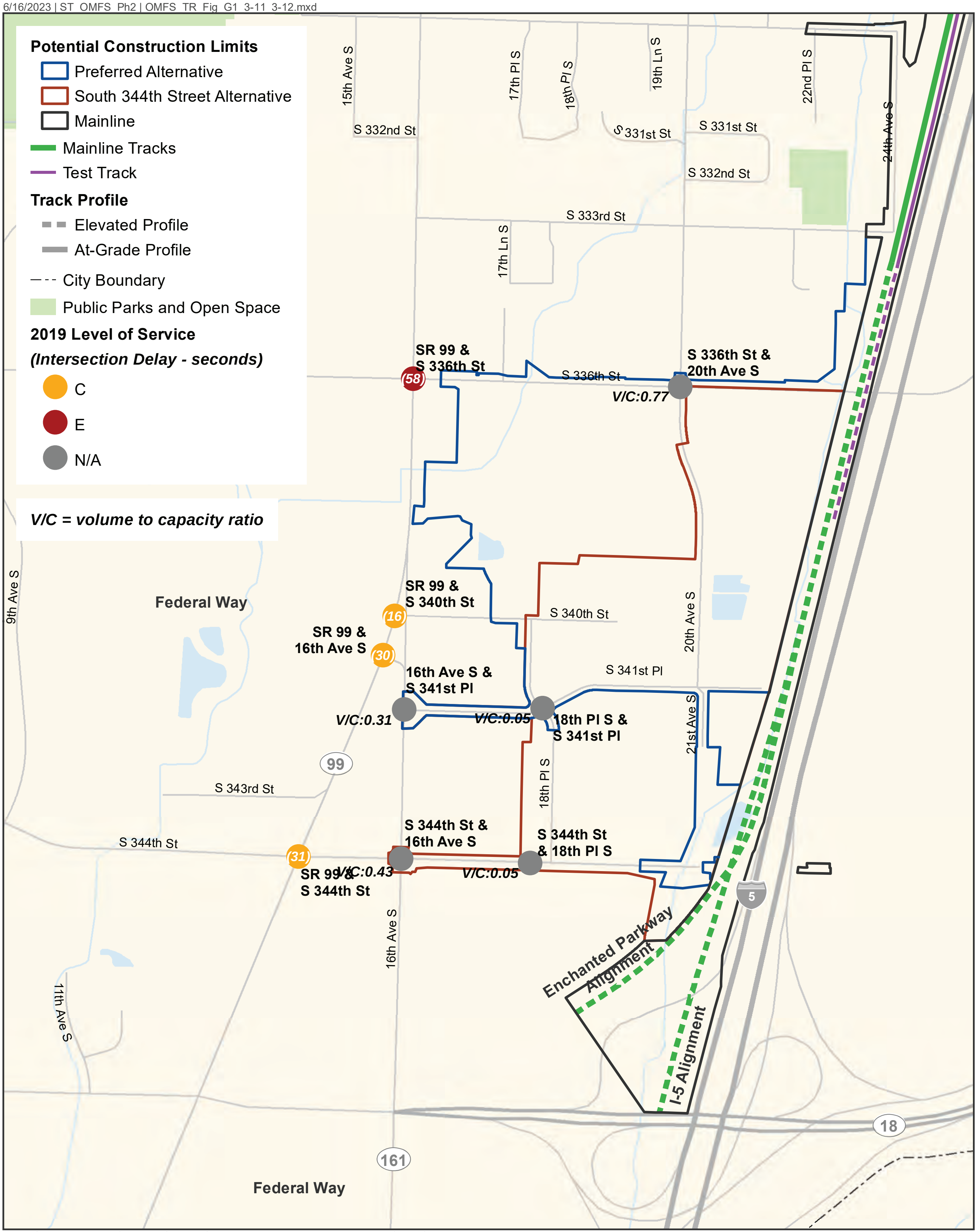

Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2019 Level of Service
(Intersection Delay - seconds)
A
B
C
D
V/C = volume to capacity ratio
S 240th St
SR 99 & S 240th St
(32)
26th Ave S
S 242nd St
26th Pl S
27th Ave S
35th Pl S
5
S 244th St
SR 99 & S 244th St
(31)
S 244th St
26th Ave S
SR 99 & Midway Mobile Home Park Driveway
(27)
35th Ave S
SR 99 & S 246th St
S 246th St
(11)
Des Moines
S 248th St
(33)
SR 99 & S 248th St
S 248th St
S 250th St
99
S 251st St
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
21st Ave S
25th Ave S
29th Ave S & S 252nd St
S 252nd St
(8)
(9)
SR 99 & S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd Pl
S 253rd St
29th Ave S
35th Pl S
Des Moines
S 254th Ct
S 254th St
31st Ave S
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
29th Ave S & S 259th Pl
(21)
S 259th Ln
S 259th Pl
SR 99 & S 260th St
S 260th St
(37)
25th Ln S
26th Pl S
35th Pl S
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-10
Existing AM Peak Hour Traffic Operations
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2019 Level of Service
(Intersection Delay - seconds)
C
E
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
58
S 336th St
S 336th St &
20th Ave S
V/C:0.77
9th Ave S
Federal Way
SR 99 &
S 340th St
16
S 340th St
20th Ave S
SR 99 &
16th Ave S
30
16th Ave S &
S 341st Pl
S 341st Pl
V/C:0.31
V/C:0.05
18th Pl S &
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
S 344th St
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
31
SR 99 &
S 344th St
V/C:0.43
V/C:0.05
5
16th Ave S
Enchanted Parkway
Alignment
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

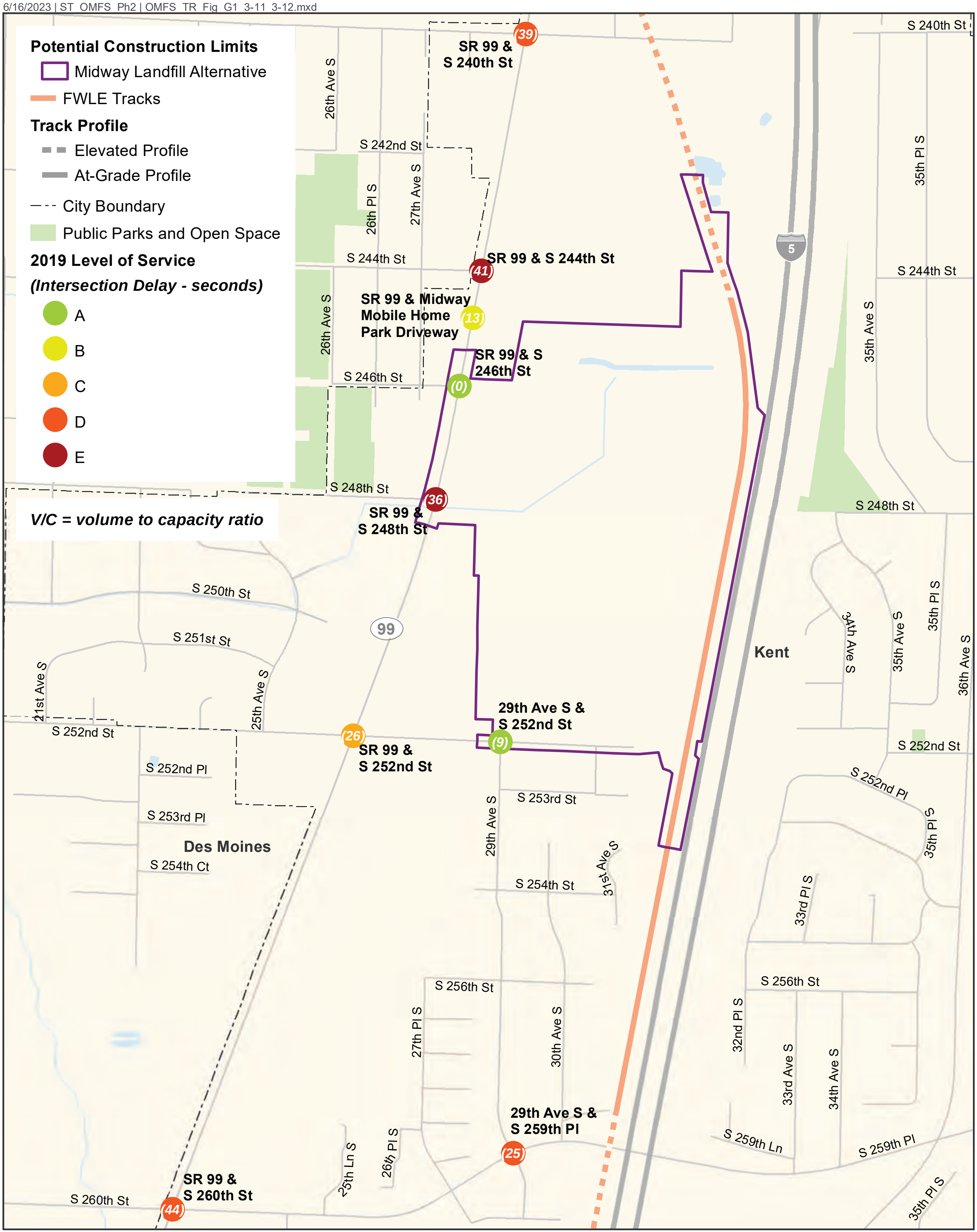
0 500 1,000 Feet

FIGURE G1.3-11

Existing PM Peak Hour Traffic Operations
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2019 Level of Service
(Intersection Delay - seconds)
A
B
C
D
E
V/C = volume to capacity ratio
S 240th St
SR 99 & S 240th St
(39)
26th Ave S
S 242nd St
26th Pl S
27th Ave S
5
S 244th St
SR 99 & S 244th St
(41)
S 244th St
26th Ave S
SR 99 & Midway Mobile Home Park Driveway
(13)
SR 99 & S 246th St
S 246th St
(0)
35th Pl S
35th Ave S
S 248th St
(36)
SR 99 & S 248th St
S 248th St
S 250th St
99
S 251st St
21st Ave S
25th Ave S
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
29th Ave S & S 252nd St
(9)
S 252nd St
(26)
SR 99 & S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd Pl
S 253rd St
29th Ave S
Des Moines
S 254th Ct
S 254th St
31st Ave S
35th Pl S
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
29th Ave S & S 259th Pl
(25)
S 259th Ln
S 259th Pl
25th Ln S
26th Pl S
SR 99 & S 260th St
S 260th St
(44)
35th Pl S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-12
Existing PM Peak Hour Traffic Operations
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

City of Kent

Within the Midway Landfill Alternative study area, Kent evaluates LOS at the roadway corridor level. The city of Kent calculates the LOS operation for key corridor intersections (in seconds of delay) during the PM peak period and then calculates an average based on a weighting of the corridor intersection volumes. Kent does not have LOS standards for AM peak period operations. This method provides a corridor-wide result, allowing some intersections to operate at a congested LOS as long as the overall corridor operation is maintained. The city of Kent's adopted LOS standard requires that all corridors operate at LOS E or better during the PM peak hour, with the exception of the Downtown zone, which is allowed to operate at LOS F, and the SR 99 corridor, which must meet WSDOT standards (City of Kent 2021). One intersection, #9 in the Midway Landfill Alternative study area, is located on a key corridor. If operations at this intersection were to degrade below LOS E and change by a full LOS step below the No-Build as a result of the project, the entire corridor would then need to be evaluated. No intersections evaluated as part of this analysis are located in the Kent Downtown zone. For intersections that would operate at LOS F under the No-Build Alternative, impacts would occur if the delay in an LOS F condition is worsened by more than 10 seconds.

3.2.3.2 AM Analysis

The existing AM peak hour LOS and delay for the study area intersections evaluated are shown in Table G1.3-9 and Table G1.3-10. In the Preferred and South 344th Street alternatives study area, all intersections operate at or better than the standards for the roadway. All intersections in the Midway Landfill Alternative study area operate at or better than the standards for the roadway in the AM peak hour. Because Federal Way and Kent's adopted LOS or v/c ratio standards applies only to the PM peak hour, those intersections located in those cities but not on a state highway are exempt from LOS or v/c ratio requirements in the AM peak hour.

Table G1.3-9 Existing AM Peak Hour Traffic Operations for Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection	Control Type	Agency (Standard)	AM Peak LOS[1, 2]	AM Peak Delay (seconds)[1, 2]	V/C Ratio[1, 2]
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.44
2	SR 99/S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A
3	SR 99/S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	17	N/A
4	SR 99/16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	35	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.11
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03
7	SR 99/ S 344th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	23	N/A

Table G1.3-9 Existing AM Peak Hour Traffic Operations for Preferred and South 344th Street Alternatives Study Area Intersections (continued)

ID	Intersection	Control Type	Agency (Standard)	AM Peak LOS[1, 2]	AM Peak Delay (seconds)[1, 2]	V/C Ratio[1, 2]
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.33
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.03

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

Table G1.3-10 Existing AM Peak Hour Traffic Operations for Midway Landfill Alternative Study Area Intersections

ID	Intersection	Control Type	Agency (Standard)	AM Peak[1, 2, 3] LOS	AM Peak[1, 2, 3] Delay (seconds)
1	SR 99/S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	32
2	SR 99/S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	31
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	27
4	SR 99/ S 246th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	B	11
5	SR 99/ S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	33
6	SR 99/ S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	A	8
7	SR 99/S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	C	21

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) At signalized intersections utilizing HCM 6th Edition methodology, U-turn movements were added to left-turn movements to allow for analysis.

3.2.3.3 PM Analysis

The existing PM peak hour LOS and delay for the study area intersections evaluated are shown in Table G1.3-11 and Table G1.3-12. In the Preferred and South 344th Street alternatives study area, only intersection #2 (SR 99/S 336th Street) operates below standards in the PM peak hour. Volumes along each approach of intersection #2 (SR 99/S 336th Street) are high, and two approaches operate at LOS E (westbound and southbound), while the other two operate at LOS D (eastbound and northbound).

Table G1.3-11 Existing PM Peak Hour Traffic Operations for Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection	Control Type	Agency (Standard)	PM Peak LOS 1, 2, 3	PM Peak Delay (seconds) 1, 2, 3	V/C Ratio1, 2, 3
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.77
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	***E***	***58***	***N/A***
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	30	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.31
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05
7	SR 99/ S 344th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	31	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.43
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

In the Midway Landfill Alternative study area, intersection #2 (SR 99/S 244th Street) and intersection #5 (SR 99/S 248th Street) operate below standard in the PM peak hour. The worst movement at both intersections is the northbound left-turn movement, which conflicts with a heavy southbound through volume.

Table G1.3-12 Existing PM Peak Hour Traffic Operations for Midway Landfill Alternative Study Area Intersections

ID	Intersection	Control Type	Agency (Standard)	PM Peak[1, 2, 3, 4] LOS	PM Peak[1, 2, 3, 4] Delay (seconds)
1	SR 99/S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	39
2	SR 99/S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***41***
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	B	13
4	SR 99/S 246th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	A	0
5	SR 99/S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***36***
6	SR 99/S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	26
7	SR 99/S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44
8	29th Avenue S/S 252nd Street	TWSC	City of Kent (LOS E)	A	9
9	29th Avenue S/S 259th Street	TWSC	City of Kent (LOS E)	D	25

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) At signalized intersections utilizing HCM 6th Edition methodology, U-turn movements were added to left-turn movements to allow for analysis.

(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

3.3 Freight

Freeways, arterials, and local streets are important to moving freight and goods in the study area. Freight is transported only via the roadway network in the study area; no other transportation modes provide freight movement.

WSDOT has designated roadways as freight routes that are classified based on the amount of annual tonnage that is transported along a road in a particular year. This classification system is called the Freight Goods Transportation System. The classifications range from roadways that carry more than 20,000 tons in 60 days to more than 10 million tons annually, as summarized in Table G1.3-13.

Table G1.3-13 Freight Goods Transportation System Classification System

Freight Goods Transportation System Classification	Annual Gross Tonnage
T-1	Over 10,000,000
T-2	4,000,000 to 10,000,000
T-3	300,000 to 4,000,000
T-4	100,000 to 300,000
T-5	Over 20,000 in 60 days

Source: (WSDOT 2020b).

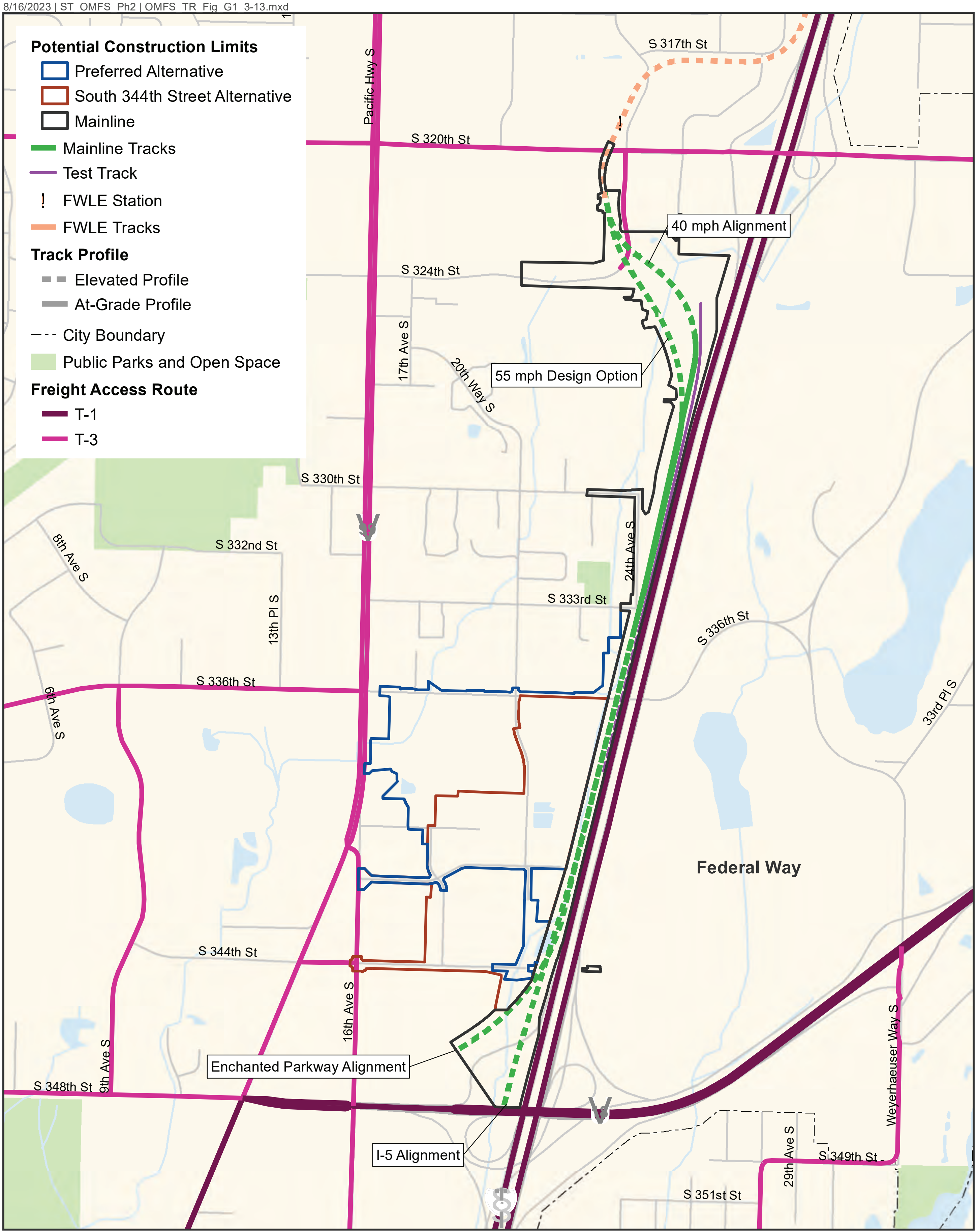
In the study areas, there are several designated freight routes, which include:

- I-5: T-1 route
- SR 99: T-3 route
- 23rd Avenue S: T-3 route
- S 259th Place: T-3 route
- S 260th Place: T-3 route

SR 99 is a designated truck/freight route by the cities of Federal Way and Kent. The city of Federal Way has also designated 16th Avenue S as a freight route.

The primary freight access routes in the study areas are shown in Figure G1.3-13 and Figure G1.3-14.

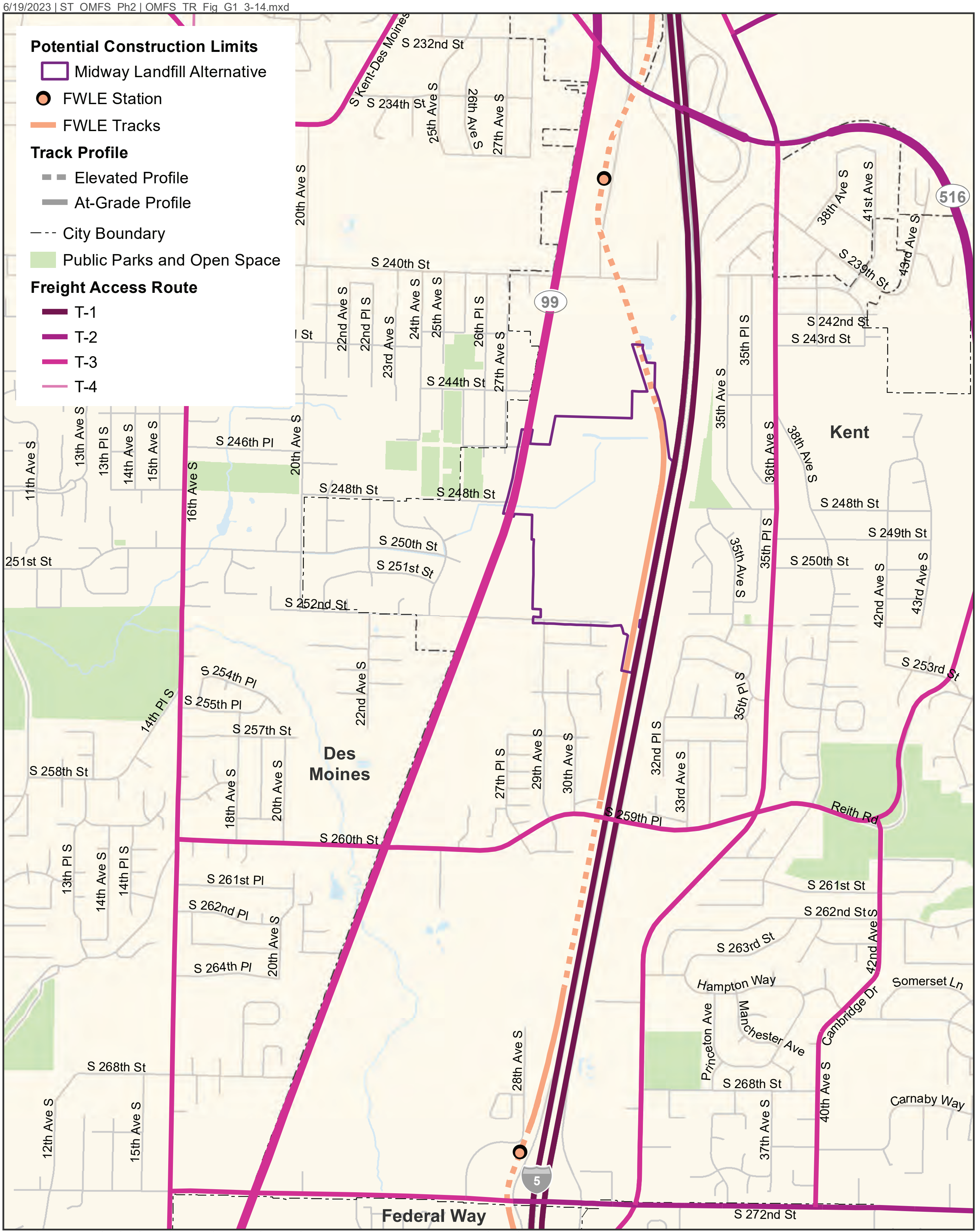
8/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-13.mxd



Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Freight Access Route
T-1
T-3
S 317th St
Pacific Hwy S
S 320th St
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
Enchanted Parkway Alignment
S 348th St
Weyerhaeuser Way S
29th Ave S
S 349th St
I-5 Alignment
S 351st St
99
5
N
0
500
1,000 Feet

Data Sources: WSDOT (2023); King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-13
Existing Freight Access Routes
Preferred and
South 344th Street Alternatives
OMF South


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Freight Access Route
T-1
T-2
T-3
T-4
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
20th Ave S
S 240th St
99
516
5
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 242nd St
S 243rd St
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
35th Ave S
35th Pl S
36th Ave S
38th Ave S
Kent
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
S 246th Pl
20th Ave S
S 248th St
S 248th St
S 248th St
S 249th St
S 250th St
S 250th St
S 251st St
251st St
35th Ave S
35th Pl S
42nd Ave S
43rd Ave S
S 252nd St
S 253rd St
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
35th Pl S
Des Moines
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
Reith Rd
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 262nd Pl
20th Ave S
S 264th Pl
S 261st St
S 262nd St
42nd Ave S
S 263rd St
Hampton Way
Somerset Ln
Princeton Ave
Manchester Ave
Cambridge Dr
S 268th St
S 268th St
28th Ave S
37th Ave S
40th Ave S
Carnaby Way
12th Ave S
15th Ave S
Federal Way
S 272nd St

Data Sources: WSDOT (2023); King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-14

Existing Freight Access Routes
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.4 Transit

King County Metro Transit (Metro), Sound Transit, and Pierce Transit provide transit service in the study area, with regional and local bus fixed route service to transit centers, park-and-ride facilities, and bus stops.

Nine bus routes provide service to the study areas.[2] Table G1.3-14 summarizes the service provider, route number, weekday frequency, and routing. Figure G1.3-15 and Figure G1.3-16 show the fixed route transit services provided in the study area. In addition to fixed route bus service, Metro also provides paratransit (Access) and various rideshare services, such as vanpool and ride matching services. Neither light rail nor commuter rail service is currently provided in the study areas. Bus stops in the study areas are located primarily on SR 99 but also include some stops on 20th Avenue S, S 336th Street, 16th Avenue S, and at the Federal Way/S 320th Street Park & Ride.

The Federal Way/S 320th Street Park & Ride is located within the Preferred and South 344th Street alternatives study area. It is served by Metro routes 177, 182, 193, and 903 and Pierce Transit routes 402, 500, and 501. Parking is available and free for transit customers. It has 877 spaces and had a utilization rate of 1.3 percent in the first quarter of 2023 (King County Metro 2023).

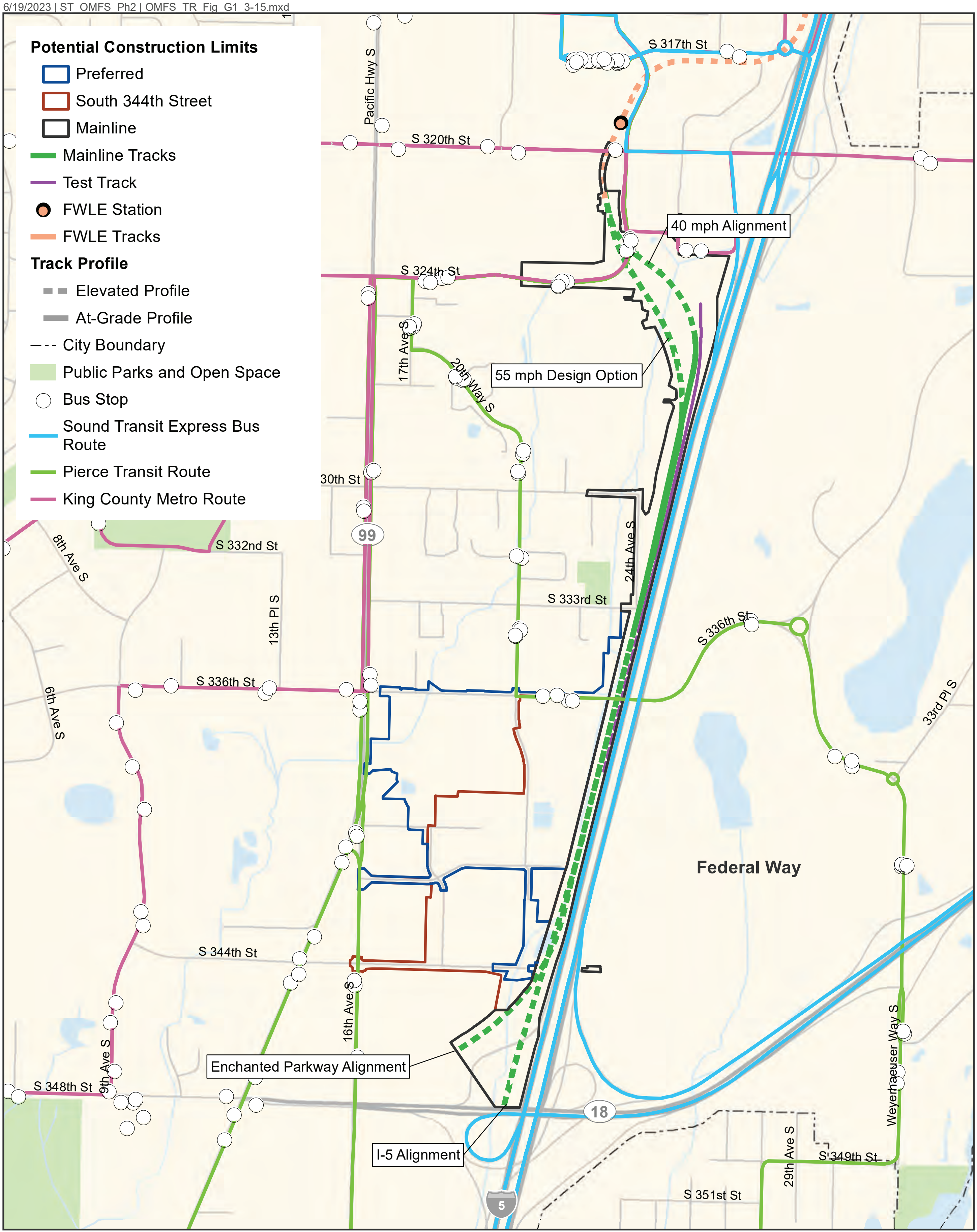
Table G1.3-14 Study Areas Existing Transit Service

Service Provider	Route	Weekday Frequency	Routing
King County Metro Transit	RapidRide A Line	10–15 minutes all day	Federal Way Downtown Station to Tukwila International Boulevard Station
King County Metro Transit	165	20–30 minutes during the AM and PM peak periods; 30 minutes midday	Green River College to Burien Transit Center via Auburn, Kent, Des Moines, and Normandy Park
King County Metro Transit	177	20–60 minutes during the AM and PM peak periods	Federal Way/S 320th Park & Ride to downtown Seattle
King County Metro Transit	182	20–30 minutes during the AM and PM peak periods; 60 minutes midday	Northeast Tacoma to Federal Way Downtown Station
King County Metro Transit	193	5–90 minutes during the AM and PM peak periods	Federal Way/S 320th Park & Ride to First Hill Seattle via Star Lake, Kent, Des Moines, and Tukwila
King County Metro Transit	903	30–60 minutes all day	Federal Way Downtown Station to Twin Lakes
Pierce Transit	402	30-60 minutes during the AM peak period; 60-80 minutes during the PM peak period and midday	Meridian to Federal Way Downtown Station
Pierce Transit	500	60 minutes all day	Tacoma to Federal Way Downtown Station
Pierce Transit	501	60 minutes all day	Milton to Federal Way Downtown Station

Sources: King County Metro (2023); Pierce Transit (2023).

---

[2] Additionally, several Metro and Sound Transit routes provide service on I-5 through the study areas.


Potential Construction Limits
Preferred
South 344th Street
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Bus Stop
Sound Transit Express Bus Route
Pierce Transit Route
King County Metro Route
S 317th St
Pacific Hwy S
S 320th St
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
30th St
99
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
Enchanted Parkway Alignment
9th Ave S
S 348th St
18
I-5 Alignment
Weyerhaeuser Way S
29th Ave S
S 349th St
S 351st St
5

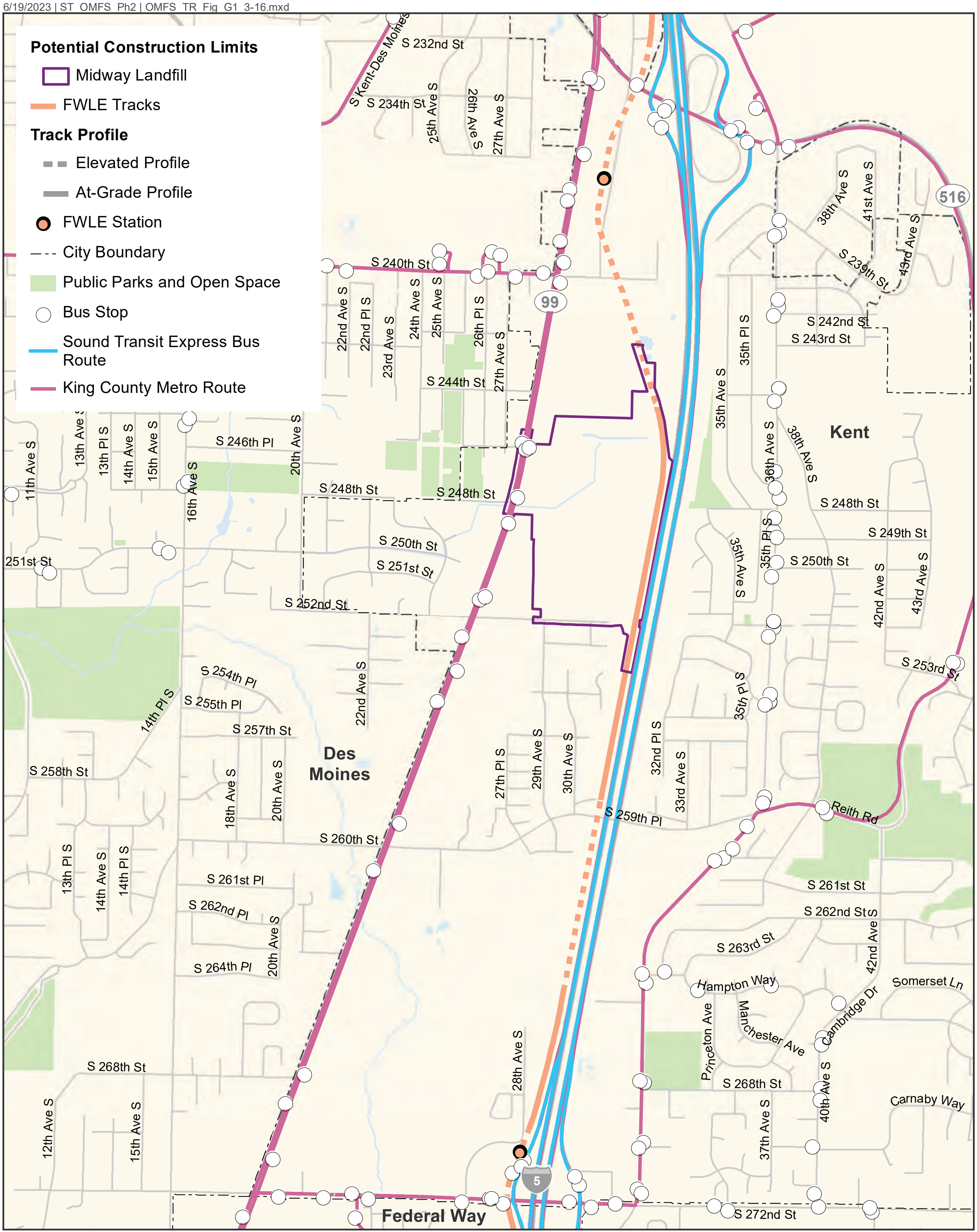
Data Sources: Sound Transit; King County Metro; Pierce Transit; King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G1.3-15
Existing Transit Routes
Preferred and
South 344th Street Alternatives
OMF South

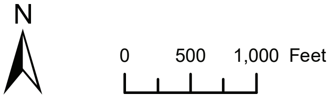
DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/19/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-16.mxd


Potential Construction Limits
Midway Landfill
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Station
City Boundary
Public Parks and Open Space
Bus Stop
Sound Transit Express Bus Route
King County Metro Route
Kent
Des Moines
Federal Way
99
516
5
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
S 240th St
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
S 246th Pl
20th Ave S
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
S 248th St
S 248th St
S 250th St
S 251st St
251st St
S 252nd St
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 262nd Pl
20th Ave S
S 264th Pl
S 268th St
12th Ave S
15th Ave S
28th Ave S
38th Ave S
41st Ave S
S 239th St
43rd Ave S
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
S 248th St
S 249th St
35th Pl S
35th Ave S
S 250th St
42nd Ave S
43rd Ave S
S 253rd St
35th Pl S
Reith Rd
S 261st St
S 262nd St
42nd Ave S
S 263rd St
Hampton Way
Somerset Ln
Princeton Ave
Manchester Ave
Cambridge Dr
S 268th St
40th Ave S
37th Ave S
Carnaby Way
S 272nd St

Data Sources: Sound Transit; King County Metro; Pierce Transit; King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-16
Existing Transit Routes
Midway Landfill Alternative


N
0
500
1,000
Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

The city of Federal Way designates transit priority corridors that are welcoming to transit and have appropriate supportive amenities that encourage ridership. SR 99 and 16th Avenue S are transit priority corridors in the Preferred and South 344th Street alternatives study area. The city of Kent does not have designated transit streets or priority corridors.

3.5 Nonmotorized Facilities

In general, the opportunities for nonmotorized (bicycle and pedestrian) circulation in the study areas are limited. East-west circulation within the study areas is limited by the presence of I-5. Each study area has only one crossing of I-5: S 336th Street in the Preferred and South 344th Street alternatives study area and S 259th Street in the Midway Landfill Alternative study area. As a result, most east-west streets in the study areas are dead ends.

In the Preferred and South 344th Street alternatives study area, north-south circulation is provided via SR 99, 16th Avenue S, 18th Place S, 20th Avenue S, and 23rd Avenue S. East-west travel is facilitated by S 324th Street, S 336th Street, S 340th Street, S 341st Place, and S 344th Street.

The presence of the Midway Landfill and other large developments restrict north-south nonmotorized circulation in the Midway Landfill Alternative study area north of S 252nd Street, and SR 99 provides the only north-south pedestrian connection in the study area between S 240th Street and S 252nd Street. The street network south of S 252nd Street has a more developed grid and offers better opportunities for nonmotorized circulation. East-west circulation is similarly restricted.

Nonmotorized facilities are inventoried in the following sections. Figure G1.3-17 and Figure G1.3-18 display the existing pedestrian and bicycle facilities within the study areas and their vicinities.

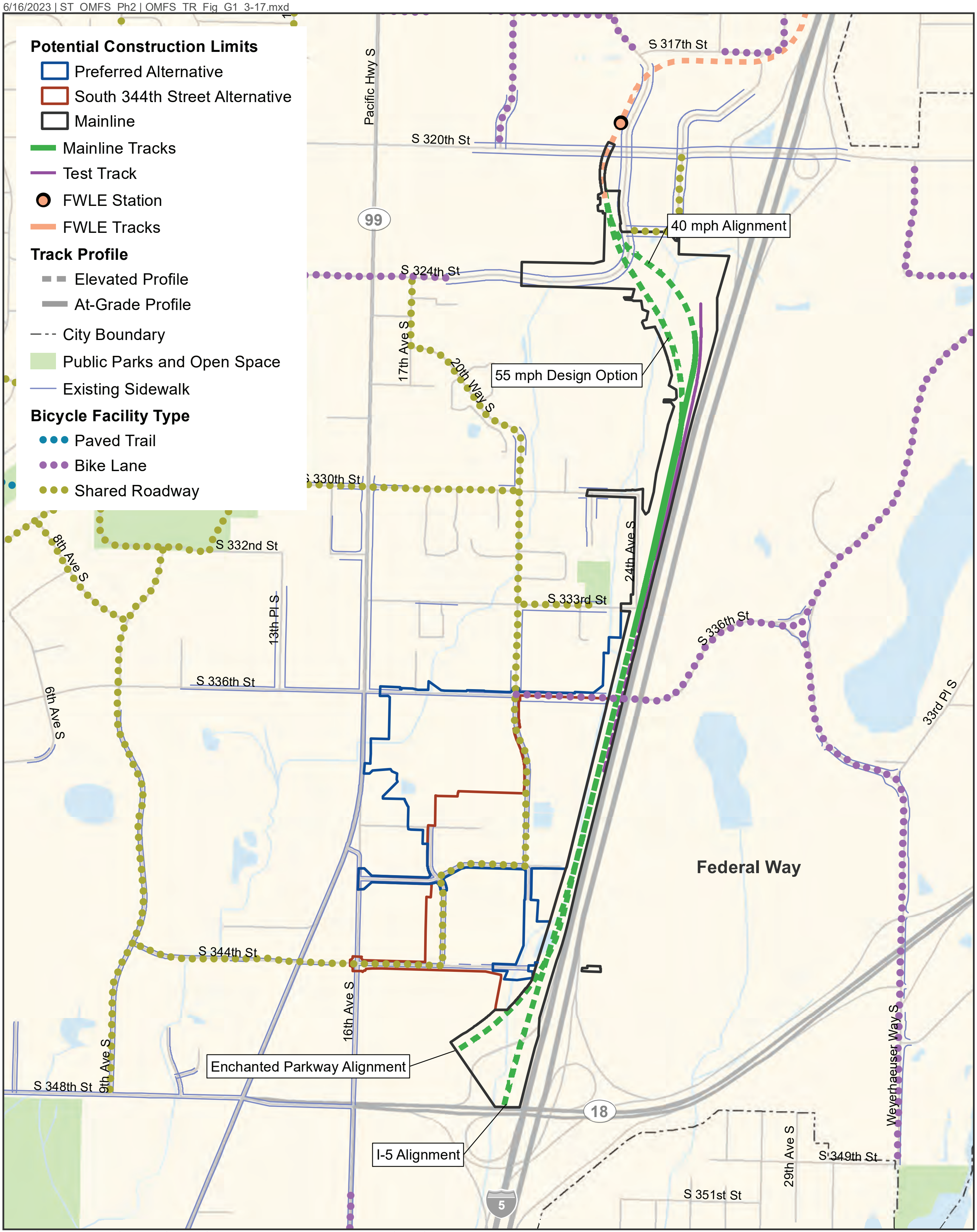
3.5.1 Pedestrian Facilities

Sidewalks are provided on most arterial streets in the study areas. Exceptions include a portion of the north side of S 336th Street and S 344th Street between SR 99 and 16th Avenue S in the Preferred and South 344th Street alternatives study area as well as a short segment of S 259th Street west of I-5 in the Midway Landfill Alternative study area. Sidewalks are also present on some nonarterial streets in the study areas. Marked crosswalks are provided at signalized intersections in the study areas and provide opportunities to access pedestrian facilities west of the study areas. I-5 restricts most opportunities for pedestrian connections east of the study areas.

3.5.2 Bicycle Facilities

Bicycle facilities in the Preferred and South 344th Street alternatives study area include east- and westbound bicycle lanes on S 336th Street east of 20th Avenue S and a greenway on 20th Avenue S, S 341st Place, 18th Place S, and S 344th Street. The Bonneville Power Administration (BPA) Trail, a shared-use trail, is located to the west of the study area, but there are no dedicated bicycle facilities that provide connections to it. The bicycle lanes on S 336th Street provide connections to facilities east of I-5 on Weyerhaeuser Way S. Federal Way recently installed shared lane markings for bicycles on 25th Avenue S, north of the South 320th Park & Ride.

There are no designated bicycle facilities in the Midway Landfill Alternative study area. Bicycle lanes are on some nearby roadways, and the nearest regional trail is the Green River Trail east of I-5. However, there are no existing bicycle connections from the Midway Landfill Alternative study area to these facilities.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Existing Sidewalk
Bicycle Facility Type
Paved Trail
Bike Lane
Shared Roadway
Pacific Hwy S
S 317th St
S 320th St
99
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
S 332nd St
8th Ave S
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
S 348th St
Enchanted Parkway Alignment
18
I-5 Alignment
29th Ave S
S 349th St
Weyerhaeuser Way S
S 351st St
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

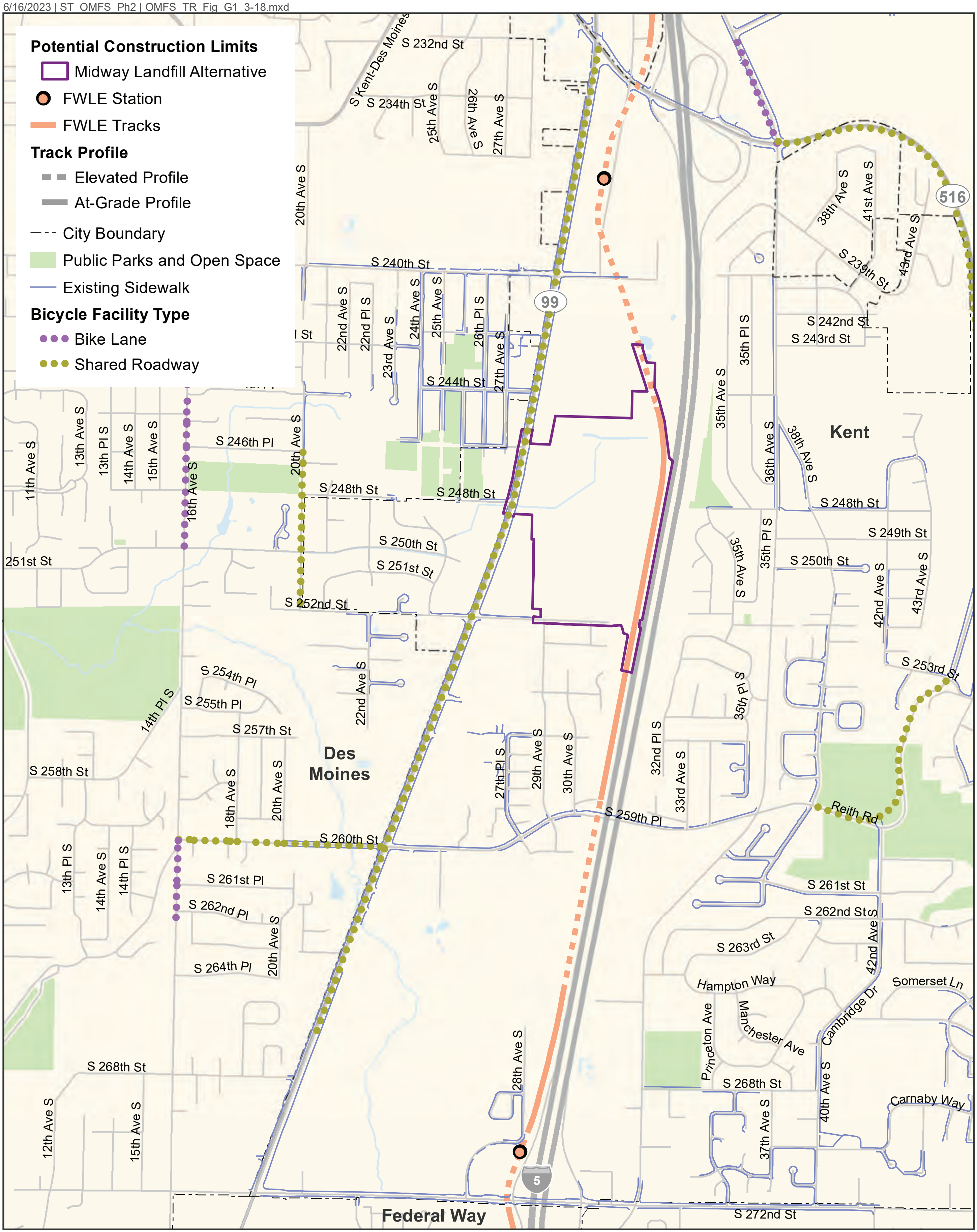
0 500 1,000 Feet

FIGURE G1.3-17

Existing Bicycle and Pedestrian Facilities
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Existing Sidewalk
Bicycle Facility Type
Bike Lane
Shared Roadway
Kent
Des Moines
Federal Way
99
516
5
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
20th Ave S
S 240th St
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
S 248th St
S 249th St
S 250th St
42nd Ave S
43rd Ave S
S 253rd St
35th Pl S
35th Ave S
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
S 246th Pl
20th Ave S
S 248th St
S 248th St
S 250th St
S 251st St
251st St
S 252nd St
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
Reith Rd
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 262nd Pl
20th Ave S
S 264th Pl
S 261st St
S 262nd St
42nd Ave S
S 263rd St
Hampton Way
Somerset Ln
Manchester Ave
Princeton Ave
Cambridge Dr
S 268th St
S 268th St
28th Ave S
12th Ave S
15th Ave S
37th Ave S
40th Ave S
Carnaby Way
S 272nd St
N
0
500
1,000
Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-18
Existing Bicycle and Pedestrian Facilities
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.5.3 Pedestrian and Bicycle Volumes

Along with the weekday turning movement counts, bicycle and pedestrian counts were collected for the same 1-day period in the AM and PM peak period (September 24, 2019). Weather is sometimes a variable for consideration when looking at pedestrian and bicycle counts. On the day of the count, the weather was partly sunny with a high of 70 degrees Fahrenheit; therefore, the weather was conducive to both modes. Tables G1.3-15 through G1.3-18 show the existing AM and PM peak hour bicycle and pedestrian counts at the study area intersections for the common peak hours.

Pedestrian volumes were relatively low in the Preferred and South 344th Street alternatives study area during the AM and PM peak hours. The highest pedestrian volumes in this study area were at intersection #2 in the AM peak hour and intersections #3, #5, and #8 in the PM peak hour. The pedestrian volumes are all within serviceable levels for signalized intersections. As shown in the tables, the highest pedestrian volumes in the Midway Landfill Alternative study area are at intersections #1, #6, and #7 in the AM and PM peak hours.

There were almost no bicycle trips through intersections in either study area, both in the AM and PM peak hours.

Table G1.3-15 Existing AM Peak Hour Pedestrian and Bicycle Volumes for Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection	Bicycle Eastbound	Bicycle Westbound	Bicycle Northbound	Bicycle Southbound	Pedestrian East	Pedestrian West	Pedestrian North	Pedestrian South
1	S 336th Street/ 20th Avenue S	0	2	0	0	0	2	3	0
2	SR 99/ S 336th Street	0	0	0	0	7	3	7	4
3	SR 99/ S 340th Street	0	0	0	0	3	0	0	0
4	SR 99/ 16th Avenue S	0	0	0	0	0	2	1	0
5	16th Avenue S/ S 341st Place	N/A	0	0	0	0	N/A	0	0
6	18th Place S/ S 341st Place	0	0	0	0	0	0	0	0
7	SR 99/ S 344th Street	0	0	0	0	0	0	2	0
8	S 344th Street/ 16th Avenue S	0	0	0	0	1	0	1	2
9	S 344th Street/ 18th Place S	0	0	0	0	1	0	1	0

Note: Data obtained from IDAX traffic study, September 2019.

Table G1.3-16 Existing PM Peak Hour Pedestrian and Bicycle Volumes for Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection	Bicycle Eastbound	Bicycle Westbound	Bicycle Northbound	Bicycle Southbound	Pedestrian East	Pedestrian West	Pedestrian North	Pedestrian South
1	S 336th Street/ 20th Avenue S	0	1	0	0	2	1	0	2
2	SR 99/ S 336th Street	0	0	0	0	6	2	4	0
3	SR 99/ S 340th Street	0	0	0	0	15	7	0	0
4	SR 99/ 16th Avenue S	0	0	0	1	3	4	0	1
5	16th Avenue S/ S 341st Place	N/A	0	0	0	10	N/A	0	0
6	18th Place S/ S 341st Place	0	0	0	0	0	0	0	1
7	SR 99/ S 344th Street	1	0	0	0	2	6	0	0
8	S 344th Street/ 16th Avenue S	0	0	0	0	7	1	1	2
9	S 344th Street/ 18th Place S	0	0	0	0	0	0	0	0

Note: Data obtained from IDAX traffic study, September 2019.

Table G1.3-17 Existing AM Peak Hour Pedestrian and Bicycle Volumes for Midway Landfill Alternative Study Area Intersections

ID	Intersection	Bicycle Eastbound	Bicycle Westbound	Bicycle Northbound	Bicycle Southbound	Pedestrian East	Pedestrian West	Pedestrian North	Pedestrian South
1	SR 99/ S 240th Street	0	0	0	0	39	52	38	63
2	SR 99/ S 244th Street	0	0	0	0	6	6	0	2
3	SR 99/Midway Mobile Home Park Driveway	N/A	0	0	0	6	N/A	2	0
4	SR 99/ S 246th Street	0	0	0	0	3	8	0	0
5	SR 99/ S 248th Street	0	0	0	0	1	3	1	0
6	SR 99/ S 252nd Street	0	0	0	0	14	3	7	8
7	SR 99/ S 260th Street	1	0	0	0	6	5	12	15
8	29th Avenue S/ S 252nd Street	0	0	1	N/A	1	0	N/A	0
9	29th Avenue S/ S 259th Street	2	0	0	0	1	1	6	0

Note: Data obtained from IDAX traffic study, September 2019.

Table G1.3-18 Existing PM Peak Hour Pedestrian and Bicycle Volumes for Midway Landfill Alternative Study Area Intersections

ID	Intersection	Bicycle Eastbound	Bicycle Westbound	Bicycle Northbound	Bicycle Southbound	Pedestrian East	Pedestrian West	Pedestrian North	Pedestrian South
1	SR 99/ S 240th Street	0	0	0	0	21	45	35	36
2	SR 99/ S 244th Street	0	0	0	0	6	7	0	5
3	SR 99/Midway Mobile Home Park Driveway	N/A	0	0	0	10	N/A	2	2
4	SR 99/ S 246th Street	0	0	1	1	2	7	0	1
5	SR 99/ S 248th Street	0	0	0	0	4	11	0	0
6	SR 99/ S 252nd Street	0	0	0	0	30	18	13	32
7	SR 99/ S 260th Street	0	0	0	0	17	6	4	26
8	29th Avenue S/ S 252nd Street	0	0	0	N/A	2	1	N/A	0
9	29th Avenue S/ S 259th Street	0	0	0	1	0	0	6	0

Note: Data obtained from IDAX traffic study, September 2019.

3.6 Parking

On-street parking is limited in the Preferred and South 344th Street alternatives study area. It is permitted between 8:00 a.m. and 6:00 p.m. on the west side of 18th Place S north of S 341st Place, the north side of S 341st Place, and the south side of S 344th Street east of 18th Place S. It is also permitted along 21st Avenue S subject to weight restrictions. Unrestricted (free, with no time restrictions) on-street parking is permitted on most residential streets south of the landfill property in the Midway Landfill Alternative study area. On-street parking is not permitted on SR 99, S 240th Street, S 259th Street, or S 260th Street, or on 18th Place S south of S 341st Place.

All private parking is associated with businesses in the project area, and there are no pay-for-parking facilities within the project area. Several off-street private business parking lots are available for use by employees and patrons within the study areas.

3.7 Safety

Historical intersection collision data was collected from WSDOT for the 3-year period from January 2016 to December 2018. This data was then reviewed to identify if any of the study area intersections or roadway segments have existing safety concerns that could be exacerbated by the project, as described in the following sections. Sound Transit decided not to update this analysis from the 2021 SEPA Draft EIS as collision rates over 2020 and 2021 are not representative due to the effects of the COVID pandemic. The data from 2016 to 2018 provides a more conservative (higher) collision rate.

3.7.1 Collisions by Severity

Tables G1.3-19 and G1.3-20 summarize collisions by severity and include total collisions and collision rates over the specified 3-year period at both study area intersections and roadway segments.

The majority of collisions at the study intersections and roadway segments resulted in property damage only (nearly 69 percent in the Preferred and South 344th Street alternatives study area and approximately 65 percent in the Midway Landfill Alternative study area). Almost all remaining collisions (approximately 30 percent in each study area) resulted in minor or possible injuries.[3]

In both study areas, no notable contributing factors were provided for the fatal and serious injury crashes other than two due to driver inattention and one due to driver disregard for a traffic signal.

Figure G1.3-19 and Figure G1.3-20 show the location of collisions by severity in the study areas.

Table G1.3-19 Existing Collisions by Severity for Preferred and South 344th Street Alternatives Study Area Intersections and Roadway Segments

ID	Intersection/ Roadway Segment Name	Intersection/ Roadway Segment Average Daily Traffic	Fatal	Serious Injury	Minor or Possible Injury	Property Damage Only	Total	Collision Rate (collisions/ MEV or MVMT)[1,2]
	Intersection							
1	20th Avenue S/ S 336th Street	14,500	0	0	1	6	7	0.41
2	SR 99/S 336th Street	59,590	0	1	25	38	64	**1.24**
3	SR 99/S 340th Street	40,690	0	0	1	3	4	0.11
4	SR 99/16th Avenue S	41,340	0	0	13	32	45	**1.24**
5	16th Avenue S/ S 341st Place	24,440	0	0	0	3	3	0.16
6	18th Place S/ S 341st Place	2,480	0	0	0	0	0	0.00
7	SR 99/S 344th Street	26,400	0	0	12	21	33	**1.44**
8	S 344th Street/ 16th Avenue S	29,320	0	0	8	12	20	0.89
9	S 344th Street/ 18th Place S	1,570	0	0	1	1	2	**1.59**
	Intersection Total		**0**	**1**	**61**	**116**	**178**	
	Roadway Segment							
1	SR 99 Segment S 336th Street to S 344th Street	31,300	0	1	1	18	20	0.85
2	S 336th Street Segment SR 99 to 20th Avenue S	11,900	0	0	3	3	6	1.71
3	S 341st Place Segment 16th Avenue S to 18th Place S	1,500	0	0	0	0	0	0.00
4	S 344th Street Segment SR 99 to 18th Place S	5,000	0	0	0	4	4	5.38

---

[3] WSDOT defines minor injury as "One or more persons in a crash had a non-life threatening injury such as: lump on the head, abrasion, bruise, or minor laceration" and possible injury as "One or more persons in a crash had: momentary unconsciousness, claim of injury, limping, complaint of pain, or nausea. These injuries are those reported by the person or indicated by their behavior, but where no wounds or injuries are readily evident" (WSDOT 2020)

Table G1.3-19 Existing Collisions by Severity for Preferred and South 344th Street Alternatives Study Area Intersections and Roadway Segments (continued)

ID	Intersection/ Roadway Segment Name	Intersection/ Roadway Segment Average Daily Traffic	Fatal	Serious Injury	Minor or Possible Injury	Property Damage Only	Total	Collision Rate (collisions/ MEV or MVMT)[1,2]
5	16th Avenue S Segment SR 99 to S 344th Street	25,700	0	0	3	12	15	4.19
6	18th Place S Segment S 341st Place to S 344th Street	800	0	0	0	1	1	6.78
	Roadway Segment Total		**0**	**1**	**7**	**38**	**46**	

Source: WSDOT Transportation Data and GIS Office, January 2016 to December 2018.

Notes:

(1) MEV = million entering vehicles (intersections only); MVMT = million vehicle miles traveled (segments only)

(2) Bolded values indicate collision rates over the 1 collision per million entering vehicles threshold for intersections or over the 10 collisions per million vehicle miles traveled threshold for segments

Disclaimer: Under 23 U.S. Code § 409, safety data, reports, surveys, schedules, or lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Table G1.3-20 Existing Collisions by Severity for Midway Landfill Alternative Study Area Intersections and Roadway Segments

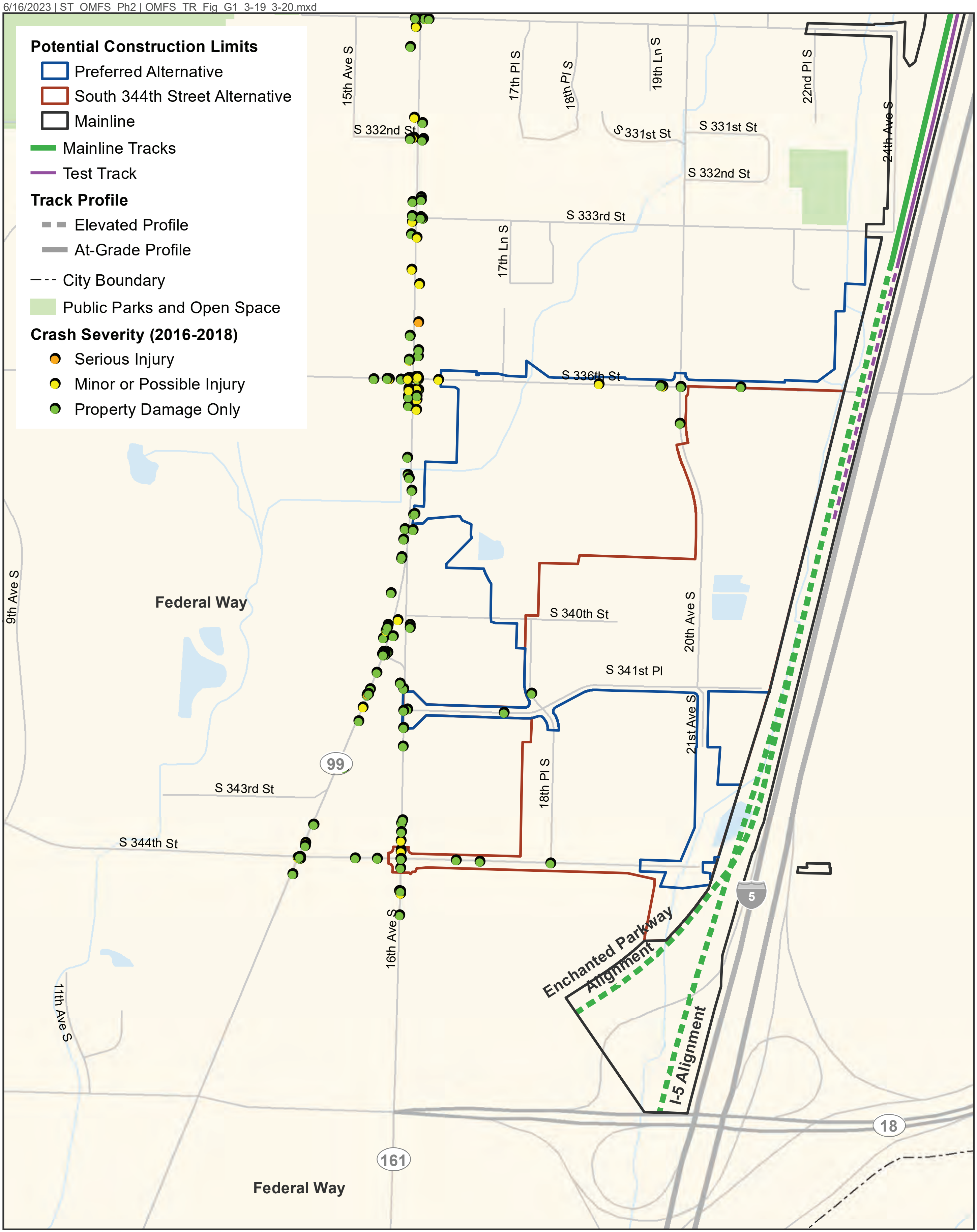
ID	Intersection/Roadway Segment Name	Intersection/Roadway Segment Average Daily Traffic	Fatal	Serious Injury	Minor or Possible Injury	Property Damage Only	Total	Collision Rate (collisions/MEV or MVMT)[1]
	Intersection							
1	SR 99/S 240th Street	45,750	2	2	13	39	56	1.48
2	SR 99/S 244th Street	37,810	0	0	1	2	3	0.10
3	SR 99/Midway Mobile Home Park Driveway	38,230	0	0	0	0	0	0.00
4	SR 99/S 246th Street	37,910	0	0	1	1	2	0.06
5	SR 99/S 248th Street	39,120	0	0	1	6	7	0.22
6	SR 99/S 252nd Street	42,190	1	2	12	32	47	1.35
7	SR 99/S 260th Street	50,080	0	0	17	40	57	1.38
8	29th Avenue S/ S 252nd Street	1,280	0	1	0	1	2	1.46
9	29th Avenue S/S 259th Street	11,950	0	0	2	2	4	0.32
	Intersection Collision Total		**3**	**5**	**47**	**123**	**178**	
	Roadway Segment							
1	SR 99 Segment S 240th Street to S 260th Street	37,000	1	1	25	36	63	2.69
2	S 252nd Street Segment SR 99 to 29th Avenue S	1,600	0	0	2	2	4	1.14
3	S 260th Segment SR 99 to 29th Avenue S	11,000	0	0	5	11	16	4.57
	Roadway Segment Total		**1**	**1**	**32**	**49**	**83**	

Source: WSDOT Transportation Data and GIS Office, January 2016 to December 2018.

Notes:

(1) MEV = million entering vehicles (intersections only); MVMT = million vehicle miles traveled (segments only)

Disclaimer: Under 23 U.S. Code § 409, safety data, reports, surveys, schedules, or lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Crash Severity (2016-2018)
Serious Injury
Minor or Possible Injury
Property Damage Only
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
S 336th St
Federal Way
9th Ave S
S 340th St
20th Ave S
S 341st Pl
21st Ave S
99
18th Pl S
S 343rd St
S 344th St
5
16th Ave S
Enchanted Parkway Alignment
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: WSDOT; King County; Cities of Des Moines, Federal Way, Kent (2019).

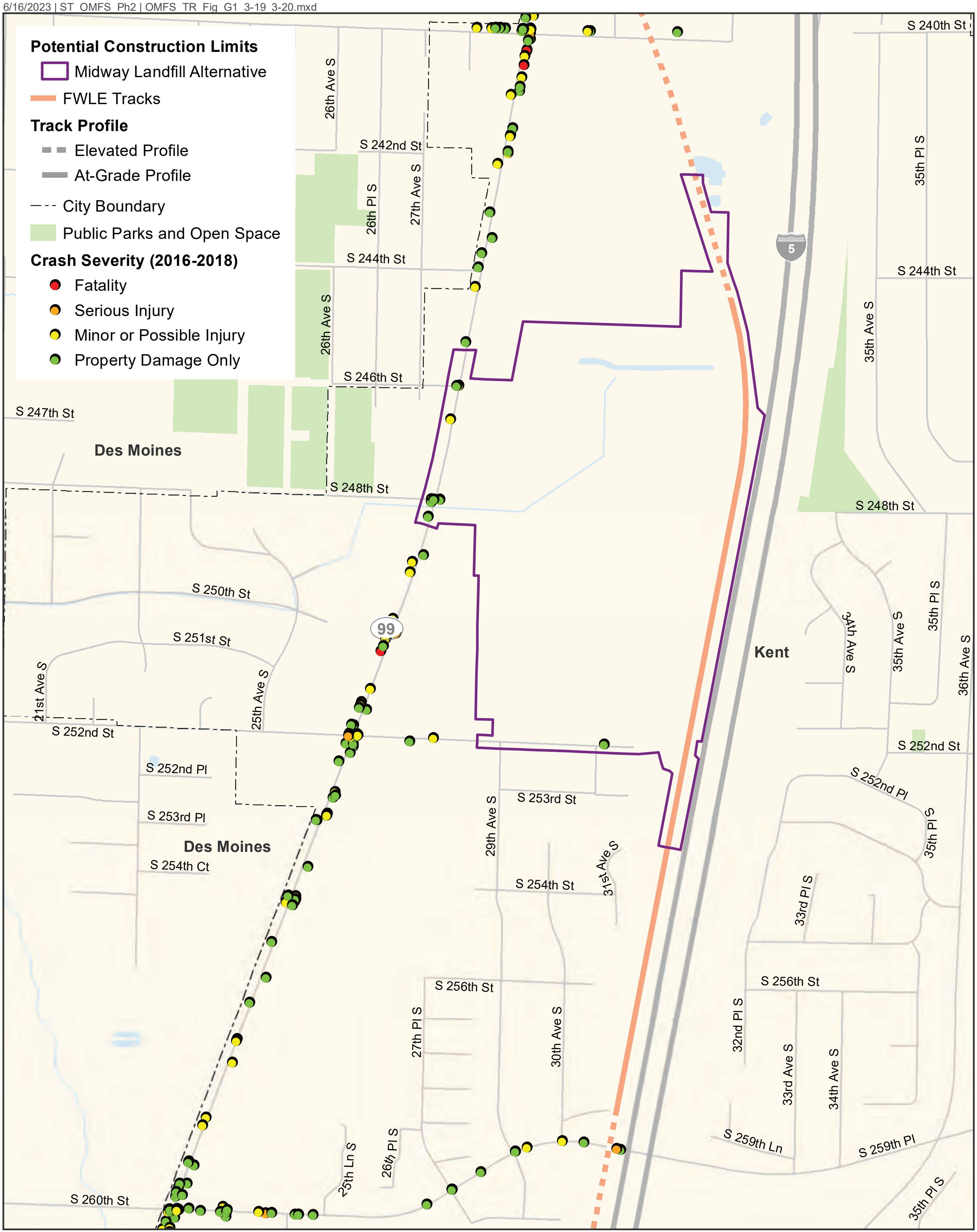
N

0 500 1,000 Feet

FIGURE G1.3-19
Collision Locations by Severity
Preferred and
South 344th Street Alternatives
OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_3-19_3-20.mxd


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Crash Severity (2016-2018)
Fatality
Serious Injury
Minor or Possible Injury
Property Damage Only
S 240th St
26th Ave S
S 242nd St
26th Pl S
27th Ave S
35th Pl S
5
S 244th St
S 244th St
26th Ave S
35th Ave S
S 246th St
S 247th St
Des Moines
S 248th St
S 248th St
S 250th St
99
S 251st St
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
21st Ave S
25th Ave S
S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd St
29th Ave S
S 253rd Pl
35th Pl S
Des Moines
31st Ave S
S 254th Ct
S 254th St
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
S 259th Ln
S 259th Pl
25th Ln S
26th Pl S
S 260th St
35th Pl S

Data Sources: WSDOT; King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.3-20
Collision Locations by Severity
Midway Landfill Alternative

N

0 500 1,000 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

3.7.2 Collisions by Type

In addition to summarizing the collision data by severity, study area intersection collisions are summarized by type in Tables G1.3-21 and G1.3-22. The most common types of collisions in the study areas were rear-end; angle (T-bone) collisions represented the second most common type of collision. Rear-end collisions made up the highest percentage (approximately 39 percent) of all collisions at intersections and roadway segments on SR 99, while angle collisions made up 21 percent of all crashes in the area.

Table G1.3-21 Existing Collisions by Type (January 2016 to December 2018) for Preferred and South 344th Street Alternatives Study Area Intersections

ID	Intersection/ Roadway Segment Name	Approach Turn	Rear End	Sideswipe	Angle (T Bone)	All Others	Head On	Fixed Object	Bicyclist	Pedestrian	Total
	Intersection										
1	S 336th Street/ 20th Avenue S	0	4	1	2	0	0	0	0	0	7
2	SR 99/ S 336th Street	12	23	8	12	3	0	1	2	3	64
3	SR 99/ S 340th Street	0	3	0	0	0	1	0	0	0	4
4	SR 99/ 16th Avenue S	3	14	12	10	4	0	2	0	0	45
5	16th Avenue S/ S 341st Place	0	0	1	2	0	0	0	0	0	3
6	18th Place S/ S 341st Place	0	0	0	0	0	0	0	0	0	0
7	SR 99/ S 344th Street	1	4	1	26	0	0	0	1	1	33
8	S 344th Street/ 16th Avenue S	5	11	2	2	0	0	0	0	0	20
9	S 344th Street/ 18th Place S	0	0	0	1	0	0	1	0	0	2
	Intersection Total	**21**	**59**	**25**	**55**	**7**	**1**	**4**	**3**	**4**	**178**
	Roadway Segment										
1	SR 99 Segment S 336th Street to S 344th Street	2	5	9	1	1	1	1	0	0	20
2	S 336th Street Segment SR 99 to 20th Avenue S	0	3	1	1	1	0	0	0	0	6
3	S 341st Place Segment 16th Avenue S to 18th Place S	0	0	0	0	0	0	0	0	0	0
4	S 344th St Segment SR 99 to 18th Place S	1	0	0	1	1	0	1	0	0	4
5	16th Avenue S Segment SR 99 to S 344th Street	0	7	3	3	1	0	0	0	0	15
6	18th Place S Segment S 341st Place to S 344th Street	0	0	0	0	1	0	0	0	0	1
	Roadway Segment Total	**2**	**15**	**13**	**6**	**5**	**1**	**2**	**0**	**0**	**46**

Source: WSDOT Transportation Data and GIS Office, January 2016 to December 2018.

Disclaimer: Under 23 U.S. Code § 409, safety data, reports, surveys, schedules, or lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Table G1.3-22 Existing Collisions by Type (January 2016 to December 2018) for Midway Landfill Alternative Study Area Intersections

ID	Intersection/ Roadway Segment Name	Approach Turn	Rear End	Sideswipe	Angle (T Bone)	All Others	Head On	Fixed Object	Bicyclist	Pedestrian	Total
	Intersection										
1	SR 99/ S 240th Street	4	24	9	13	3	0	0	0	3	56
2	SR 99/ S 244th Street	0	0	2	1	0	0	0	0	0	3
3	SR 99/Midway Mobile Home Park Driveway	0	0	0	0	0	0	0	0	0	0
4	SR 99/ S 246th Street	1	1	0	0	0	0	0	0	0	2
5	SR 99/ S 248th Street	3	3	0	0	1	0	0	0	0	7
6	SR 99/ S 252nd Street	3	31	3	5	1	0	0	1	3	47
7	SR 99/ S 260th Street	3	27	10	12	1	0	3	0	1	57
8	29th Avenue S/ S 252nd Street	0	0	1	0	0	0	0	0	1	2
9	29th Avenue S/ S 259th Street	2	0	0	1	0	0	1	0	0	4
	Intersection Total	**16**	**86**	**25**	**32**	**6**	**0**	**4**	**1**	**8**	**178**
	Roadway Segment										
1	SR 99 Segment S 240th Street to S 260th Street	6	23	13	8	4	1	3	1	4	63
2	S 252nd Street Segment SR 99 to 29th Avenue S	0	0	0	0	3	0	1	0	0	4
3	S 260th Segment SR 99 to 29th Avenue S	6	5	2	3	0	0	0	0	0	16
	Roadway Segment Total	**12**	**28**	**15**	**11**	**7**	**1**	**4**	**1**	**4**	**83**

Source: WSDOT Transportation Data and GIS Office, January 2016 to December 2018.

Disclaimer: Under 23 U.S. Code § 409, safety data, reports, surveys, schedules, or lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Sideswipe collisions made up 16 percent of collisions in both study areas. Of the 12 serious injury or fatality collisions described in Section 3.7.1, eight involved either pedestrians or bicyclists. Collisions occurred in the business access transit (BAT) and high-occupancy vehicle (HOV) lanes in both study areas, although at a much lower rate than those in the innermost lanes. Collision locations by type are shown in Figure G1.3-21 and Figure G1.3-22.

3.7.2.1 Preferred and South 344th Street Alternatives

During the 3-year period (January 2016 to December 2018), no fatal crashes and two serious injury crashes occurred in the Preferred and South 344th Street alternatives study area. A total of 224 collisions occurred at intersections and roadway segments in the study area. The intersection at SR 99/S 336th Street had the highest number of collisions (64), equating to a rate of more than 21 collisions per year. The next highest number of collisions (45) occurred at the SR 99/16th Avenue S intersection, resulting in a rate of 15 collisions per year. Collisions at these two intersections comprise almost 49 percent of the total collisions in the study area. Collisions on SR 99 and 16th Avenue S accounted for more than 75 percent of all roadway segment collisions in the study area. Rear-end and sideswipe collisions accounted for more than 56 percent of all collisions on roadway segments in the study area. The numbers of angle (T-bone) collisions and rear-end collisions were almost the same. Bicyclists and pedestrians were involved in four collisions each. One of the two serious injury collisions in the Preferred and S 344th Street Alternatives study area involved a bicyclist.

Three collisions involving buses occurred in the Preferred and South 344th Street Alternatives study area. They include one involving a school bus at the SR 99/S 344th Street intersection and two involving transit buses at the SR 99/16th Avenue S and SR 99/S 336th Street intersections. The three collisions were rear-end, angle, and approach-turn collisions, respectively. One of the bus collisions resulted in minor injuries, and the other two bus collisions had no injuries.

In the Preferred and South 344th Street Alternatives study area, 19 collisions occurred in the SR 99 HOV lane, representing 30 percent of all roadway segment collisions.

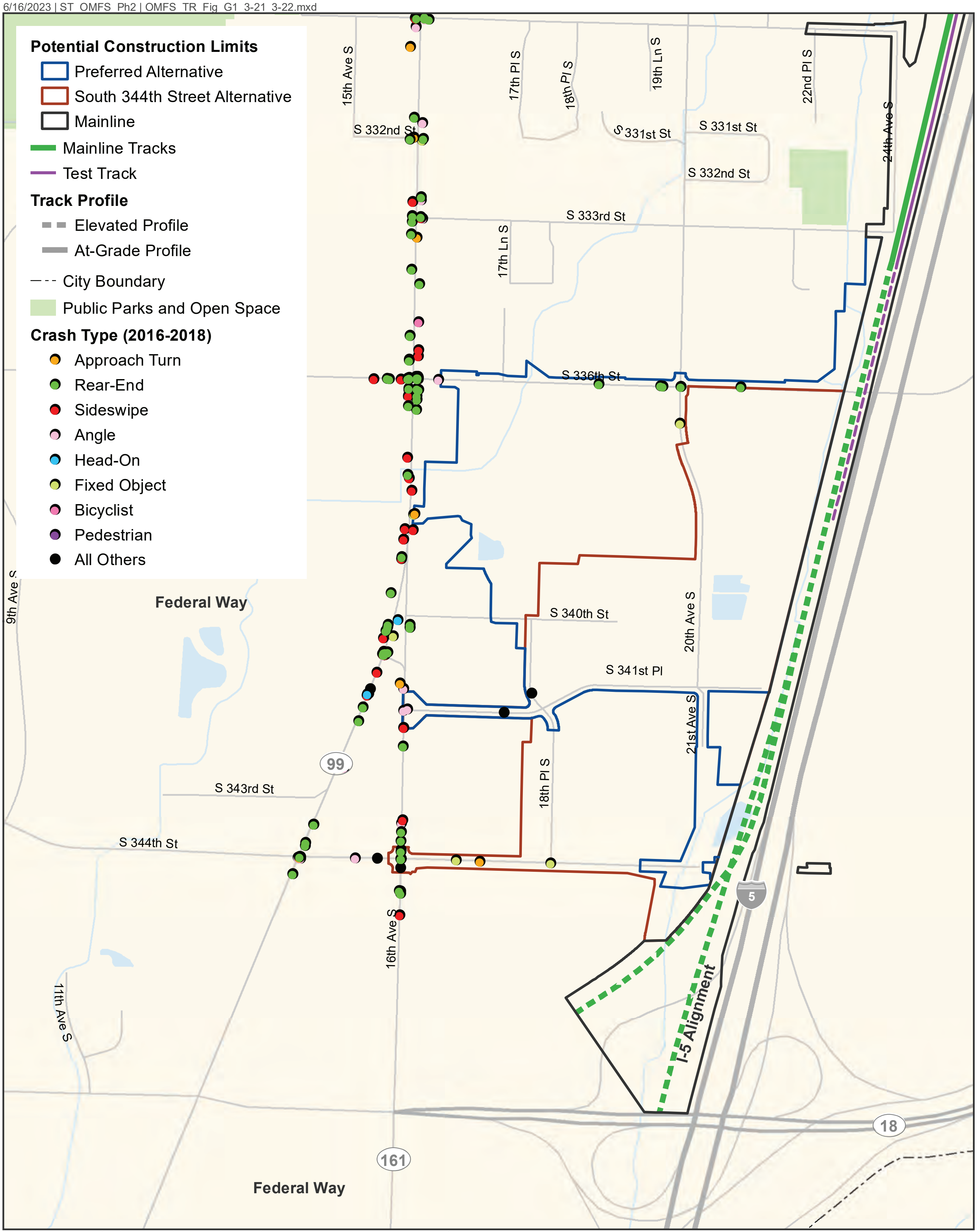
The city of Federal Way has established collision rate thresholds, defined in their *Public Works Development Standards Manual* (City of Federal Way 2019). Four intersections in the Preferred and South 344th Street Alternatives study area, three of which are along SR 99, exceed the intersection collision rate threshold of one collision per million entering vehicles (see Table G1.3-20). No roadway segments in the study area exceed the segment collision rate threshold of 10 collisions per million vehicle miles traveled. Locations exceeding these thresholds may indicate safety inadequacies as well as prioritized locations for safety improvements.

3.7.2.2 Midway Landfill Alternative

During the 3-year period (January 2016 to December 2018), four fatal crashes and six serious injury crashes occurred in the Midway Landfill Alternative study area. Of these, two fatal crashes and two serious injury crashes occurred at the intersection of SR 99 and S 240th Street. A total of 261 collisions occurred at intersections and roadway segments in the Midway Landfill Alternative study area. The intersections at SR 99/S 240th Street and SR 99/S 260th Street had the most collisions over the 3-year period, with 56 and 57 collisions, respectively, equating to a rate of approximately 19 collisions per year at each intersection. The intersection at SR 99/S 252nd Street had the next highest number of collisions (47) and a rate of approximately 16 collisions per year. Collisions at these three intersections comprise 61 percent of the total collisions in the study area. SR 99 between S 240th Street and S 260th Street had the most roadway segment collisions (63) and a rate of approximately 21 collisions per year. Two collisions involved a bicyclist, and 12 involved a pedestrian.

One collision in the Midway Landfill Alternative study area involved a school bus. It occurred along the S 260th Street roadway segment (SR 99 to 29th Avenue S) and resulted from a sideswipe collision.

Eleven collisions occurred in the SR 99 HOV lane, representing 17 percent of total collisions along roadway segments in the Midway Landfill Alternative study area.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Crash Type (2016-2018)
Approach Turn
Rear-End
Sideswipe
Angle
Head-On
Fixed Object
Bicyclist
Pedestrian
All Others
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
S 336th St
Federal Way
9th Ave S
S 340th St
20th Ave S
S 341st Pl
21st Ave S
99
18th Pl S
S 343rd St
S 344th St
5
16th Ave S
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: WSDOT; King County; Cities of Des Moines, Federal Way, Kent (2019).

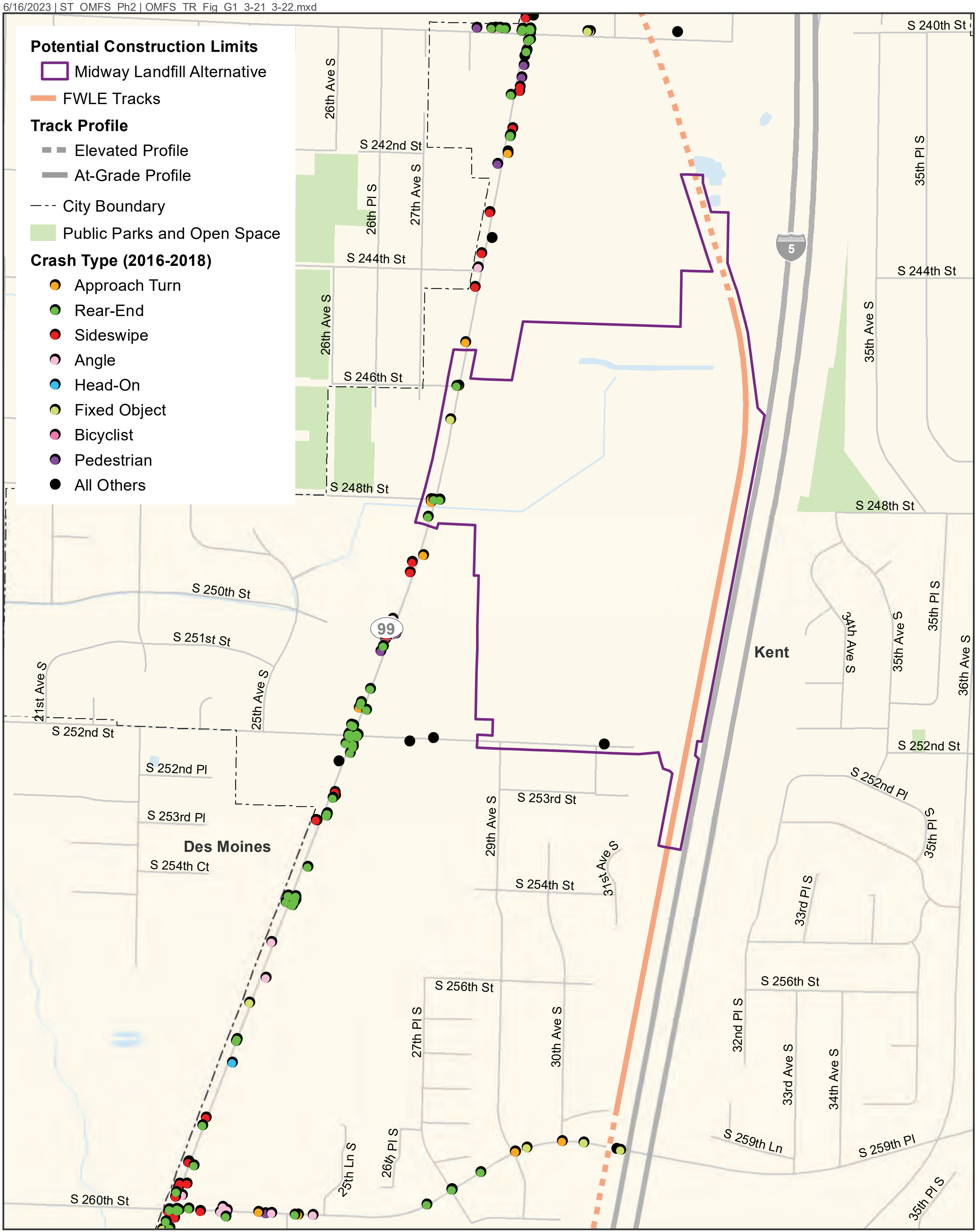
N
0
500
1,000 Feet

FIGURE G1.3-21

Collision Locations by Type
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Crash Type (2016-2018)
Approach Turn
Rear-End
Sideswipe
Angle
Head-On
Fixed Object
Bicyclist
Pedestrian
All Others
S 240th St
26th Ave S
S 242nd St
26th Pl S
27th Ave S
35th Pl S
5
S 244th St
S 244th St
26th Ave S
35th Ave S
S 246th St
S 248th St
S 248th St
S 250th St
99
S 251st St
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
21st Ave S
25th Ave S
S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd St
29th Ave S
S 253rd Pl
35th Pl S
Des Moines
S 254th Ct
S 254th St
31st Ave S
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
S 259th Ln
S 259th Pl
25th Ln S
26th Pl S
S 260th St
35th Pl S

Data Sources: WSDOT; King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.3-22
Collision Locations by Type
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

4 TRANSPORTATION IMPACTS

This chapter discusses impacts for the future forecast year of 2042 for the No-Build Alternative and the build alternatives.

4.1 No-Build Alternative

Under the No-Build Alternative, impacts to transportation from construction or operation of OMF South would not occur. However, for the purposes of this Final EIS, the No-Build Alternative assumes that, by the design year 2042, all planned Sound Transit 3 projects, including FWLE and the Tacoma Dome Link Extension (TDLE; currently under environmental review), are built along with the other public and private projects planned within the study area. The proposed alignment for the TDLE mainline track overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4 Cumulative Impacts.

4.1.1 Arterial and Local Street Operations

4.1.1.1 Roadway Network and Intersection Modifications

Sound Transit reviewed agency and jurisdictional long-range plans to identify planned and funded transportation projects. The following list of future projects was developed through coordination with WSDOT, city of Federal Way, and city of Kent staff. Very few improvements are planned by the cities of Federal Way and Kent that would alter the roadway network and intersections in the study area for the No-Build Alternative. The following projects are planned by the city of Federal Way in the Preferred and South 344th Street alternatives study area. Only the first project listed has secured funding.

- Add a southbound auxiliary lane on 16th Avenue S from S 344th Street to S 348th Street (the auxiliary lane from S 347th Street to S 348th Street is complete).
- Extend 20th Avenue S to S 344th Street

In the Midway Landfill Alternative study area, the following projects are planned by the city of Kent. Only the first project listed has secured funding.

- Construct two new streets, 32nd Avenue S from S 240th Street to S 244th Street and S 244th Street from SR 99 to 32nd Avenue S, including sidewalks and bike lanes
- Change the signal phasing at the S 260th Street/SR 99 intersection to include flashing yellow arrows on the eastbound and westbound approaches as part of FWLE
- Change the signal phasing at the S 240th Street/SR 99 intersection
- Add westbound dual left-turn lanes and an eastbound right turn pocket at the S 260th Street/SR 99 intersection

4.1.1.2 Traffic Volumes

Future (2042) no-build volumes at the study intersections were forecast using growth rates specific to both Federal Way and Kent. For the Preferred and South 344th Street alternatives study area, a singular growth rate of 0.8 percent per year, consistent with assumptions used for analyzing traffic impacts associated with TDLE was applied to existing volumes. For the Midway

Landfill Alternative study area, growth rates of 1.11 and 1.12 percent per year derived from the FWLE Final Environmental Impact Statement (Sound Transit 2016) were applied to AM and PM peak hour existing volumes, respectively.

Traffic volumes are forecast to increase throughout the study area between existing conditions and the 2042 AM and PM peak hours. Figure G1.4-1 and Figure G1.4-2 show the forecasted 2042 AM and PM peak hour turning movements under the No-Build Alternative.

Intersection Operations

The traffic operations analysis compares the No-Build Alternative at the same study intersections analyzed under existing conditions. The existing and No-Build Alternative AM and PM peak hour LOS and delay for the study area intersections evaluated are shown in Tables G1.4-1 through G1.4-4. Figures G1.4-3 through G1.4-6 show 2042 AM and PM peak hour operations at the study intersections under the No-Build Alternative.

2042 AM Analysis

As shown in Figure G1.4-1 and Table G1.4-1, no intersections in the Preferred and South 344th Street alternatives study area are forecast to operate below the LOS or v/c ratio standards for the roadway during the 2042 AM peak hour for the No-Build Alternative.

As shown in Table G1.4-2, intersection #2 (SR 99/S 244th Street), intersection #3 (SR 99/Midway Mobile Home Park Driveway), and intersection #5 (SR 99/S 248th Street) in the Midway Landfill Alternative study area are forecast to operate below the LOS standards for the roadway during the 2042 AM peak hour for the No-Build Alternative due to increased congestion in 2042 compared with existing conditions. These intersections would experience an increase in delay of 12, 11, and 20 seconds per vehicle compared to the existing condition, respectively. The delays can be attributed to the expected population and employment growth in Kent and surrounding cities. In 2042, some intersections operate with a decrease in delay compared with existing conditions. This could happen because of signal optimization, addition of a municipal project, or a combination of the two.

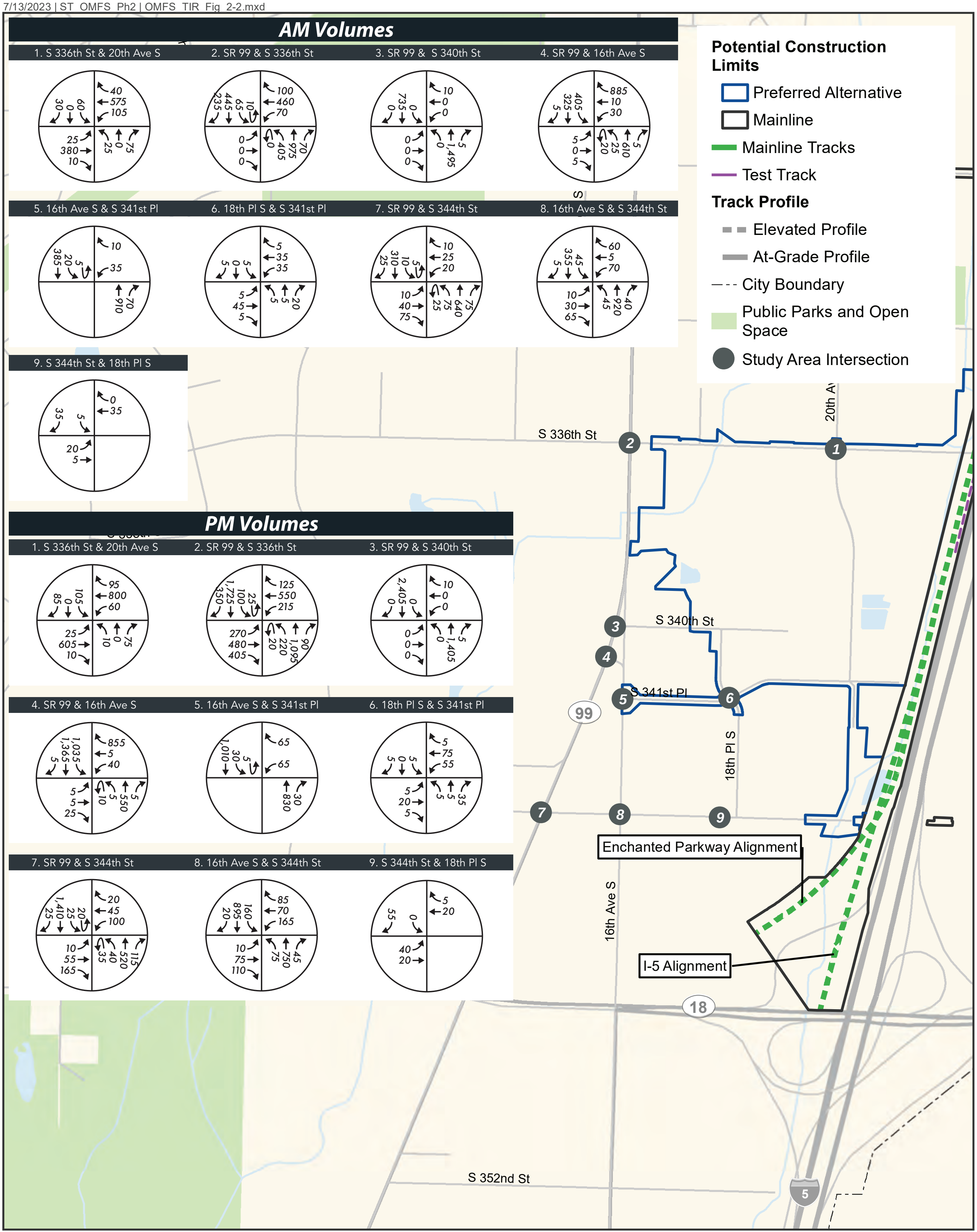
2042 PM Analysis

As described for the 2042 AM peak hour, the No-Build Alternative would experience more congestion in 2042 than under existing conditions. This can be attributed to expected population and employment growth in Federal Way, Kent, and other nearby communities. For similar reasons as outlined for the morning traffic operations, some intersections will show an operational improvement compared with existing conditions in both study areas.

In the Preferred and South 344th Street alternatives study area, intersection #2 (SR 99/S 336th Street) would experience a decrease in delay from 58 seconds to 54 seconds during the 2042 PM peak hour and would no longer operate below the LOS or v/c ratio standards for the intersection. Despite an increase in volume between existing and 2042, there is a decrease in delay due to signal timing optimization. During the 2042 PM peak hour, two of the Midway Landfill Alternative study area intersections are forecast to operate below the LOS standards for the study area. Intersection #2 (SR 99/S 244th Street) and intersection #5 (SR 99/S 248th Street) would experience increases in delay of 81 and 61 seconds, respectively.

Table G1.4-3 and Table G1.4-4 show the intersections that are forecast to operate below the LOS or v/c ratio standards, as applicable.

7/13/2023 | ST_OMFS_Ph2 | OMFS_TIR_Fig_2-2.mxd


AM Volumes
1. S 336th St & 20th Ave S
40 575 105 30 0 60 25 380 10 25 0 75
2. SR 99 & S 336th St
100 460 70 235 445 65 10 0 0 0 405 975 70
3. SR 99 & S 340th St
10 0 0 0 735 0 0 0 0 0 1,495 5
4. SR 99 & 16th Ave S
885 10 30 5 325 405 5 0 5 20 25 610 5
5. 16th Ave S & S 341st Pl
10 35 385 20 5 910 70
6. 18th Pl S & S 341st Pl
5 35 35 5 0 5 5 45 5 5 5 20
7. SR 99 & S 344th St
10 25 20 25 310 10 5 10 40 75 25 75 640 75
8. 16th Ave S & S 344th St
60 5 70 5 355 45 10 30 65 45 920 40
9. S 344th St & 18th Pl S
0 35 35 5 20 5
PM Volumes
1. S 336th St & 20th Ave S
95 800 60 85 0 105 25 605 10 10 0 75
2. SR 99 & S 336th St
125 550 215 350 1,725 100 25 270 480 405 20 220 1,095 90
3. SR 99 & S 340th St
10 0 0 0 2,405 0 0 0 0 0 1,405 5
4. SR 99 & 16th Ave S
855 5 40 5 1,365 1,035 5 5 25 10 5 550 5
5. 16th Ave S & S 341st Pl
65 65 1,010 30 5 830 30
6. 18th Pl S & S 341st Pl
5 75 55 5 0 5 5 20 5 5 5 35
7. SR 99 & S 344th St
20 45 100 25 1,410 25 20 10 55 165 35 40 520 115
8. 16th Ave S & S 344th St
85 70 165 20 895 160 10 75 110 75 750 45
9. S 344th St & 18th Pl S
5 20 55 0 40 20
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
S 336th St
20th Ave S
S 340th St
S 341st Pl
18th Pl S
16th Ave S
S 352nd St
99
18
5
1
2
3
4
5
6
7
8
9
Enchanted Parkway Alignment
I-5 Alignment

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

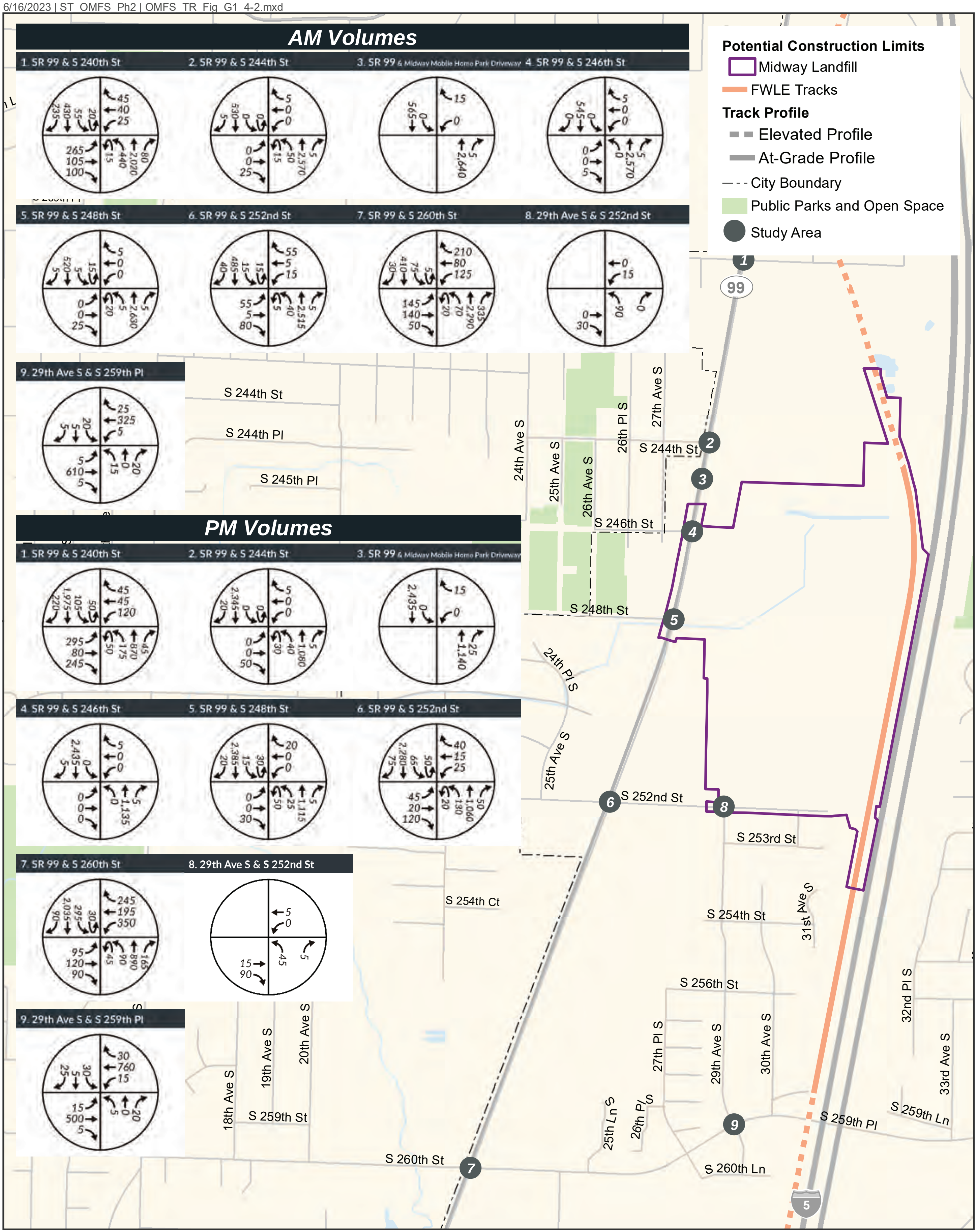
FIGURE G1.4-1

2042 No-Build Alternative AM and PM Traffic Volumes
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

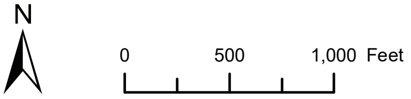
6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-2.mxd


AM Volumes
1. SR 99 & S 240th St
45 40 25 20 55 430 235 265 105 100 15 440 2,020 80
2. SR 99 & S 244th St
5 0 0 0 530 5 0 0 25 15 50 2,570 5
3. SR 99 & Midway Mobile Home Park Driveway
15 0 565 0 2,640 5
4. SR 99 & S 246th St
5 0 0 0 545 0 0 0 5 0 2,570 5
5. SR 99 & S 248th St
5 0 0 15 5 520 5 0 0 25 20 5 2,630 5
6. SR 99 & S 252nd St
55 5 15 15 15 485 40 55 5 80 5 40 2,515 5
7. SR 99 & S 260th St
210 80 125 5 75 410 30 145 140 50 20 70 2,290 335
8. 29th Ave S & S 252nd St
0 15 0 30 90 0
9. 29th Ave S & S 259th Pl
25 325 5 20 5 5 5 610 5 15 0 20
PM Volumes
1. SR 99 & S 240th St
45 45 120 50 105 1,975 220 295 80 245 50 175 870 45
2. SR 99 & S 244th St
5 0 0 0 2,345 20 0 0 50 30 40 1,080 5
3. SR 99 & Midway Mobile Home Park Driveway
15 0 2,435 0 1,140 25
4. SR 99 & S 246th St
5 0 0 0 2,435 5 0 0 0 0 1,135 5
5. SR 99 & S 248th St
20 0 0 30 15 2,385 20 0 0 30 50 25 1,115 5
6. SR 99 & S 252nd St
40 15 25 50 65 2,280 75 45 20 120 20 130 1,040 50
7. SR 99 & S 260th St
245 195 350 30 295 2,035 90 95 120 90 45 90 890 165
8. 29th Ave S & S 252nd St
5 0 15 90 45 5
9. 29th Ave S & S 259th Pl
30 760 15 30 5 25 15 500 5 5 0 20
Potential Construction Limits
Midway Landfill
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area
99
5
1
2
3
4
5
6
7
8
9
S 244th St
S 244th Pl
S 245th Pl
24th Ave S
25th Ave S
26th Ave S
26th Pl S
27th Ave S
S 244th St
S 246th St
S 248th St
24th Pl S
25th Ave S
S 252nd St
S 253rd St
S 254th Ct
S 254th St
31st Ave S
S 256th St
32nd Pl S
33rd Ave S
27th Pl S
29th Ave S
30th Ave S
18th Ave S
19th Ave S
20th Ave S
S 259th St
25th Ln S
26th Pl S
S 259th Pl
S 259th Ln
S 260th St
S 260th Ln

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-2

2042 No-Build Alternative AM and PM Traffic Volumes
Midway Landfill Alternative


N
0
500
1,000 Feet

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Table G1.4-1 Preferred and South 344th Street Alternatives Study Area No-Build Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	Existing LOS 1, 2	Existing Delay (seconds) 1, 2	Existing V/C Ratio 1, 2	No Build Alternative LOS 1, 2	No Build Alternative Delay (seconds) 1, 2	No Build Alternative V/C Ratio 1, 2
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.44	N/A	N/A	0.52
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A	D	44	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	17	N/A	C	19	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	35	N/A	C	28	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.11	N/A	N/A	0.15
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.03
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	23	N/A	B	18	N/A
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.33	N/A	N/A	0.39
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.04

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

Table G1.4-2 Midway Landfill Alternative Study Area No-Build Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	Existing LOS 1, 2, 3, 4	Existing Delay (seconds) 1, 2, 3, 4	No Build Alternative LOS 1, 2, 3, 4	No Build Alternative Delay (seconds) 1, 2, 3, 4
1	SR 99/ S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D))	C	32	C	23
2	SR 99/ S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	31	***E***	***43***
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	27	***E***	***38***
4	SR 99/ S 246th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	B	11	B	11
5	SR 99/ S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	D	33	***F***	***53***
6	SR 99/ S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	A	8	A	7
7	SR 99/ S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	D	47
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	C	21	C	22

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) At signalized intersections utilizing HCM 6th Edition methodology, U-turn movements were added to left-turn movements to allow for analysis.

(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

Table G1.4-3 Preferred and South 344th Street Alternatives Study Area No-Build Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	Existing LOS 1, 2, 3	Existing Delay (seconds) 1, 2, 3	Existing V/C Ratio 1, 2, 3	No Build Alternative LOS 1, 2, 3	No Build Alternative Delay (seconds) 1, 2, 3	No Build Alternative V/C Ratio 1, 2, 3
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.77	N/A	N/A	0.66
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	***E^3***	***58***	***N/A***	***D***	***54***	***N/A***
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A	C	16	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	30	N/A	D	37	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.31	N/A	N/A	0.38
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	31	N/A	B	16	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.43	N/A	N/A	0.51
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

Table G1.4-4 Midway Landfill Alternative Study Area No-Build Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	Existing LOS 1, 2, 3, 4	Existing Delay (seconds) 1, 2, 3, 4	No Build Alternative LOS 1, 2, 3, 4	No Build Alternative Delay (seconds) 1, 2, 3, 4
1	SR 99/ S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	39	D	37
2	SR 99/ S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***41***	***F***	***122***
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	B	13	C	15
4	SR 99/ S 246th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	A	0	A	0
5	SR 99/ S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***36***	***F***	***97***
6	SR 99/ S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	26	D	36
7	SR 99/ S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	D	41
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	D	25	E	38

Notes:

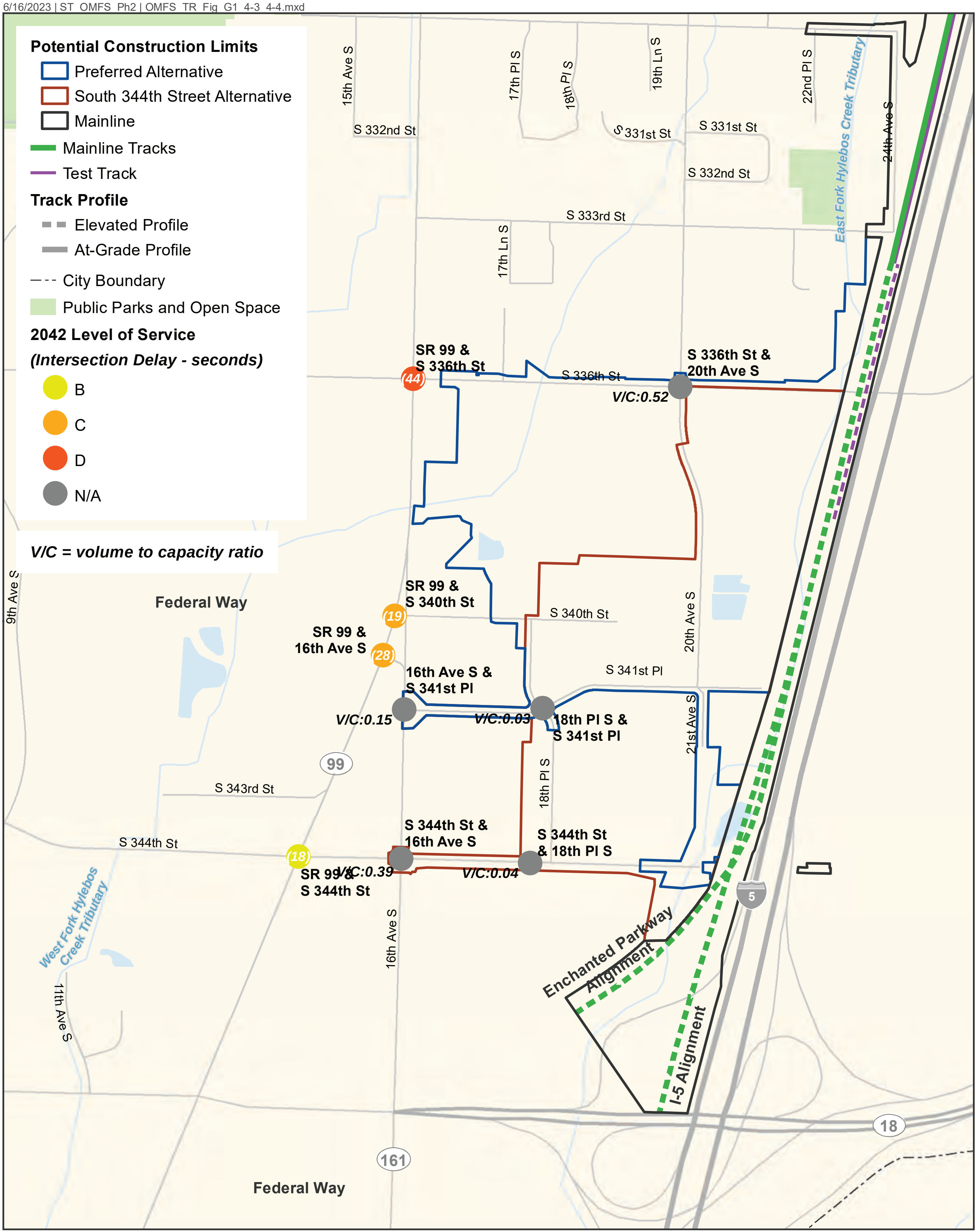
(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

(3) At signalized intersections utilizing HCM 6th Edition methodology, U-turn movements were added to left-turn movements to allow for analysis.

(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

6/16/2023 | ST OMFS Ph2 | OMFS TR Fig G1 4-3 4-4.mxd



Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
B
C
D
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
East Fork Hylebos Creek Tributary
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
44
S 336th St
S 336th St &
20th Ave S
V/C:0.52
Federal Way
9th Ave S
SR 99 &
S 340th St
19
S 340th St
SR 99 &
16th Ave S
28
20th Ave S
16th Ave S &
S 341st Pl
S 341st Pl
V/C:0.15
V/C:0.03
18th Pl S &
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
S 344th St
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
18
SR 99 &
S 344th St
V/C:0.39
V/C:0.04
5
West Fork Hylebos Creek Tributary
16th Ave S
Enchanted Parkway Alignment
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

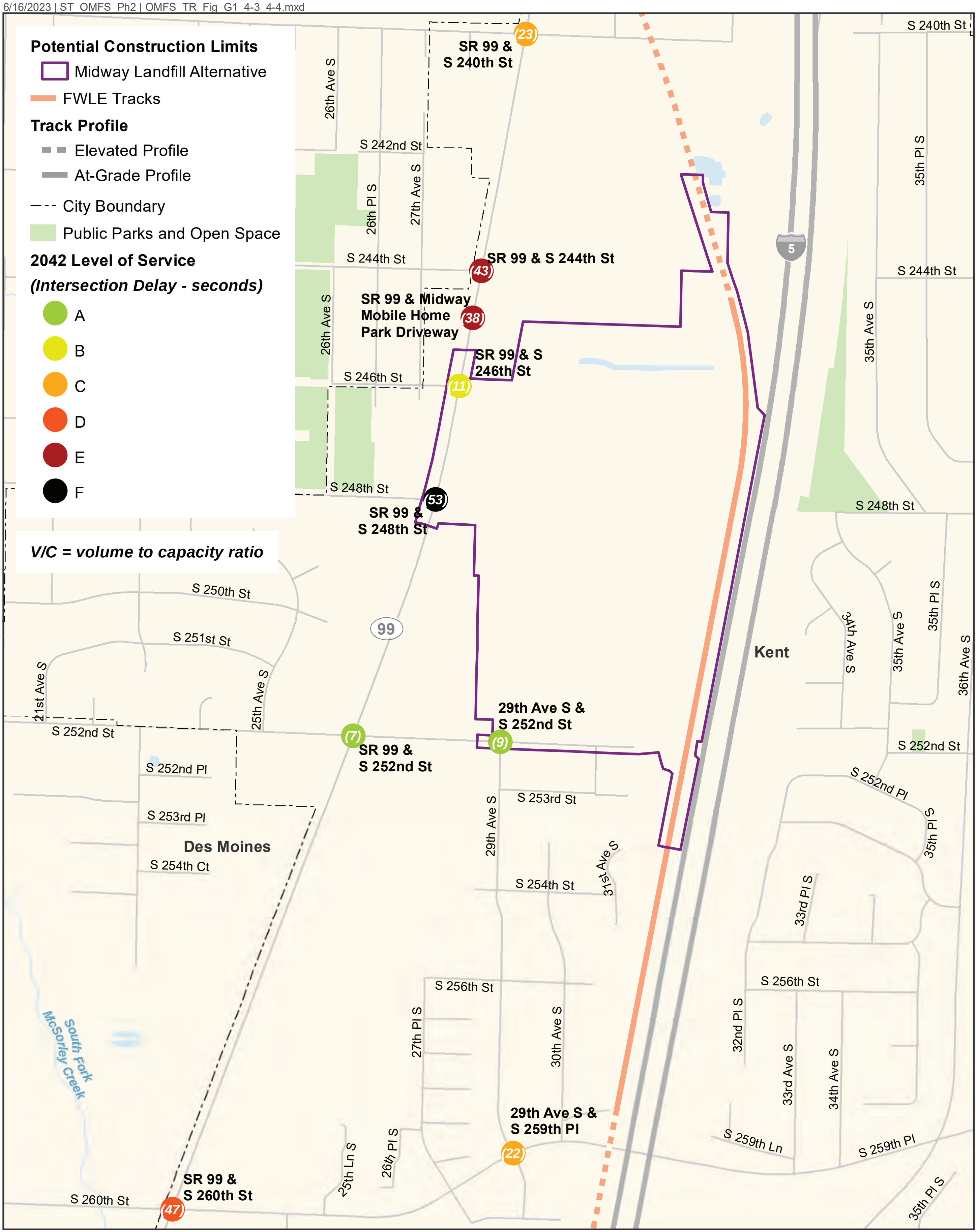
FIGURE G1.4-3

2042 No-Build Alternative AM Peak Hour Traffic Operations
Preferred and
South 344th Street Alternatives

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-3_4-4.mxd


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
B
C
D
E
F
V/C = volume to capacity ratio
S 240th St
SR 99 & S 240th St
(23)
26th Ave S
S 242nd St
26th Pl S
27th Ave S
35th Pl S
5
S 244th St
SR 99 & S 244th St
(43)
S 244th St
SR 99 & Midway Mobile Home Park Driveway
(38)
26th Ave S
35th Ave S
SR 99 & S 246th St
S 246th St
(11)
S 248th St
(53)
SR 99 & S 248th St
S 248th St
S 250th St
S 251st St
99
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
21st Ave S
25th Ave S
29th Ave S & S 252nd St
(9)
S 252nd St
(7)
SR 99 & S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd Pl
S 253rd St
35th Pl S
Des Moines
S 254th Ct
29th Ave S
31st Ave S
S 254th St
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
South Fork McSorley Creek
29th Ave S & S 259th Pl
(22)
S 259th Ln
S 259th Pl
25th Ln S
26th Pl S
SR 99 & S 260th St
S 260th St
(47)
35th Pl S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

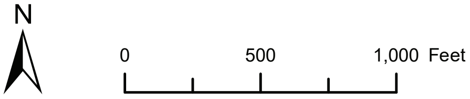
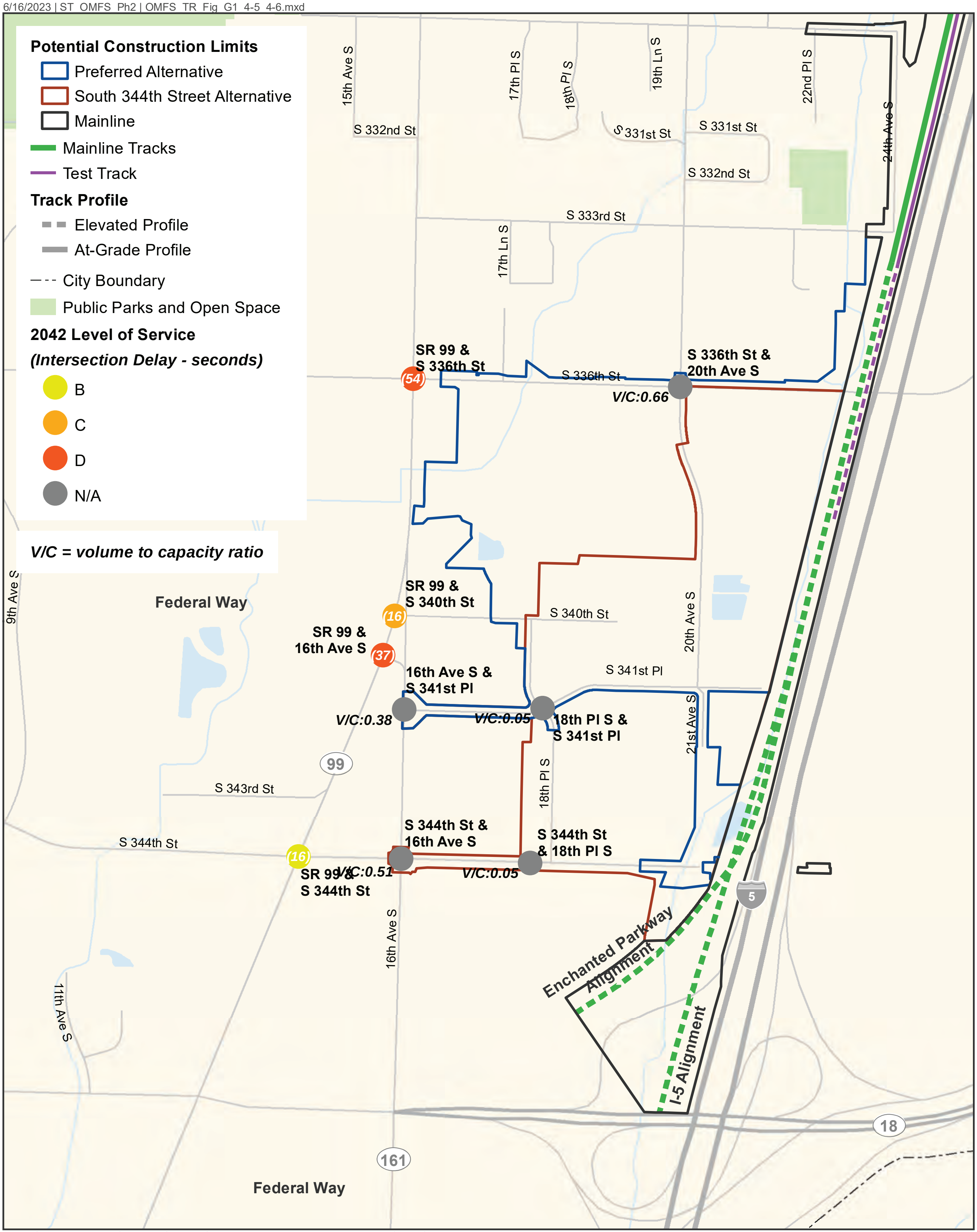

N
0
500
1,000 Feet

FIGURE G1.4-4

2042 No-Build Alternative AM Peak Hour Traffic Operations
Midway Landfill Alternative

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

OMF South

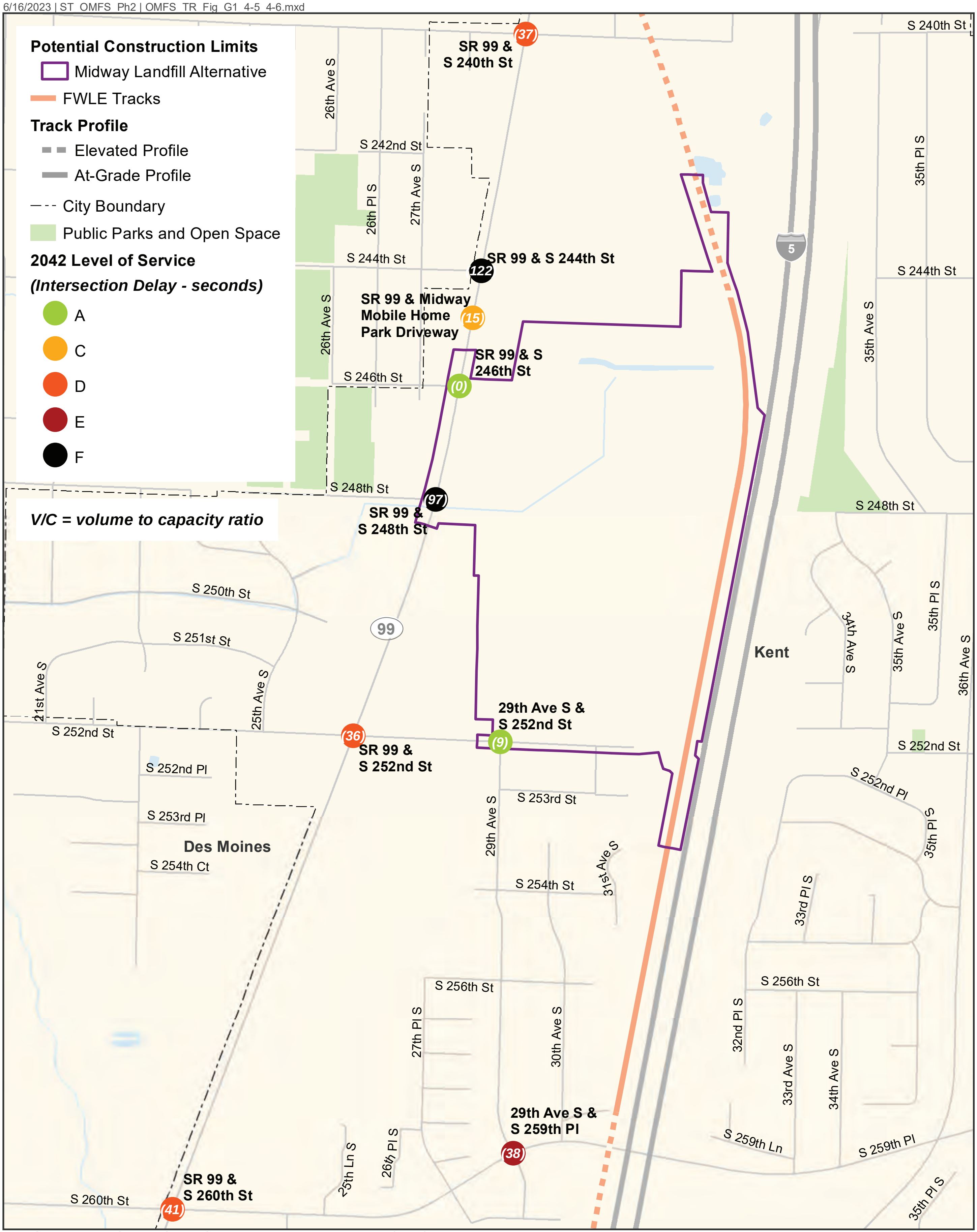

Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
B
C
D
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
54
S 336th St
S 336th St &
20th Ave S
V/C:0.66
Federal Way
9th Ave S
SR 99 &
S 340th St
16
S 340th St
20th Ave S
SR 99 &
16th Ave S
37
16th Ave S &
S 341st Pl
S 341st Pl
V/C:0.38
V/C:0.05
18th Pl S &
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
S 344th St
16
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
SR 99 &
S 344th St
V/C:0.51
V/C:0.05
5
16th Ave S
Enchanted Parkway
Alignment
11th Ave S
I-5 Alignment
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G1.4-5
2042 No-Build Alternative PM Peak Hour Traffic Operations
Preferred and
South 344th Street Alternatives
OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
C
D
E
F
V/C = volume to capacity ratio
(37) SR 99 & S 240th St
(122) SR 99 & S 244th St
(15) SR 99 & Midway Mobile Home Park Driveway
(0) SR 99 & S 246th St
(97) SR 99 & S 248th St
(9) 29th Ave S & S 252nd St
(36) SR 99 & S 252nd St
(38) 29th Ave S & S 259th Pl
(41) SR 99 & S 260th St
S 240th St
S 242nd St
S 244th St
S 246th St
S 248th St
S 250th St
S 251st St
S 252nd St
S 252nd Pl
S 253rd Pl
S 253rd St
S 254th Ct
S 254th St
S 256th St
S 259th Ln
S 259th Pl
S 260th St
21st Ave S
25th Ave S
25th Ln S
26th Ave S
26th Pl S
27th Ave S
27th Pl S
29th Ave S
30th Ave S
31st Ave S
32nd Pl S
33rd Ave S
33rd Pl S
34th Ave S
35th Ave S
35th Pl S
36th Ave S
99
5
Kent
Des Moines

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-6

2042 No-Build Alternative PM Peak Hour Traffic Operations
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.1.2 Freight

Under the No-Build Alternative, freight traffic is expected to be affected similarly to general-purpose traffic. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections with increased congestion.

4.1.3 Transit

In the No-Build Alternative, Link light rail service will extend to Tacoma through the study areas, as well as to downtown Redmond, downtown Seattle, West Seattle, Ballard, University District, Northgate, Lynnwood, Everett, south Kirkland, and Issaquah. As described in Metro's Long Range Plan, Metro Connects, some additional bus service is planned along 16th Avenue S in the Preferred and South 344th Street alternatives study area. Bus service on the north end and south boundaries of the Midway Landfill Alternative study area is expected to increase with the opening of the Kent/Des Moines station near Highline College as part of FWLE (King County Metro 2021). No additional service is planned on SR 99. The bus stops at S 240th Street and SR 99 may be closed, with new RapidRide stops developed at the Link station. Metro plans to provide less peak-oriented bus service on I-5 through the study areas in 2042.

It is assumed Sound Transit will reduce bus service levels on I-5 through the study areas in 2042, as Link light rail will replace much of the current north-south service from south Puget Sound cities to downtown Seattle and the University District. Existing Sound Transit routes that currently provide service to cities north of Tacoma will be truncated at the Tacoma Dome and Fife Link stations, where riders will transfer to or from Link. It is also assumed Pierce Transit will truncate bus service via Routes 402 and 500 at the South Federal Way Link station, and this service would no longer be provided in the Preferred and South 344th Street alternatives study area. Route 501 will be discontinued and no longer provide service in the Preferred and South 344th Street alternatives study area.

Under the No-Build Alternative, Sound Transit would not have the capacity to receive, test, commission, store, maintain, and deploy the expanded fleet of LRVs needed to support existing and planned future expansions of the Link light rail system at planned service levels. As a result, light rail operations would be less efficient than they would otherwise be with the facility, and Sound Transit would not be able to meet the expected ridership demand.

4.1.4 Nonmotorized Facilities

In the No-Build Alternative, pedestrian and bicycle facilities would be improved in accordance with adopted local plans. The Transportation Element of the Federal Way Comprehensive Plan calls for installation of bicycle lanes on S 336th Street between SR 99 and 20th Avenue S and planned trails through the Federal Way/S 320th Street Park & Ride.

Nonmotorized volumes are expected to increase in the Midway Landfill Alternative study area as a result of land use regulations that encourage mixed uses and higher residential densities in the city of Kent's Midway Subarea. The Midway Subarea is located in the western portion of Kent and is bound to the north by SR-516 (Kent-Des Moines Road), to the south by South 272nd Street, and by the City of Des Moines along the entire western border. The Midway Subarea Plan (City of Kent 2011) envisions an expanded, conceptual pedestrian and bike path framework in the study area, including a bridge over I-5 near S 240th Street and a north-south path connecting S 244th Street to S 252nd Street. 29th Avenue S, S 244th Street, S 252nd Street, S 259th Street, and S 260th Street are envisioned as complete streets, meaning that they would add pedestrian and bicycle facilities.

The city of Kent Transportation Master Plan identifies recommended LOS thresholds for pedestrian and bicycle facilities. The city's Pedestrian LOS guidelines describe the comfort of someone walking, which can vary depending on the roadway type and land use context of a given street. Bicycle Level of Traffic stress (LTS), which provides a framework for planning bikeway facilities to meet the needs of their intended users, is used to define treatment options on corridors in the city. Table G1.4-5 summarizes the recommended LOS for existing and planned pedestrian and bicycle facilities in the Midway Landfill Alternative study area.

Table G1.4-5 Recommended Bicycle and Pedestrian LOS Standards for Nonmotorized Facilities in the Midway Landfill Alternative Study Area

Segment	Pedestrian LOS	Bicycle LOS/LTS
SR 99 – S 240th Street to 1st driveway south of S 244th Street	Downtown/TOD Standard	LOS 1
SR 99 – 1st driveway south of 244th Street to S 259th Street	Areas of High Pedestrian Activity	LOS 1
S 259th Street – SR 99 to West Hill Mobile Manor Driveway	Areas of High Pedestrian Activity	LOS 1
S 259th Street – West Hill Mobile Manor Driveway to East Midway Landfill Alternative Study Area Limits	Other Arterials	LOS 1
S 240th Street – SR 99 to just west of I-5	Downtown/TOD Standard	LOS 2
S 252nd Street from SR 99 to 29th Avenue S	N/A	LOS 2
29th Avenue S from 252nd Street to S 259th Street	N/A	LOS 2
S 244th Street from SR 99 to just west of I-5	N/A	LOS 2
32nd Avenue S from S 240th Street to S 244th Street	N/A	LOS 2

Source: City of Kent Transportation Master Plan (2021)

Notes: LTS 1 facilities are very low stress: they are intended to be welcoming to cyclists of all abilities and levels and generally include separated facilities, such as off-street trails or leverage low-speed, low-volume residential streets. The next level of accommodation is LTS 2, which is the category that describes most cyclists, and generally can be met by installing striped or buffered bike lanes on lower speed arterials and collectors.

4.1.5 Parking

In the No-Build Alternative, the quantity of on-street parking along streets within the study areas described in Section 3.6 is not assumed to change. On-street parking use is expected to stay the same as well because the land uses within the study areas are not expected to change (the comprehensive plans for Federal Way and Kent show the underlying zoning remaining the same). Any new developments within the study areas would be expected to provide adequate off-street parking for their use.

4.1.6 Safety

As noted in the Arterials and Operations section, traffic and nonmotorized volumes in the study area are expected to increase by 2042. This could increase collision frequencies for both motor vehicle and nonmotorized users in the study area. The planned roadway and intersection projects previously described could improve safety through rechannelization, improved sight lines, or the addition of turn lanes. The construction of new bicycle and pedestrian facilities would improve safety for nonmotorized users and motor vehicles in the study area. Dedicated pedestrian and bicycle facilities would improve predictability at conflict points between motor vehicles, pedestrians, and cyclists, and would reduce the likelihood of collisions because potential conflict points would be clearly identifiable by all users.

4.2 Long-Term Impacts

4.2.1 Long-Term Impacts Common to all Build Alternatives

This section analyzes the operational impacts common to all the build alternatives within the study areas for the 2042 forecast year. In both study areas, all track crossings of existing or planned roadways would be grade separated. Because there would be no impacts to traffic operations, these track crossings were not included in the intersections evaluated in this analysis.

For each alternative, all access points to the OMF South sites would be controlled by fenced rolling gates, one of which would be located at a guard house. Access to the OMF South site would be granted via approval by staff stationed at the guard house or by an automated system, such as electronic key cards.

The gate operations were evaluated for two scenarios. The first scenario assumed free-flow movement into each OMF South site without considering the effect of opening and closing the rolling gate. The second scenario assumed that the gates open and close between vehicles entering the site. For the second scenario, the capacity for vehicles to enter the gate was calculated based on estimated timing for each gate opening and closing. The second scenario was assumed to represent a more conservative approach with the potential for greater traffic impacts. These impacts are discussed in Section 4.2.1.2, Gate Operations.

This evaluation was completed without the use of the Synchro software because staffed guard houses and gate operations cannot be evaluated with the software. The two scenarios were evaluated to help understand whether there would be operational flexibility at the gates through the peak hour. The peak hour vehicle trips generated at the facility were assigned to study area roadways and intersections based on existing travel patterns. Traffic volumes are forecast to increase throughout the study areas during both the 2042 AM peak hours and the 2042 PM peak hours. An estimated 610 people would be employed at the facility over the course of three shifts. Within the individual shifts, staff would access the facility during various times. Table G1.4-6 details the estimated staff levels for OMF South, maintenance of way (MOW), and Link System-Wide Storage facilities across three shifts. All employees were assumed to arrive in single-occupancy vehicles.

Table G1.4-6 OMF South, MOW, and Link System-Wide Storage Facility Staffing Calculations

	Day	Swing	Graveyard	Total
	3:30 a.m. to 4 p.m.	11 a.m. to 11:30 p.m.	6:30 p.m. – 7:30 a.m.	
Staff Totals	250	195	165	610

All trips forecast to and from the facility were assumed to be single-occupancy vehicle trips. No transit or nonmotorized trips were assumed.

4.2.1.1 Traffic Volumes

The system peak hours used for analysis in the cities of Federal Way and Kent are summarized in Table G1.4-7 and are consistent with existing data trends.

Table G1.4-7 System Peak Hours for the Cities of Federal Way and Kent

	AM Peak Hour	PM Peak Hour
Federal Way	7:45-8:45 a.m.	4:30-5:30 p.m.
Kent	7:15-8:15 a.m.	4:30-5:30 p.m.

Based on the shift times provided for the staffing as shown in Table G1.4-6, there would be overlap among employees from different shifts arriving and departing the site. There are several overlapping shifts throughout the day, with the largest number of inbound and outbound employee trips during midday. A portion of the day and graveyard shifts staffing estimates would apply to the AM and PM peak hour analyses. Due to the staggered arrival and departure times within the shifts, only 69 of the 250 day-shift employees would arrive during the AM peak hour. The overlap of shifts would also result in 11 departures during the AM peak hour. During the PM peak hour, 57 employees are forecast to depart, with no arrivals forecast. Because each employee is assumed to arrive or depart in a single-occupancy vehicle, forecast auto volumes match the employee arrival and departure activity. The amount of freight traffic to and from the OMF South site is anticipated to be minimal, particularly during the AM and PM peak hours, because deliveries would primarily occur during off-peak hours. Therefore, freight traffic was not factored into the analysis. Auto volumes for the build alternatives during the 2042 AM and PM peak hours are shown in Table G1.4-8.

Table G1.4-8 Forecast Auto Volumes for the Build Alternatives 2042 AM and PM Peak Hours

	Inbound AM	Inbound PM	Outbound AM	Outbound PM
Preferred and South 344th Street Alternatives	69	0	11	57
Midway Landfill Alternative	69	0	11	57

4.2.1.2 Gate Operations

As noted previously, the first gate operation scenario assumed free-flow movement into each site. Therefore, no additional queueing and delays would result at the gates, and no spillback from the gates would occur that could impact intersection operations.

The second scenario assumed the rolling gate would open and close for each vehicle. Example calculations for the time required for the gate to open and close and the associated vehicles per hour capacity are shown in Table G1.4-9. Assuming that 75 percent of inbound and outbound vehicles arrive at gate-managed driveways during a peak 15-minute period either before shift change (AM peak hour) or after shift change (PM peak hour), the access gates should have sufficient capacity to accommodate the inbound and outbound vehicles trips without additional queueing and delays that would impact intersection operations.

However, if the time to open and close the gate or the percentage of inbound and outbound vehicles arriving during a peak 15-minute period is larger than assumed, spillback from the gates could occur and the actual intersection delay and queueing could be worse than reported below. Depending on the location of the gate, the driveway could potentially accommodate some number of queuing vehicles.

Table G1.4-9 Forecast Gate Capacity

Alternative	Time Required	Gate Capacity (vehicles/ 15 minutes)	Inbound Vehicles Using Gate Accesses	Outbound Vehicles Using Gate Accesses
Preferred Alternative	15 seconds	60 vehicles	52	43
South 344th Street	15 seconds	60 vehicles	52	43
Midway Landfill	15 seconds	60 vehicles	39	30

Note:
(1) Vehicle volumes at SR 99 Midway gate access represent the vehicles using SR 99/S 246th Street entrance, as vehicles using the S 248th Street entrance would not use the gate.

4.2.1.3 Freight

The build alternatives are not anticipated to negatively affect truck circulation or truck routes on the local street network in the study area. There are no at-grade light rail track profiles that would result in additional crossings or delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

4.2.1.4 Transit

It is assumed the bus service network under the build alternatives would be the same as the No-Build Alternative, which includes the transit service modifications planned in conjunction with FWLE and TDLE. Additional bus service levels or rerouting to the facility are not anticipated for any alternatives.

Development of OMF South would provide Sound Transit with additional capacity to receive, test, commission, store, maintain, and deploy an expanded fleet of LRVs for planned Link service. This capacity would provide for more efficient operations of existing and planned future expansions of the Link light rail system than would occur without the facility.

4.2.1.5 Parking

Under the build alternatives, existing off-street parking associated with property acquisitions would be removed in order to accommodate development of the facility. For the build alternatives, on-street parking would be eliminated as follows:

- South 344th Street Alternative: 21st Avenue S and S 341st Place, east of 18th Place S, and S 344th Street east of 21st Avenue S
- Midway Landfill Alternative: S 252nd Street

The loss of on-street parking in the study areas is likely to result in minimal impacts. Off-street parking that would be lost would be associated with property acquisitions. The loss of on-street parking on S 252nd Street under the Midway Landfill Alternative could impact adjacent single-family residences; however, there appears to be available capacity along the roadway.

It is estimated that up to 480 spaces will be needed for on-site parking for employees, visitors, and nonrevenue vehicles. Table G1.4-10 summarizes the estimated on-site parking need for employees, visitors, and nonrevenue vehicles. The estimated employee vehicle parking was calculated as the total number of employees during the largest shift plus 50 percent. The day shift is forecast to be the largest shift for the MOW and Link System-Wide Storage.

The conceptual layouts for each alternative (see Figures G1.1-2 through G1.1-4) identify sufficient on-site parking to accommodate forecast demand.

Table G1.4-10 Estimated On-Site Parking Needed for Build Alternatives

	Estimated Parking Need
OMF Building Parking	
OMF Building Day Shift Staff Total + 50%	210
Visitor Spaces	16
Accessible Spaces	6
Motorcycle Spaces	8
Nonrevenue Vehicle Spaces	18
Total OMF Building Parking	**258**
MOW and Facilities Building Parking	
MOW and Facilities Building Day Shift Staff Total + 50%	149
Visitor Spaces	12
Accessible Spaces	4
Motorcycle Spaces	5
Nonrevenue Vehicle Spaces	23
Total MOW and Facilities Building Parking	**193**
Link System-Wide Storage Building Parking	
Link System-Wide Storage Building Day Shift Staff Total + 50%	14
Visitor Spaces	4
Accessible Spaces	2
Motorcycle Spaces	1
Nonrevenue Vehicle Spaces	9
Total Link System-Wide Storage Building Parking	**30**
Total Site Parking	**480**

Note:

(1) Employee and visitor parking includes accessible spaces.

4.2.1.6 Safety

As with the No-Build Alternative, traffic and nonmotorized volumes in the study area are forecast to increase by 2042, which could increase collision frequencies for both motor vehicles and nonmotorized users in the study area. The roadway, intersection, and nonmotorized improvements identified under the No-Build Alternative, and applicable for the build alternatives, would improve safety for motor vehicles and nonmotorized users in the study areas under the build alternatives. OMF South would not result in any adverse safety impacts to intersections, including those with over one crash per million entering vehicles.

With the exception of site driveways, OMF South would be located outside transportation facilities, including roadways, highways, sidewalks, bicycle lanes, and nonmotorized trails. All tracks connecting to the site would be elevated over transportation facilities and would not present conflicts for drivers, buses, freight, pedestrians, or cyclists. All vertical support elements, such as walls and columns, would be sited to comply with transportation safety requirements for fixed objects, vertical and horizontal clearances, and other infrastructure-related safety elements.

4.2.2 Preferred Alternative

4.2.2.1 Roadway Network and Intersection Modifications

The roadway network would be modified for the Preferred Alternative. The alternative would not interfere with the potential to add a southbound auxiliary lane on 16th Avenue S (described above under the No-Build Alternative).

The Preferred Alternative would have three access points, all of which would be provided on S 341st Place. The first would be a visitor/employee entrance with a guard house east of 18th Place S. The current proposal is for all employees to access the site at this location. Access would allow for left-in, left-out, right-in, and right-out at S 341st Place. The second access would be provided 270 feet west of 21st Avenue S and would be used primarily for truck deliveries to the Link System Wide Storage building. The third entrance would be located 120 feet west of 21st Avenue S and would provide access to the MOW building. The second and third entrances would not be used for daily employee access to the site. There would be no turn restrictions at the second or third driveway locations.

The segment of 20th Avenue S from S 336th Street to S 341st Place would be closed. A new roadway would be constructed to the west of the OMFS, extending 18th Place S to S 336th Street. This extension of 18th Place S would add a new three-legged intersection to the south side of S 336th Street. This new S 336th Street/18th Place S Extension intersection would be a TWSC intersection with access for left-in, left-out, right-in, and right-out. Also, 21st Avenue S would be extended to S 344th Street. Development of the Preferred Alternative would not preclude extension of 20th Avenue S from S 341st Place to S 344th Street by the city of Federal Way (described above under the No-Build Alternative).

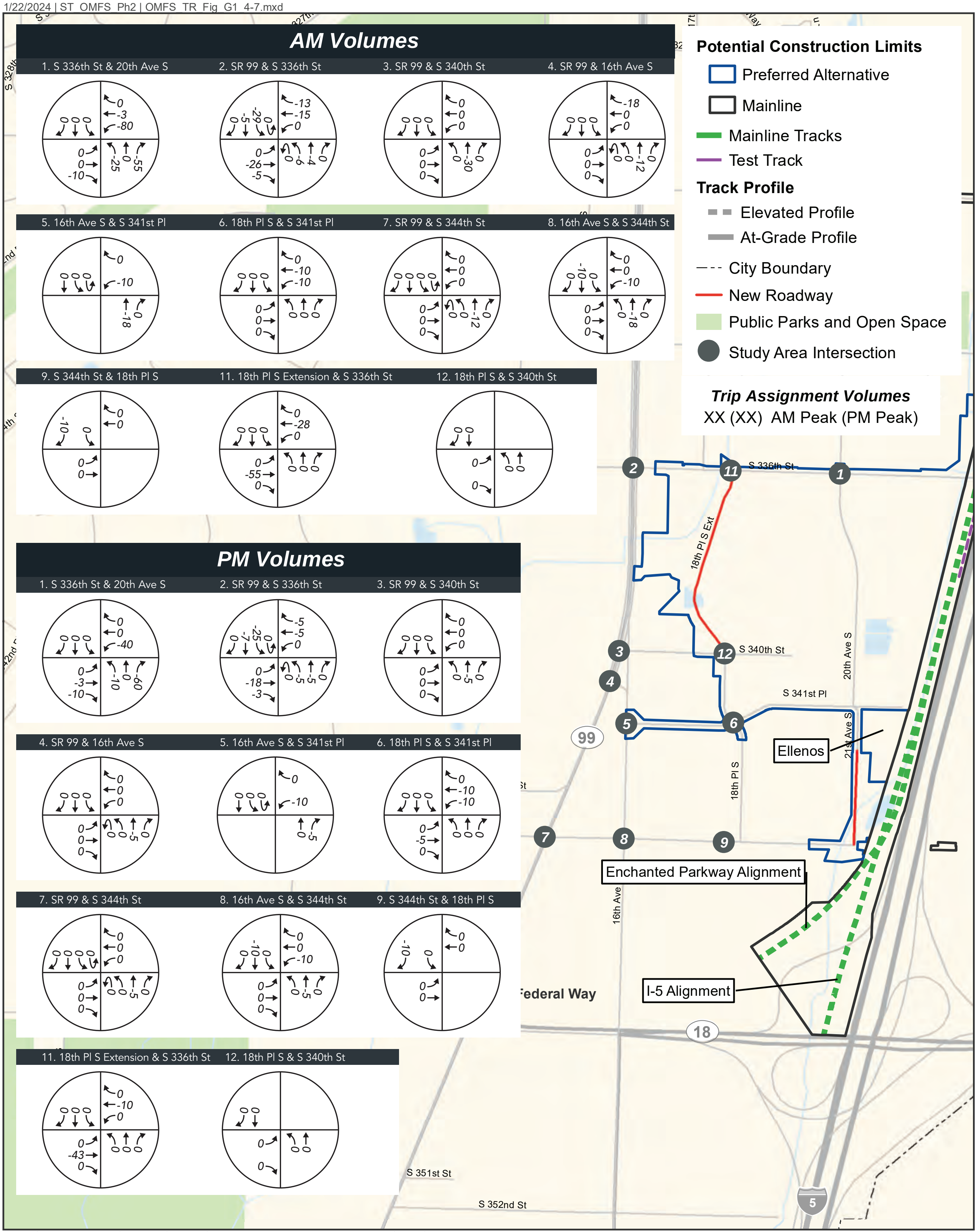
4.2.2.2 Traffic Volumes

To develop traffic volumes for the Preferred Alternative, existing trips from properties that would be acquired were removed and existing trips that would be rerouted due to changes in the roadway network were rerouted to other intersections or intersection movements. Existing trips from properties that would be acquired were estimated based on existing land uses and estimated trip generation and were confirmed with existing intersection volumes. After removing the existing trips from properties that would be acquired, the majority of the remaining trips that currently use 20th Avenue S are assumed to travel to and from Ellenos Yogurt. It is assumed that existing trips that currently travel to and from Ellenos Yogurt from north of the site would use SR 99 instead of the new 18th Place S Extension due to the character and speed of SR 99. This assumption is conservative and represents worst case for traffic along SR 99. The existing trips from properties that would be acquired are shown in Figure G1.4-7, and the existing trips that would be rerouted due to changes in the roadway network are shown in Figure G1.4-8.

The peak hour vehicle trips generated by the Preferred Alternative OMF facility, as described in Section 4.2.1.1 and shown in Table G1.4-8, were then assigned to study area roadways and intersections based on existing travel patterns and are summarized in Figure G1.4-9.

As discussed under the No-Build Alternative, traffic volumes are forecast to increase throughout the study area during both the 2042 AM and PM peak hours as a result of planned population and employment growth by the local jurisdictions. Figure G1.4-10 shows the forecast 2042 AM and PM peak hour turning movements under the Preferred Alternative.

1/22/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-7.mxd


AM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
11. 18th Pl S Extension & S 336th St
12. 18th Pl S & S 340th St
PM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
11. 18th Pl S Extension & S 336th St
12. 18th Pl S & S 340th St
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
Study Area Intersection
Trip Assignment Volumes
XX (XX) AM Peak (PM Peak)
S 336th St
18th Pl S Ext
S 340th St
S 341st Pl
20th Ave S
21st Ave S
18th Pl S
16th Ave
Ellenos
Enchanted Parkway Alignment
I-5 Alignment
Federal Way
S 351st St
S 352nd St
99
18
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

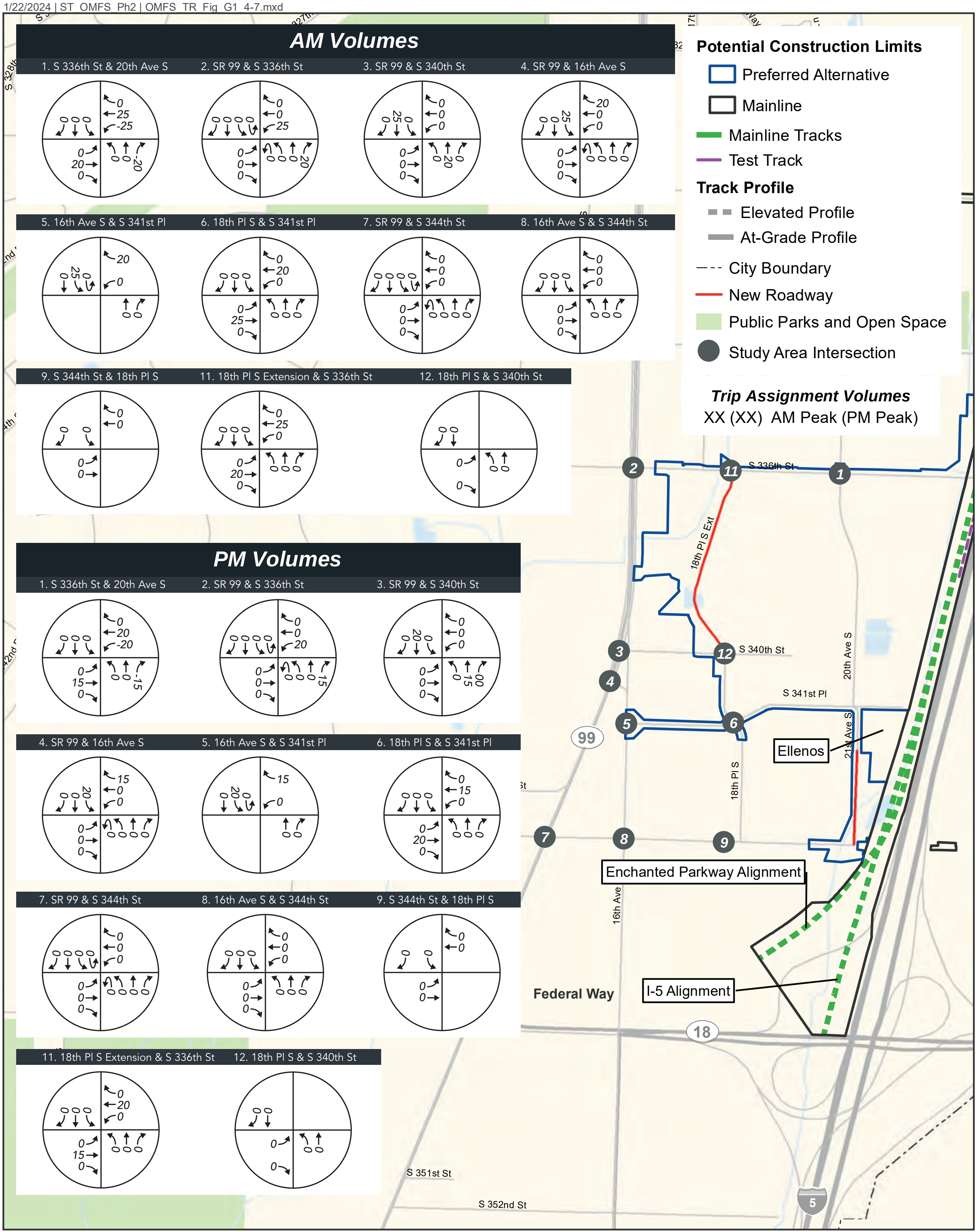
0 500 1,000 Feet

FIGURE G1.4-7

2042 Build Alternative AM and PM Removed Trips
Preferred Alternative

OMF South

1/22/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-7.mxd


AM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
11. 18th Pl S Extension & S 336th St
12. 18th Pl S & S 340th St
PM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
11. 18th Pl S Extension & S 336th St
12. 18th Pl S & S 340th St
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
Study Area Intersection
Trip Assignment Volumes
XX (XX) AM Peak (PM Peak)
S 336th St
18th Pl S Ext
S 340th St
S 341st Pl
20th Ave S
21st Ave S
18th Pl S
16th Ave
Ellenos
Enchanted Parkway Alignment
I-5 Alignment
Federal Way
99
18
5
S 351st St
S 352nd St

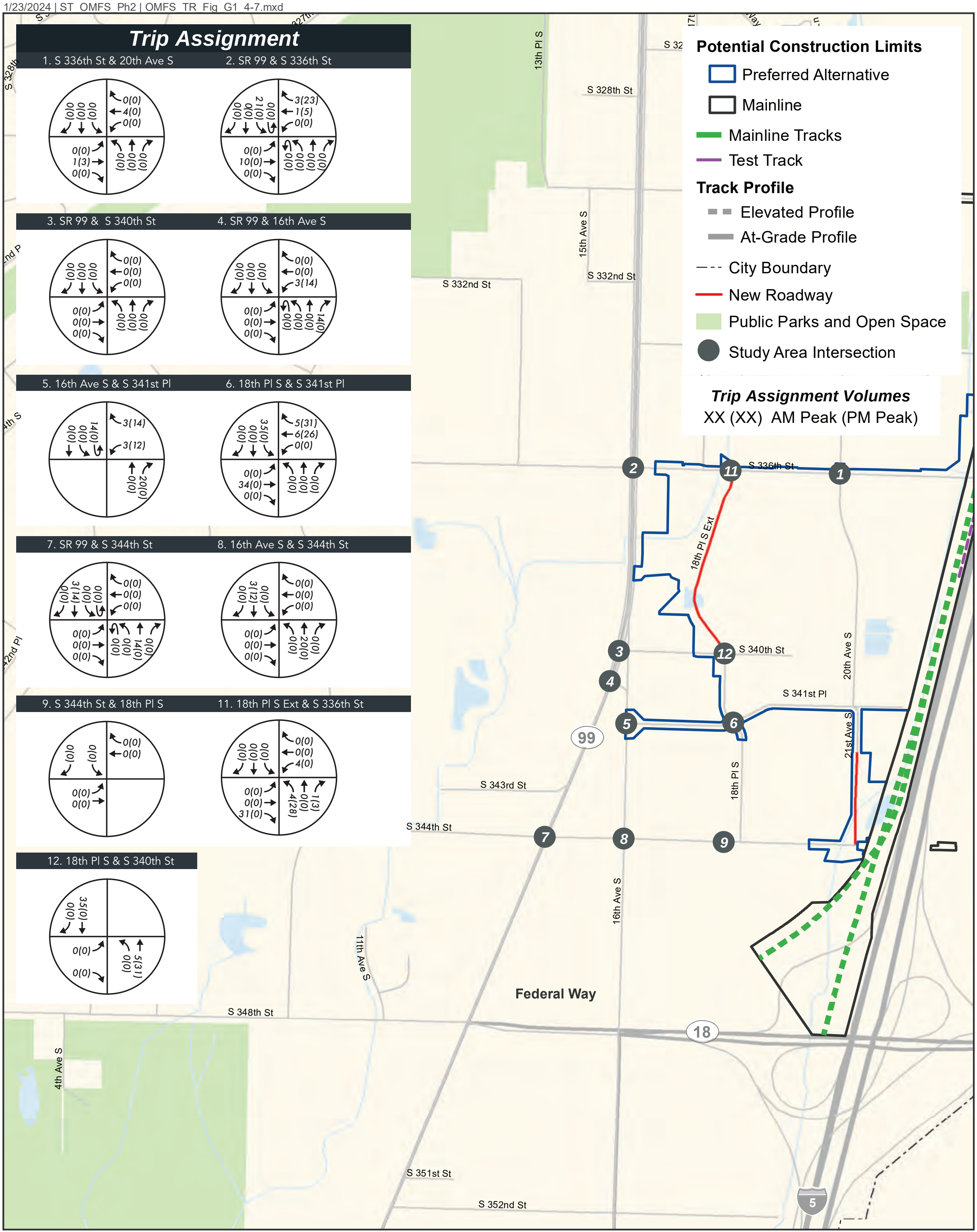
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0 500 1,000 Feet

FIGURE G1.4-8
2042 Build Alternative AM and PM Rerouted Trips
Preferred Alternative

OMF South

1/23/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-7.mxd


Trip Assignment
1. S 336th St & 20th Ave S
0(0) 0(0) 0(0)
0(0) 4(0) 0(0)
0(0) 1(3) 0(0)
0(0) 0(0) 0(0)
2. SR 99 & S 336th St
0(0) 0(0) 21(0) 0(0)
3(23) 1(5) 0(0)
0(0) 10(0) 0(0)
0(0) 0(0) 0(0) 0(0)
3. SR 99 & S 340th St
0(0) 0(0) 0(0)
0(0) 0(0) 0(0)
0(0) 0(0) 0(0)
0(0) 0(0) 0(0)
4. SR 99 & 16th Ave S
0(0) 0(0) 0(0)
0(0) 0(0) 3(14)
0(0) 0(0) 0(0)
0(0) 0(0) 0(0) 14(0)
5. 16th Ave S & S 341st Pl
0(0) 0(0) 14(0)
3(14) 3(12)
0(0) 20(0)
6. 18th Pl S & S 341st Pl
0(0) 0(0) 35(0)
5(31) 6(26) 0(0)
0(0) 34(0) 0(0)
0(0) 0(0) 0(0)
7. SR 99 & S 344th St
0(0) 3(14) 0(0) 0(0)
0(0) 0(0) 0(0)
0(0) 0(0) 0(0)
0(0) 0(0) 14(0) 0(0)
8. 16th Ave S & S 344th St
0(0) 3(12) 0(0)
0(0) 0(0) 0(0)
0(0) 0(0) 0(0)
0(0) 20(0) 0(0)
9. S 344th St & 18th Pl S
0(0) 0(0)
0(0) 0(0)
0(0) 0(0)
11. 18th Pl S Ext & S 336th St
0(0) 0(0) 0(0)
0(0) 0(0) 4(0)
0(0) 0(0) 31(0)
4(28) 0(0) 1(3)
12. 18th Pl S & S 340th St
0(0) 35(0)
0(0) 0(0)
0(0) 5(31)
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
Study Area Intersection
Trip Assignment Volumes
XX (XX) AM Peak (PM Peak)
S 328th
13th Pl S
S 328th St
15th Ave S
S 332nd St
S 332nd St
S 336th St
18th Pl S Ext
S 340th St
20th Ave S
S 341st Pl
21st Ave S
18th Pl S
S 343rd St
S 344th St
16th Ave S
11th Ave S
Federal Way
S 348th St
4th Ave S
S 351st St
S 352nd St
99
18
5
1
2
3
4
5
6
7
8
9
11
12

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

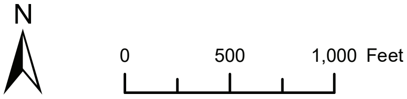
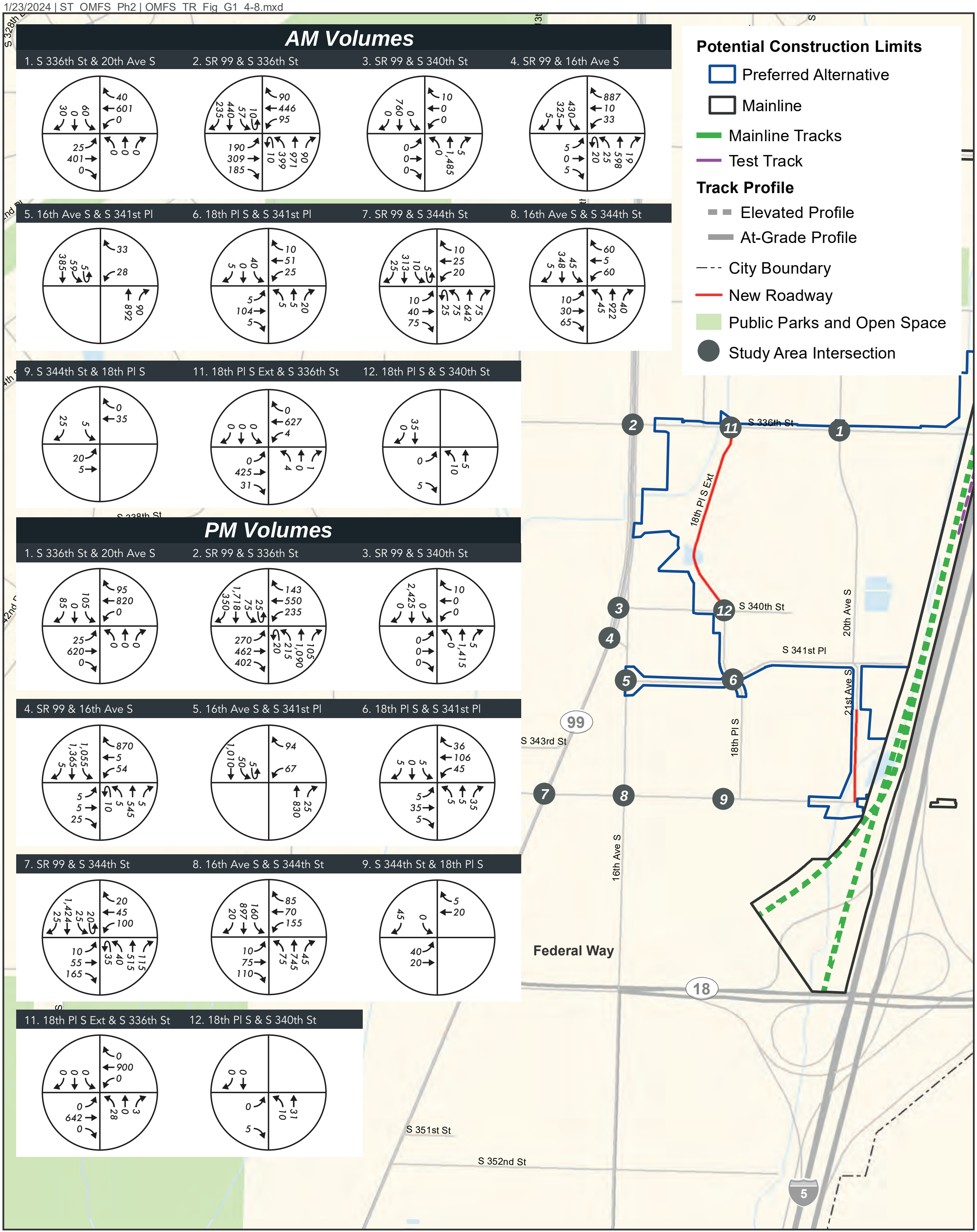

N
0
500
1,000 Feet

FIGURE G1.4-9
2042 Build Alternative AM and PM Vehicle Trips
Preferred Alternative


AM Volumes
1. S 336th St & 20th Ave S
40 601 0 30 0 60 25 401 0 0 0 0
2. SR 99 & S 336th St
90 446 95 235 440 57 10 190 309 185 10 971 399 90
3. SR 99 & S 340th St
10 0 0 0 760 0 0 0 0 0 0 1,485 5
4. SR 99 & 16th Ave S
887 10 33 5 325 430 5 0 5 20 25 598 19
5. 16th Ave S & S 341st Pl
33 28 385 59 5 892 90
6. 18th Pl S & S 341st Pl
10 51 25 5 0 40 5 104 5 5 5 20
7. SR 99 & S 344th St
10 25 20 25 313 10 5 10 40 75 25 75 642 75
8. 16th Ave S & S 344th St
60 5 60 5 348 45 10 30 65 45 922 40
9. S 344th St & 18th Pl S
0 35 25 5 20 5
11. 18th Pl S Ext & S 336th St
0 627 4 0 0 0 0 425 31 4 0 1
12. 18th Pl S & S 340th St
35 0 0 5 5 10
PM Volumes
1. S 336th St & 20th Ave S
95 820 0 85 0 105 25 620 0 0 0 0
2. SR 99 & S 336th St
143 550 235 350 1,718 75 25 270 462 402 20 215 1,090 105
3. SR 99 & S 340th St
10 0 0 0 2,425 0 0 0 0 0 1,415 5
4. SR 99 & 16th Ave S
870 5 54 5 1,365 1,055 5 5 25 10 5 545 5
5. 16th Ave S & S 341st Pl
94 67 1,010 50 5 830 25
6. 18th Pl S & S 341st Pl
36 106 45 5 0 5 5 35 5 5 5 35
7. SR 99 & S 344th St
20 45 100 25 1,424 25 20 10 55 165 35 40 515 115
8. 16th Ave S & S 344th St
85 70 155 20 897 160 10 75 110 75 745 45
9. S 344th St & 18th Pl S
5 20 45 0 40 20
11. 18th Pl S Ext & S 336th St
0 900 0 0 0 0 0 642 0 28 0 3
12. 18th Pl S & S 340th St
0 0 0 5 10 31
Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
Study Area Intersection
S 328th St
S 338th St
S 336th St
18th Pl S Ext
S 340th St
20th Ave S
S 341st Pl
21st Ave S
18th Pl S
S 343rd St
16th Ave S
Federal Way
99
18
5
S 351st St
S 352nd St
1
2
3
4
5
6
7
8
9
11
12

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

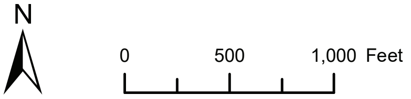

N
0
500
1,000 Feet

FIGURE G1.4-10

2042 Build Alternative AM and PM Traffic Volumes
Preferred Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.2.2.3 Intersection Operations

The forecast project alternatives for the 2042 AM and PM peak hour LOS as well as delay for the study area intersections evaluated are discussed below.

Preferred Alternative 2042 AM Analysis

Under the Preferred Alternative, no intersections are forecast to operate below the applicable LOS or v/c ratio standards for the roadway or highway, as shown in Table G1.4-11. Figure G1.4-11 shows the 2042 AM peak hour operations at the Preferred Alternative study intersections.

Table G1.4-11 Preferred Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection[1]	Control Type	Agency Standard	No Build Alternative LOS [2, 3]	No Build Alternative Delay (seconds) [2, 3]	No Build Alternative V/C Ratio [2, 3]	Preferred Alternative LOS [2, 3]	Preferred Alternative Delay (seconds) [2, 3]	Preferred Alternative V/C Ratio [2, 3]
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.52	N/A	N/A	0.52
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A	D	46	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	19	N/A	C	20	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	28	N/A	D	36	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.15	N/A	N/A	0.17
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.06
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	18	N/A	B	19	N/A
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.39	N/A	N/A	0.38
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.04	N/A	N/A	0.03
11	18th Place S Extension/ S 336th Street	TWSC	N/A	-	-	-	N/A	N/A	0.01
12	18th Place S/S 340th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.01

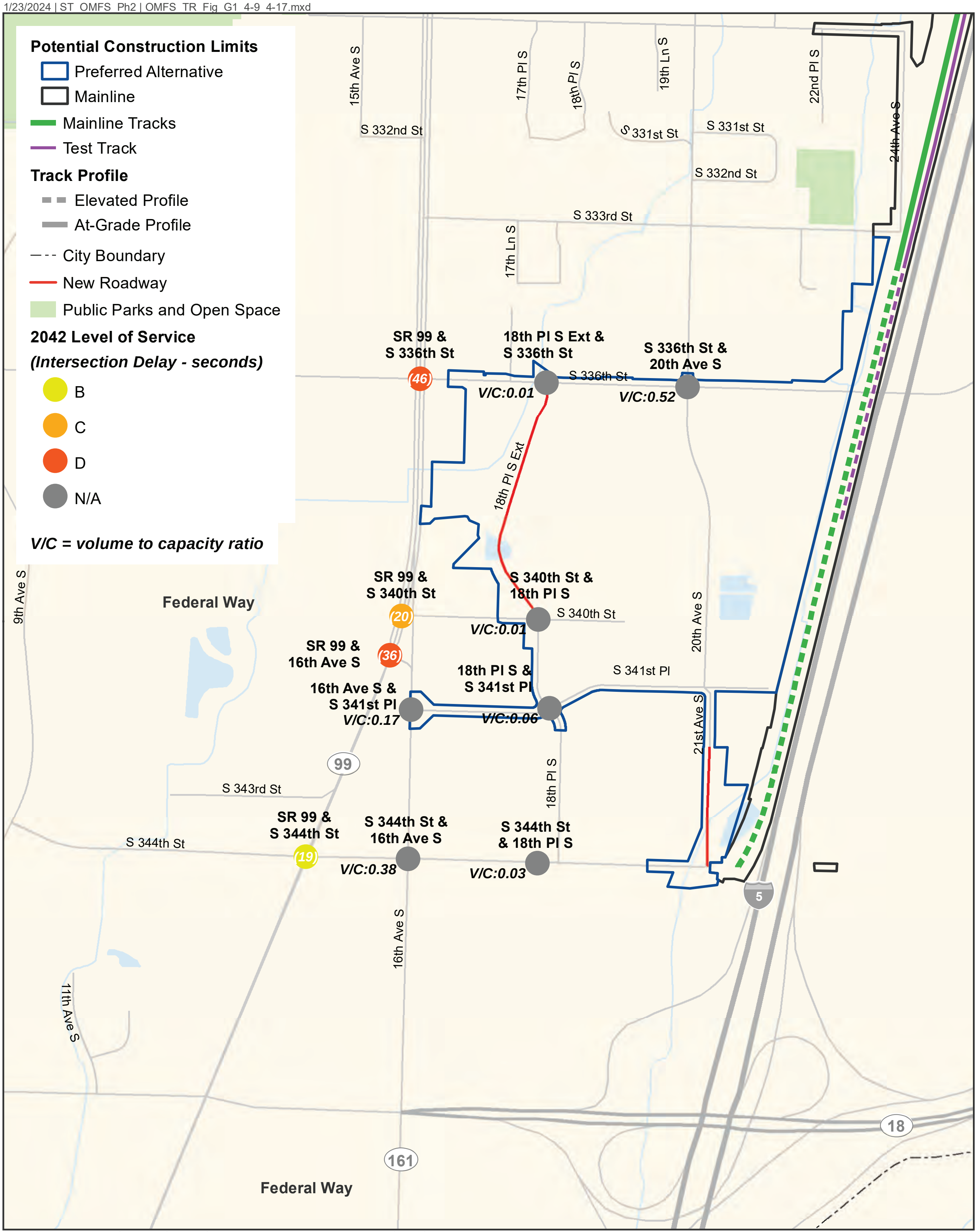
Notes:

(1) Intersection 10 (SR99/Driveway), as discussed in the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS, is no longer included because the site entrance has moved to S 341st Place, east of Intersection 6 (18th Place S/S 341st Place).

(2) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(3) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

1/23/2024 | ST OMFS Ph2 | OMFS TR Fig G1 4-9 4-17.mxd


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
B
C
D
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 & S 336th St
46
18th Pl S Ext & S 336th St
V/C:0.01
S 336th St
S 336th St & 20th Ave S
V/C:0.52
18th Pl S Ext
SR 99 & S 340th St
20
S 340th St & 18th Pl S
S 340th St
V/C:0.01
Federal Way
9th Ave S
SR 99 & 16th Ave S
36
20th Ave S
16th Ave S & S 341st Pl
V/C:0.17
18th Pl S & S 341st Pl
V/C:0.06
S 341st Pl
21st Ave S
99
S 343rd St
18th Pl S
SR 99 & S 344th St
19
S 344th St & 16th Ave S
V/C:0.38
S 344th St & 18th Pl S
V/C:0.03
S 344th St
5
16th Ave S
11th Ave S
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-11

2042 Build Alternative AM Peak Hour Traffic Operations
Preferred Alternative

N

0 500 1,000 Feet

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Preferred Alternative 2042 PM analysis

Under the Preferred Alternative, no intersections would operate below the applicable LOS or v/c ratio standards for the roadway or highway during the PM peak hour. Table G1.4-12 and Figure G1.4-12 show the 2042 PM peak hour operations at the Preferred Alternative study intersections.

Table G1.4-12 Preferred Alternative 2042 PM Peak Hour Traffic Operations

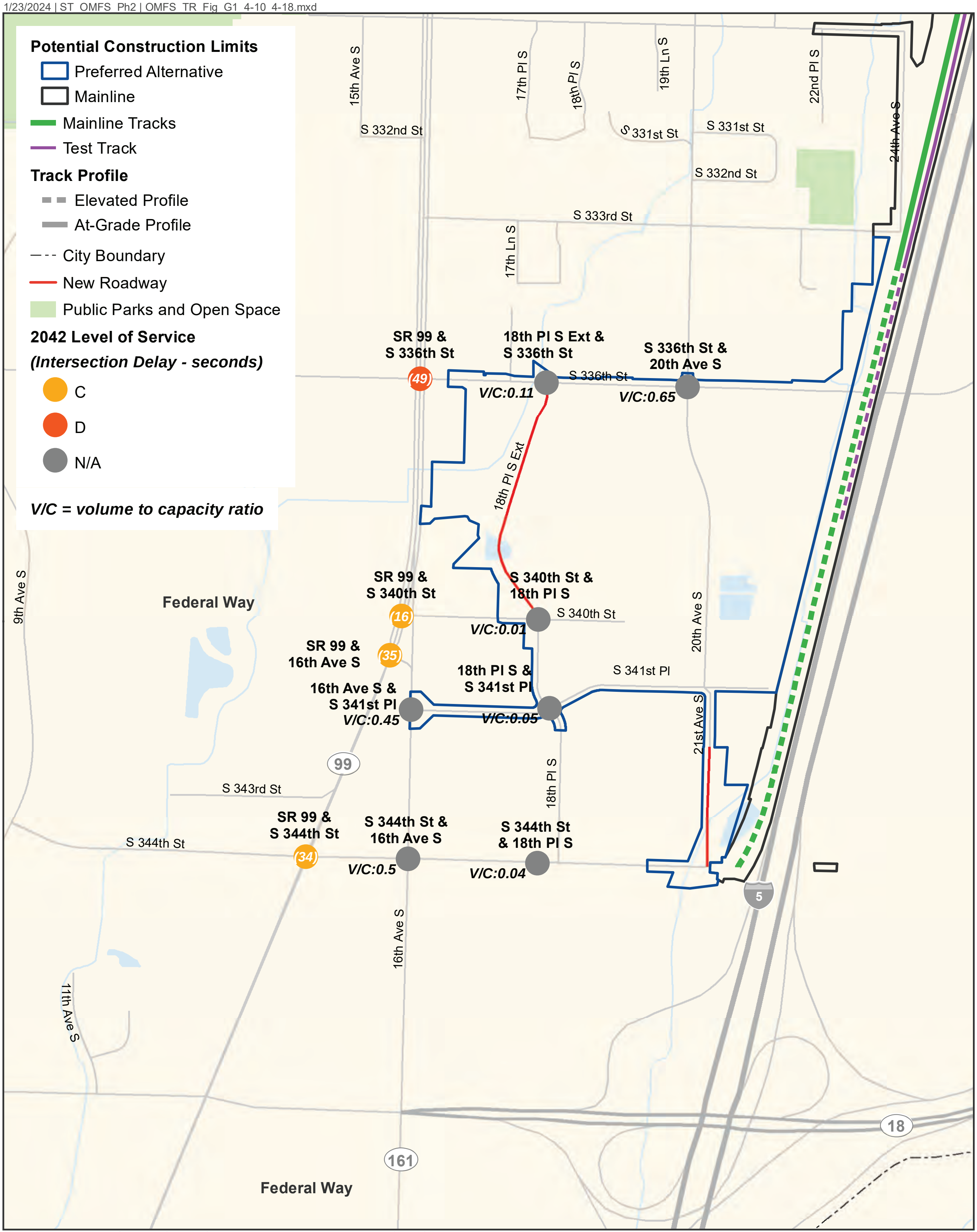
ID	Intersection[1]	Control Type	Agency Standard	No Build Alternative LOS [2, 3]	No Build Alternative Delay (seconds) [2, 3]	No Build Alternative V/C Ratio [2, 3]	Preferred Alternative LOS [2, 3]	Preferred Alternative Delay (seconds) [2, 3]	Preferred Alternative V/C Ratio [2, 3]
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.66	N/A	N/A	0.65
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	54	N/A	D	49	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A	C	16	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	N/A	C	35	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.38	N/A	N/A	0.45
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	16	N/A	C	34	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.51	N/A	N/A	0.50
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.04
11	18th Place S Extension/ S 336th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.11
12	18th Place S/ S 340th Street	TWSC	City of Federal Way (v/c 1.0)	-	-	-	N/A	N/A	0.01

Notes:

(1) Intersection 10 (SR99/Driveway), as discussed in the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS, is no longer included because the site entrance has moved to S 341st Place, east of Intersection 6 (18th Place S/S 341st Place).

(2) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(3) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
New Roadway
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
C
D
N/A
V/C = volume to capacity ratio
SR 99 & S 336th St
49
18th Pl S Ext & S 336th St
V/C:0.11
S 336th St & 20th Ave S
V/C:0.65
SR 99 & S 340th St
16
S 340th St & 18th Pl S
V/C:0.01
SR 99 & 16th Ave S
35
16th Ave S & S 341st Pl
V/C:0.45
18th Pl S & S 341st Pl
V/C:0.05
SR 99 & S 344th St
34
S 344th St & 16th Ave S
V/C:0.5
S 344th St & 18th Pl S
V/C:0.04
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
S 336th St
18th Pl S Ext
S 340th St
20th Ave S
S 341st Pl
21st Ave S
18th Pl S
S 343rd St
S 344th St
16th Ave S
9th Ave S
11th Ave S
Federal Way
Federal Way
99
5
18
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-12

2042 Build Alternative PM Peak Hour Traffic Operations
Preferred Alternative

N

0 500 1,000 Feet

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.2.2.4 Freight

The Preferred Alternative is not anticipated to negatively affect truck circulation or truck routes on the local street network. The mainline would not have any at-grade roadway crossings; therefore, there would not be delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

4.2.2.5 Transit

Depending on the mainline alignment, up to 50 parking spaces in the Federal Way/S 320th Street Park & Ride would be removed as part of the Preferred Alternative to accommodate the elevated mainline and a relocated BPA transmission line tower. Given the size of the Federal Way/S 320th Street Park & Ride and its low utilization, it is estimated that sufficient parking would still be available to accommodate demand with a reduction of 50 parking spaces. WSDOT has indicated that the loss of these stalls would not require replacement.

4.2.2.6 Nonmotorized Facilities

Under the Preferred Alternative, nonmotorized volumes would increase similarly to the No-Build Alternative. Pedestrian and bicycle facilities would generally be developed in a manner comparable to the No-Build Alternative. The conceptual layout of the Preferred Alternative would include bicycle lanes along the extended segment of 18th Place S and extend the eastbound bicycle lanes on S 336th Street from 20th Avenue S to SR 99, maintaining the existing bicycle network in the study area. It could also affect the future alignment of the planned trails through the Federal Way/S 320th Street Park & Ride but would not necessarily preclude them. Right-of-way improvements, which may include the development of new pedestrian and/or bicycle facilities, are planned for the Preferred Alternative. These areas include S 336th Street from SR 99 to I-5 and approximately 150 feet along 21st Avenue S south of S 341st Place.

4.2.2.7 Parking

Development of the mainline for the Preferred Alternative would require the permanent removal of approximately 10 parking stalls from the east side of The Commons at Federal Way shopping mall. There would be an abundance of parking stalls remaining at The Commons at Federal Way. Nearby developments along 18th Place S, S 341st Place, and S 344th Street currently use the street parking that would be removed; however, several of these properties would be acquired as part of the project. As a result, no adverse impacts are expected.

Impacts to the Federal Way/S 320th Street Park & Ride are described in the Transit section.

4.2.2.8 Safety

Beginning south of S 324th Street, the mainline tracks connecting the Preferred Alternative to FWLE would be constructed in the I-5 right-of-way directly adjacent to the clear zone—which is the unobstructed, relatively flat area beyond the edge of the roadway to allow drivers to stop safely or regain control of a vehicle if needed. While portions of the mainline alignment would maintain clear zone standards, there may be locations where the minimum widths cannot be met. In such instances, deviations from clear zone distances require approval from WSDOT or FHWA. Failure to meet the standard width of the clear zone could result in impacts to safety conditions and an increase in collision frequencies. In areas where minimum clear zone conditions cannot be maintained, guardrails, barriers, or impact attenuators, such as water-filled jersey barriers or sand-filled barrels, would be provided to shield vehicles from roadside hazards. As a result, the mainline along I-5 is not anticipated to have any quantifiable impact to safety along I-5.

4.2.3 South 344th Street Alternative

4.2.3.1 Roadway Network and Intersection Modifications

The roadway network would be modified under the South 344th Street Alternative. The alternative would not interfere with the potential to add a southbound auxiliary lane on 16th Avenue S, as described for the No-Build Alternative.

The South 344th Street Alternative would have two access points. The first is a visitor/employee access with a guard house would be provided at the intersection of S 344th Street and 18th Place S, allowing for access to SR 99 via 16th Avenue S or S 344th Street. The current proposal is for all employees to access the site at this location. A second access would be provided at 20th Avenue S, south of S 336th Street, with direct access to the signalized intersection at S 336th Street; however, it would not be for daily employee access to the site. The design of two study intersections would be modified as part of the South 344th Street Alternative. At intersection #6 (18th Place S/S 341st Place), the south and east legs would be removed, as they would be occupied by OMF South. The resulting traffic volumes using these legs were therefore removed from the South 344th Street Alternative analysis at this intersection.

The alternative would close 20th Avenue S 300 feet south of S 336th Street and preclude the planned extension of 20th Avenue S from S 341st Place to 344th Street, described under the No-Build Alternative. 20th Avenue S would still provide access to the Christian Faith Center from the north. Drivers and nonmotorized travelers wishing to access the remaining streets in the southern part of the study area would be required to do so via 16th Avenue S or SR 99.

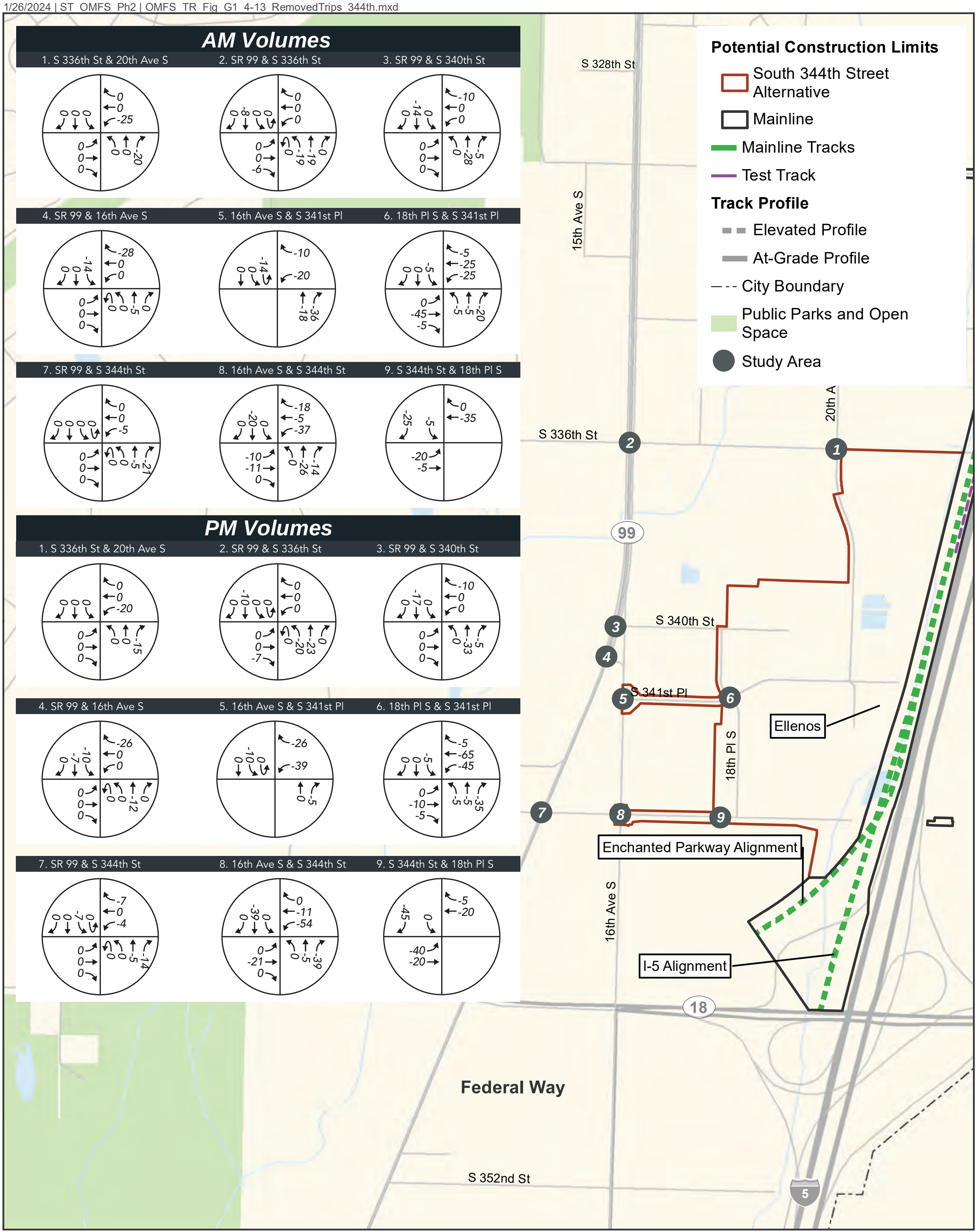
4.2.3.2 Traffic Volumes

To develop traffic volumes for the South 344th Street Alternative existing trips from properties that would be acquired were removed and existing trips that would be rerouted due to changes in the roadway network were rerouted to other intersections or intersection movements. Existing trips from properties that would be acquired were estimated based on existing land uses and estimated trip generation and were confirmed with existing intersection volumes. The existing trips from properties that would be acquired are shown in Figure G1.4-13, and the existing trips that would be rerouted due to changes in the roadway network are shown in Figure G1.4-14. The peak hour vehicle trips generated by the S 344th Street facility, as described in Section 4.2.1.1 and shown in Table G1.4-8, were then assigned to study area roadways and intersections based on existing travel patterns and are summarized in Figure G1.4-15.

As discussed under the No-Build Alternative, traffic volumes are forecast to increase throughout the study area during both the 2042 AM and PM peak hours as a result of planned population and employment growth by the local jurisdictions. Figure G1.4-16 show the forecast 2042 AM and PM peak hour turning movements under the South 344th Street Alternative.

4.2.3.3 Intersection Operations

The forecast project alternatives for the 2042 AM and PM peak hour LOS as well as delay for the study area intersections evaluated are discussed below. Nearby uses, such as the Christian Faith Center, generate large traffic volumes outside of the weekday AM or PM peak hours. Given the planned arrival and departure times for staff at the facility, traffic generated by the facility is not anticipated to exacerbate existing conditions associated with church events.


AM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
PM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area
S 328th St
15th Ave S
S 336th St
20th A
S 340th St
S 341st Pl
18th Pl S
16th Ave S
Ellenos
Enchanted Parkway Alignment
I-5 Alignment
99
18
5
Federal Way
S 352nd St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

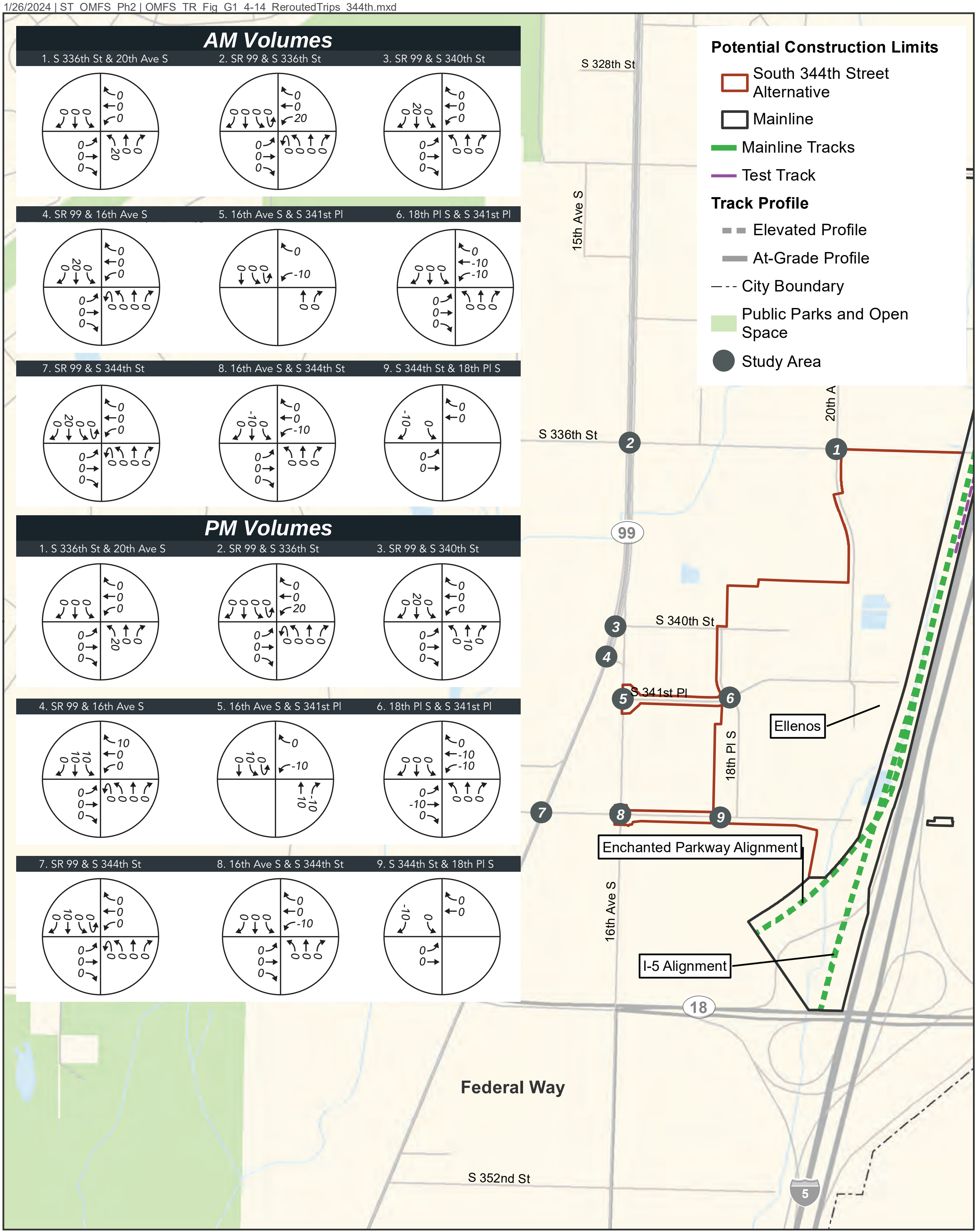
FIGURE G1.4-13

2042 Build Alternative AM and PM Removed Trips
South 344th Street Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

1/26/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-14_ReroutedTrips_344th.mxd


AM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
PM Volumes
1. S 336th St & 20th Ave S
2. SR 99 & S 336th St
3. SR 99 & S 340th St
4. SR 99 & 16th Ave S
5. 16th Ave S & S 341st Pl
6. 18th Pl S & S 341st Pl
7. SR 99 & S 344th St
8. 16th Ave S & S 344th St
9. S 344th St & 18th Pl S
Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area
S 328th St
15th Ave S
20th A
S 336th St
99
S 340th St
S 341st Pl
18th Pl S
Ellenos
Enchanted Parkway Alignment
16th Ave S
I-5 Alignment
18
Federal Way
S 352nd St
5
1
2
3
4
5
6
7
8
9

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-14
2042 Build Alternative AM and PM Rerouted Trips
South 344th Street Alternative

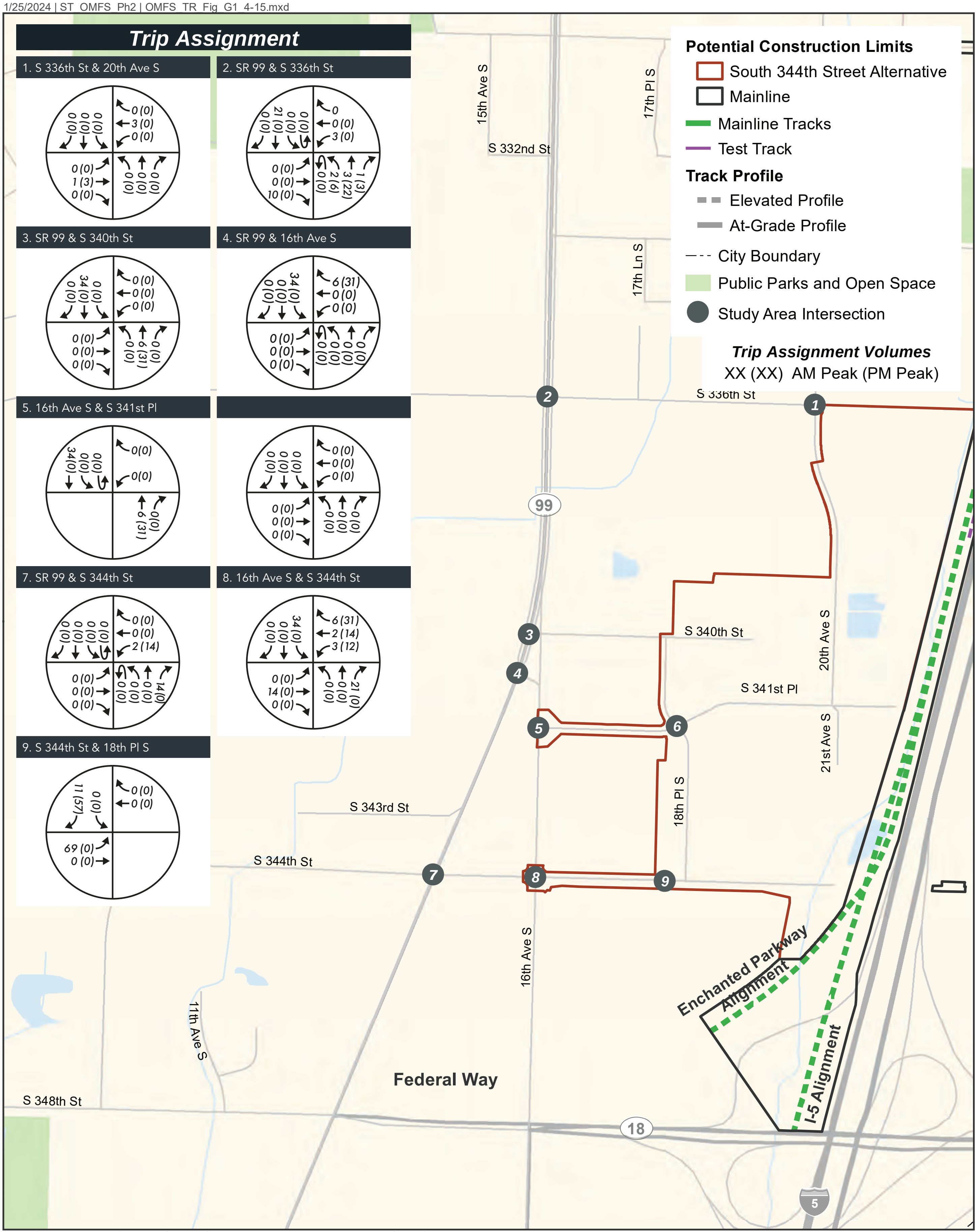
N

0 500 1,000 Feet

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

1/25/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-15.mxd


Trip Assignment
1. S 336th St & 20th Ave S
0 (0) 0 (0) 0 (0)
0 (0) 3 (0) 0 (0)
0 (0) 1 (3) 0 (0)
0 (0) 0 (0) 0 (0)
2. SR 99 & S 336th St
0 (0) 21 (0) 0 (0) 0 (0)
0 0 (0) 3 (0)
0 (0) 0 (0) 10 (0)
0 (0) 2 (6) 3 (22) 1 (3)
3. SR 99 & S 340th St
34 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 6 (31) 0 (0)
4. SR 99 & 16th Ave S
34 (0) 0 (0) 0 (0)
6 (31) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0) 0 (0)
5. 16th Ave S & S 341st Pl
34 (0) 0 (0) 0 (0)
0 (0) 0 (0)
6 (31) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
7. SR 99 & S 344th St
0 (0) 0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 2 (14)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0) 14 (0)
8. 16th Ave S & S 344th St
34 (0) 0 (0) 0 (0)
6 (31) 2 (14) 3 (12)
0 (0) 14 (0) 0 (0)
0 (0) 0 (0) 21 (0)
9. S 344th St & 18th Pl S
11 (57) 0 (0)
0 (0) 0 (0)
69 (0) 0 (0)
Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
Trip Assignment Volumes
XX (XX) AM Peak (PM Peak)
15th Ave S
17th Pl S
S 332nd St
17th Ln S
S 336th St
99
S 340th St
20th Ave S
S 341st Pl
21st Ave S
18th Pl S
S 343rd St
S 344th St
16th Ave S
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
Federal Way
S 348th St
18
5
1
2
3
4
5
6
7
8
9

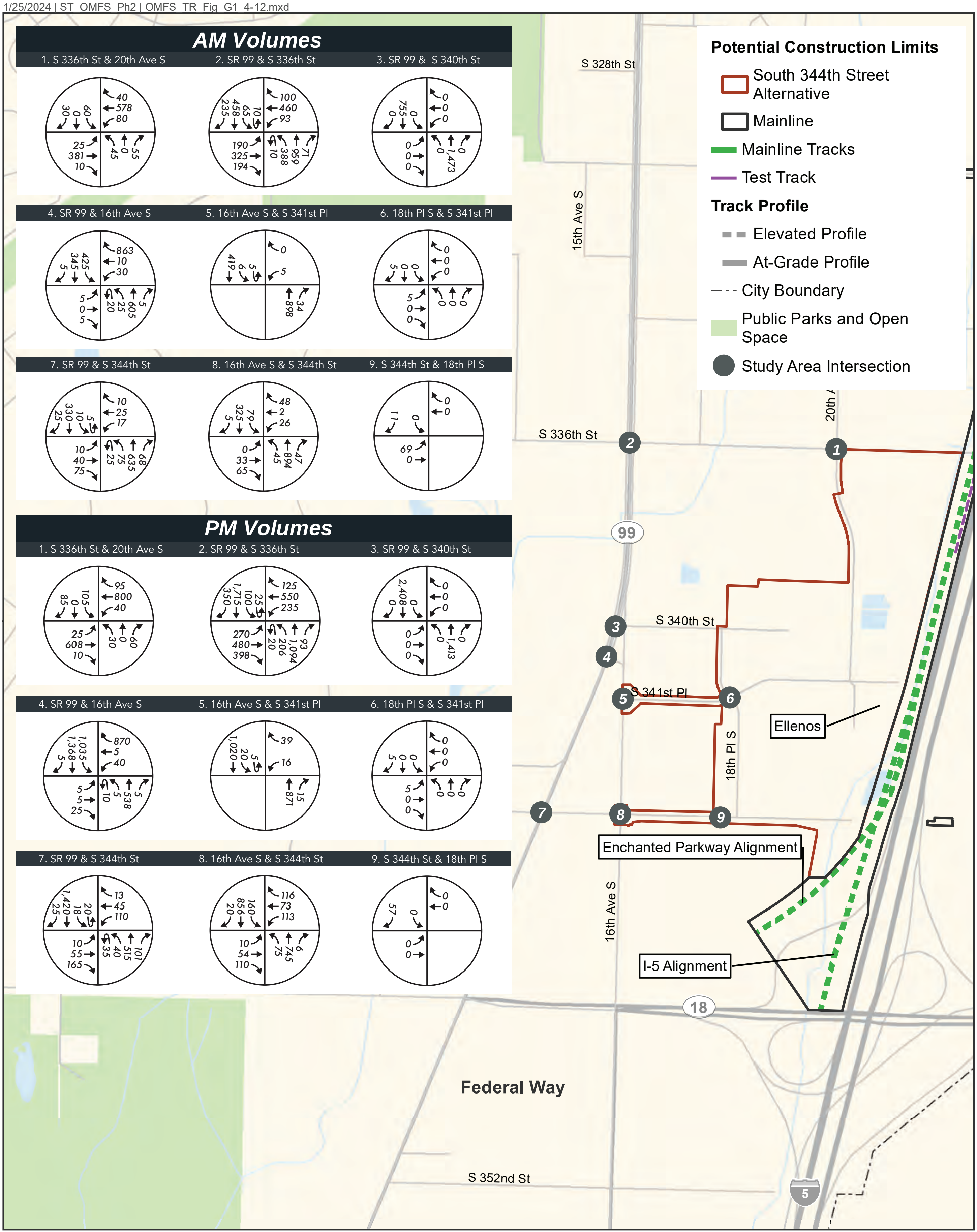
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-15
2042 Build Alternative AM and PM Vehicle Trips
South 344th Street Alternative

N

0 500 1,000 Feet

OMF South


AM Volumes
1. S 336th St & 20th Ave S
30 0 60
40 578 80
25 381 10
45 0 55
2. SR 99 & S 336th St
235 458 65 10
100 460 93
190 325 194
10 388 959 71
3. SR 99 & S 340th St
0 755 0
0 0 0
0 0 0
0 1,473 0
4. SR 99 & 16th Ave S
5 345 425
863 10 30
5 0 5
20 25 605 5
5. 16th Ave S & S 341st Pl
419 6 5
0 5
898 34
6. 18th Pl S & S 341st Pl
5 0 0
0 0 0
5 0 0
0 0 0
7. SR 99 & S 344th St
25 330 10 5
10 25 17
10 40 75
25 75 635 68
8. 16th Ave S & S 344th St
5 325 79
48 2 26
0 33 65
45 894 47
9. S 344th St & 18th Pl S
11 0
0 0
69 0
PM Volumes
1. S 336th St & 20th Ave S
85 0 105
95 800 40
25 608 10
30 0 60
2. SR 99 & S 336th St
350 1,715 100 25
125 550 235
270 480 398
20 206 1,094 93
3. SR 99 & S 340th St
0 2,408 0
0 0 0
0 0 0
0 1,413 0
4. SR 99 & 16th Ave S
5 1,368 1,035
870 5 40
5 5 25
10 5 538 5
5. 16th Ave S & S 341st Pl
1,020 20 5
39 16
871 15
6. 18th Pl S & S 341st Pl
5 0 0
0 0 0
5 0 0
0 0 0
7. SR 99 & S 344th St
25 1,420 18 20
13 45 110
10 55 165
35 40 515 101
8. 16th Ave S & S 344th St
20 856 160
116 73 113
10 54 110
75 745 6
9. S 344th St & 18th Pl S
57 0
0 0
0 0
Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
S 328th St
15th Ave S
S 336th St
20th Ave S
99
S 340th St
S 341st Pl
18th Pl S
Ellenos
Enchanted Parkway Alignment
16th Ave S
I-5 Alignment
18
Federal Way
S 352nd St
5
1
2
3
4
5
6
7
8
9

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-16

2042 Build Alternative AM and PM Traffic Volumes
South 344th Street Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

South 344th Street Alternative 2042 AM Analysis

As shown in Table G1.4-13, no intersections under the South 344th Street Alternative are forecast to operate below the applicable LOS or v/c ratio standards for the roadway or highway. Figure G1.4-17 shows the 2042 AM peak hour operations at the South 344th Street Alternative study intersections.

Table G1.4-13 South 344th Street Alternative 2042 AM Peak Hour Traffic Operations

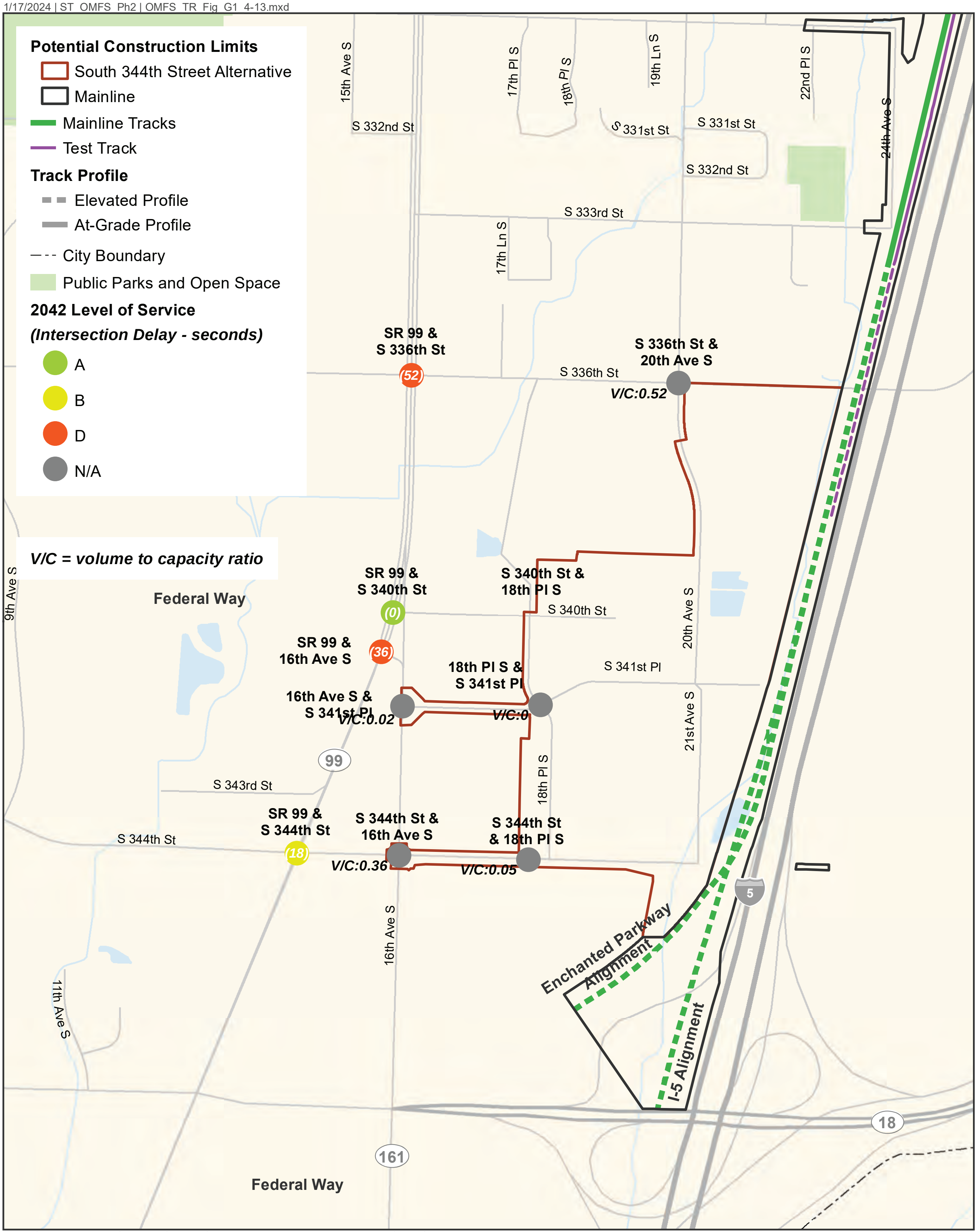
ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2	No Build Alternative Delay (seconds) 1, 2	No Build Alternative V/C Ratio 1, 2	South 344th Street Alternative LOS 1, 2	South 344th Street Alternative Delay (seconds) 1, 2	South 344th Street Alternative V/C Ratio 1, 2
1	S 336th Street/ 20th Avenue S	Signal	N/A	N/A	N/A	0.52	N/A	N/A	0.52
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	44	N/A	D	52	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	19	N/A	A	0	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	28	N/A	D	36	N/A
5	16th Avenue S/ S 341st Place	TWSC	N/A	N/A	N/A	0.15	N/A	N/A	0.02
6	18th Place S/ S 341st Place	Uncontrolled	N/A	N/A	N/A	0.03	N/A	N/A	0.00
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	18	N/A	B	18	N/A
8	S 344th Street/ 16th Avenue S	Signal	N/A	N/A	N/A	0.39	N/A	N/A	0.36
9	S 344th Street/ 18th Place S	Uncontrolled	N/A	N/A	N/A	0.04	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).

1/17/2024 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-13.mxd



Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
B
D
N/A
V/C = volume to capacity ratio
SR 99 & S 336th St
(52)
S 336th St & 20th Ave S
V/C:0.52
SR 99 & S 340th St
(0)
S 340th St & 18th Pl S
SR 99 & 16th Ave S
(36)
18th Pl S & S 341st Pl
V/C:0
16th Ave S & S 341st Pl
V/C:0.02
SR 99 & S 344th St
(18)
S 344th St & 16th Ave S
V/C:0.36
S 344th St & 18th Pl S
V/C:0.05
Enchanted Parkway Alignment
I-5 Alignment
Federal Way
Federal Way
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
S 336th St
S 340th St
20th Ave S
S 341st Pl
21st Ave S
9th Ave S
S 343rd St
S 344th St
18th Pl S
16th Ave S
11th Ave S
99
5
18
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G1.4-17

2042 Build Alternative AM Peak Hour Traffic Operations
South 344th Street Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

South 344th Street Alternative 2042 PM Analysis

Similar to the Preferred Alternative, no intersections would operate below the applicable LOS or v/c ratio standards for the roadway or highway during the PM peak hour. Table G1.4-14 and Figure G1.4-18 show the 2042 PM peak hour operations at the South 344th Street Alternative study intersections.

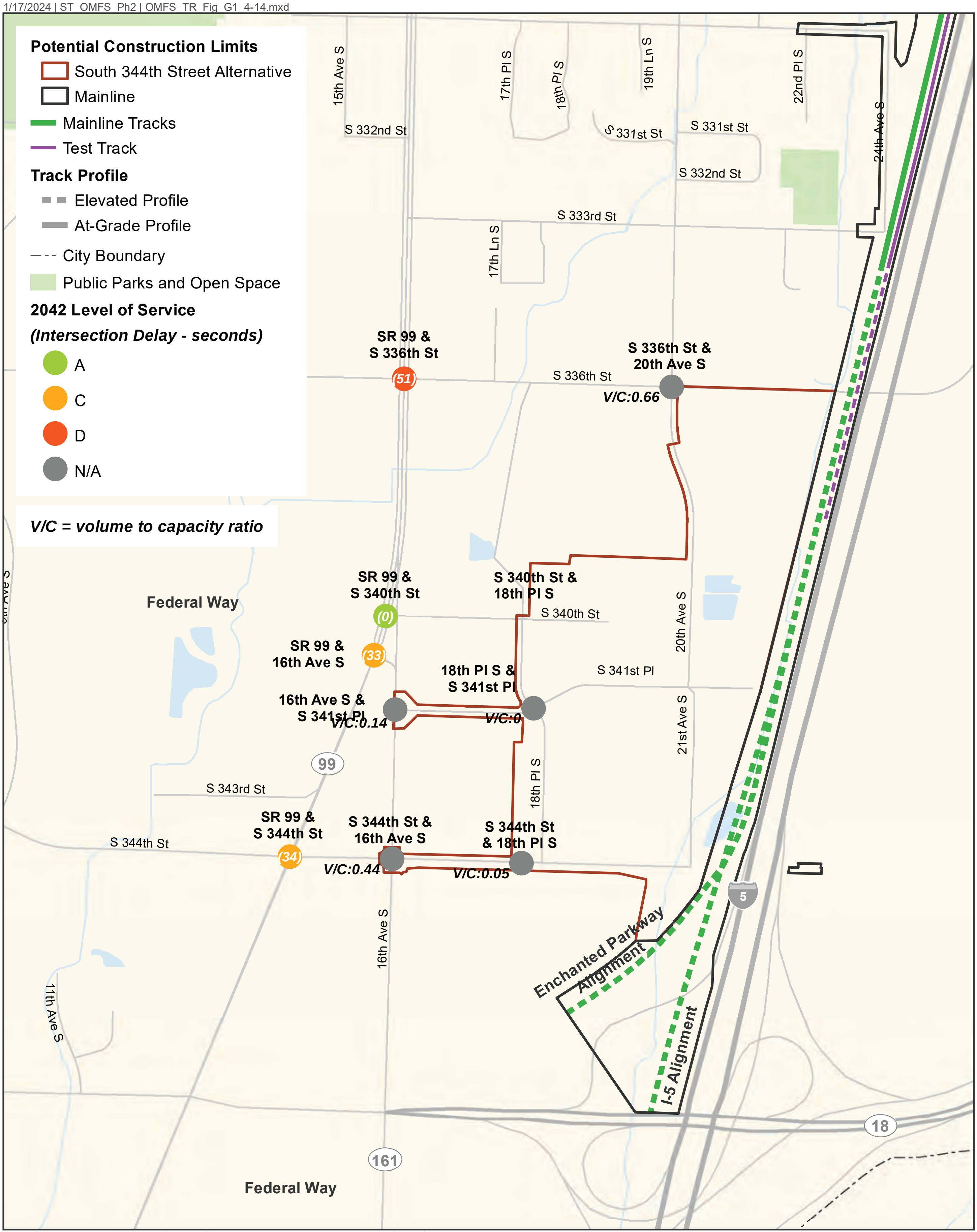
Table G1.4-14 South 344th Street Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2	No Build Alternative Delay (seconds) 1, 2	No Build Alternative V/C Ratio 1, 2	South 344th Street Alternative LOS 1, 2	South 344th Street Alternative Delay (seconds) 1, 2	South 344th Street Alternative V/C Ratio 1, 2
1	S 336th Street/ 20th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.66	N/A	N/A	0.66
2	SR 99/ S 336th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	54	N/A	D	51	N/A
3	SR 99/ S 340th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	16	N/A	A	0	N/A
4	SR 99/ 16th Avenue S	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	N/A	C	33	N/A
5	16th Avenue S/ S 341st Place	TWSC	City of Federal Way (v/c 1.0)	N/A	N/A	0.38	N/A	N/A	0.14
6	18th Place S/ S 341st Place	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.00
7	SR 99/ S 344th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	B	16	N/A	C	34	N/A
8	S 344th Street/ 16th Avenue S	Signal	City of Federal Way (v/c 1.2)	N/A	N/A	0.51	N/A	N/A	0.44
9	S 344th Street/ 18th Place S	Uncontrolled	City of Federal Way (v/c 1.0)	N/A	N/A	0.05	N/A	N/A	0.05

Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using HCM 6th Edition (Transportation Research Board 2016) for signalized and unsignalized intersections, except where HCM 6th Edition limitations necessitated use of HCM 2000 methodology (Transportation Research Board 2000).


Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
C
D
N/A
V/C = volume to capacity ratio
15th Ave S
17th Pl S
18th Pl S
19th Ln S
22nd Pl S
24th Ave S
S 332nd St
S 331st St
S 331st St
S 332nd St
S 333rd St
17th Ln S
SR 99 &
S 336th St
(51)
S 336th St
S 336th St &
20th Ave S
V/C:0.66
Federal Way
SR 99 &
S 340th St
(0)
S 340th St &
18th Pl S
S 340th St
20th Ave S
SR 99 &
16th Ave S
(33)
18th Pl S &
S 341st Pl
S 341st Pl
16th Ave S &
S 341st Pl
V/C:0.14
V/C:0
21st Ave S
99
S 343rd St
18th Pl S
SR 99 &
S 344th St
S 344th St &
16th Ave S
S 344th St
& 18th Pl S
S 344th St
(34)
V/C:0.44
V/C:0.05
5
16th Ave S
Enchanted Parkway
Alignment
I-5 Alignment
11th Ave S
18
161
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-18

2042 Build Alternative PM Peak Hour Traffic Operations
South 344th Street Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.2.3.4 Freight

The South 344th Street Alternative is not anticipated to negatively affect truck circulation or truck routes on the local street network. The mainline would not have any at-grade roadway crossings; therefore, there would not be delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections.

4.2.3.5 Transit

Depending on the mainline alignment, up to 50 parking spaces in the Federal Way/S 320th Street Park & Ride would be removed as part of the South 344th Street Alternative to accommodate the elevated mainline and a relocated BPA transmission line tower. Given the size of the Federal Way/S 320th Street Park & Ride and its low utilization, it is estimated that sufficient parking would still be available to accommodate demand with a reduction of 50 parking spaces.

4.2.3.6 Nonmotorized Facilities

Under the South 344th Street Alternative, nonmotorized volumes would increase similarly to the No-Build Alternative. Pedestrian and bicycle facilities would generally be developed in a manner comparable to the No-Build Alternative. However, the alternative would eliminate the greenway between S 336th Street and S 344th Street. The South 344th Street Alternative would also close portions of 18th Place S and S 341st Place, effectively eliminating much of the existing street grid network in the southern part of the study area. Pedestrians and cyclists could continue to travel on the existing sidewalks on S 336th Street between SR 99 and S 344th Street. Right-of-way improvements, which may include the development of new pedestrian and/or bicycle facilities, are planned for the South 344th Street Alternative. These areas include S 341st Place and S 344th Street from SR 99 to the programmed site area boundary and 18th Place S from S 340th Street to S 341st Place. In addition, Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street.

4.2.3.7 Parking

Development of the mainline for the South 344th Street Alternative would require the permanent removal of approximately 10 stalls from the east side of The Commons at Federal Way shopping mall and approximately 20 from the southeast portion of the Walmart property south of S 344th Street. The South 344th Street Alternative would also displace on-street parking adjacent to developments along 21st Avenue S, S 341st Place east of 18th Place S, and S 344th Street east of 18th Place S. There would be an abundance of parking stalls remaining at The Commons mall and at Walmart. Most developments that may currently use on-street parking along 18th Place S, S 341st Place, and S 344th Street would be acquired as part of the project.

The South 344th Street Alternative may displace up to five on-street parking spaces on the south side of S 344th Street, east of 18th Place S, that may be currently used to access developments that would not be acquired. However, there would be ample space remaining for on-street parking along the south side of S 344th Street and no adverse parking impacts are expected.

Impacts to the Federal Way/S 320th Street Park & Ride are described in the Transit section.

4.2.3.8 Safety

The South 344th Street Alternative mainline would have the same safety impacts as described above for the Preferred Alternative for the majority of its length, the only difference being for the mainline tail tracks.

The Enchanted Parkway alignment would turn southwest away from the I-5 right-of-way between S 344th Street and S 359th Street. It would be elevated for this entire section and cross public streets and property access points with grade-separated crossings. For the I-5 alignment, the tail tracks would remain elevated as they travel over the I-5/S 348th St interchange right-of-way. Both tail track alignments would adhere to current design standards and would not be expected to result in safety impacts.

4.2.4 Midway Landfill Alternative

4.2.4.1 Roadway Network and Intersection Modifications

Development of the Midway Landfill Alternative would not change the existing roadway network or interfere with the potential for development of planned improvements within the study area as described for the No-Build Alternative.

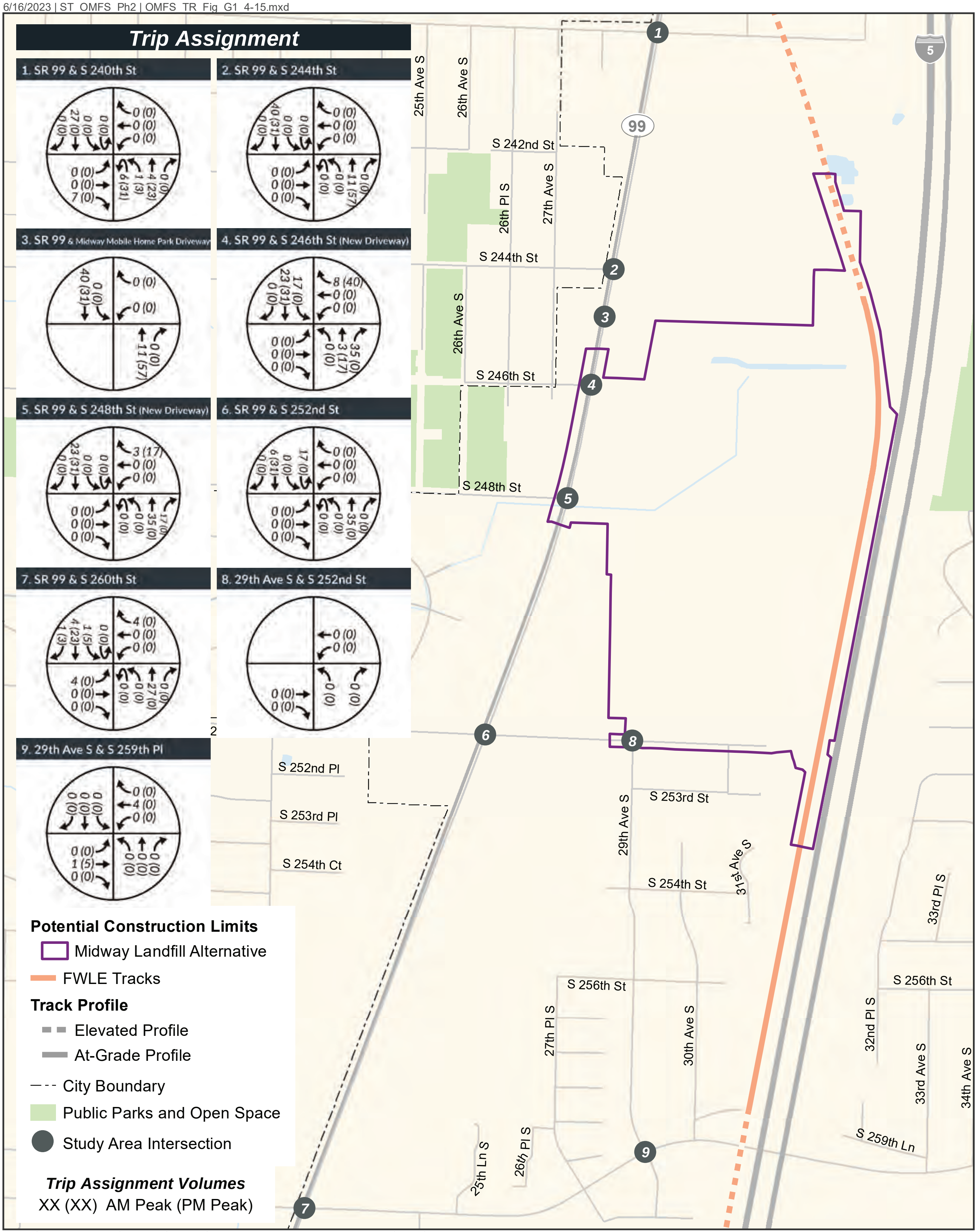
Three driveways to the site would be provided, including a visitor/employee access with a guard house from SR 99 at S 246th Street and employee-only access at SR 99/S 248th Street and S 252nd Street/30th Avenue S. Left-turn access into or out of the site at the S 246th Street driveway is currently prohibited by a c-curb. However, the project would modify it to allow left turns by southbound drivers. Left turns into the site at S 248th Street are permitted via a southbound left-turn pocket, but left turns out of the site are prohibited by a c-curb. These would be unsignalized access points. Access at S 252nd Street is signalized, and left turns are permitted at the intersection. The northern and southern driveways on SR 99 would be located at intersections #4 and #5, respectively. Intersection #10, the south driveway at 30th Avenue S and S 252nd Street, was not evaluated under the No-Build Alternative.

For the Midway Landfill Alternative, there are two driveways that are accessible from SR 99. Some drivers arriving or departing during the peak time period will use the parking area that is closest to the MOW and Link System-Wide Storage facilities and will enter using the southernmost driveway. Drivers who are required to enter the gate controlled area will use the driveway to the north.

4.2.4.2 Traffic Volumes

To develop traffic volumes for the Midway Landfill Alternative, existing trips from properties that would be acquired were removed. These trips were estimated based on existing land uses and estimated trip generation and were confirmed with existing intersection volumes. The peak hour vehicle trips generated by the Midway Landfill Alternative facility, as described in Section 4.2.1.1 and shown in Table G1.4-8, were assigned to study area roadways and intersections based on existing travel patterns and are summarized in Figure G1.4-19.

As discussed under the No-Build Alternative, traffic volumes are forecast to increase throughout the study area during both the 2042 AM and PM peak hours as a result of planned population and employment growth by local jurisdictions. Figure G1.4-20 shows the forecast 2042 AM and PM peak hour turning movements under the Midway Landfill Alternative.


Trip Assignment
1. SR 99 & S 240th St
0 (0) 27 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 7 (0)
6 (31) 1 (3) 4 (23) 0 (0)
2. SR 99 & S 244th St
40 (31) 0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 11 (57) 0 (0)
3. SR 99 & Midway Mobile Home Park Driveway
40 (31) 0 (0)
0 (0) 0 (0)
11 (57) 0 (0)
4. SR 99 & S 246th St (New Driveway)
23 (31) 17 (0) 0 (0)
8 (40) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 3 (17) 35 (0)
5. SR 99 & S 248th St (New Driveway)
23 (31) 0 (0) 0 (0) 0 (0)
3 (17) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 35 (0) 17 (0)
6. SR 99 & S 252nd St
6 (31) 0 (0) 17 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 0 (0)
0 (0) 0 (0) 35 (0) 0 (0)
7. SR 99 & S 260th St
1 (3) 4 (23) 1 (5) 0 (0)
4 (0) 0 (0) 0 (0)
4 (0) 0 (0) 0 (0)
0 (0) 0 (0) 27 (0) 0 (0)
8. 29th Ave S & S 252nd St
0 (0) 0 (0)
0 (0) 0 (0)
0 (0) 0 (0)
9. 29th Ave S & S 259th Pl
0 (0) 0 (0) 0 (0) 0 (0)
0 (0) 4 (0) 0 (0)
0 (0) 1 (5) 0 (0)
0 (0) 0 (0) 0 (0)
1
2
3
4
5
6
7
8
9
99
5
25th Ave S
26th Ave S
S 242nd St
26th Pl S
27th Ave S
S 244th St
26th Ave S
S 246th St
S 248th St
S 252nd Pl
S 253rd Pl
S 254th Ct
29th Ave S
S 253rd St
31st Ave S
S 254th St
33rd Pl S
S 256th St
27th Pl S
30th Ave S
S 256th St
32nd Pl S
33rd Ave S
34th Ave S
S 259th Ln
25th Ln S
26th Pl S
Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
Trip Assignment Volumes
XX (XX) AM Peak (PM Peak)
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

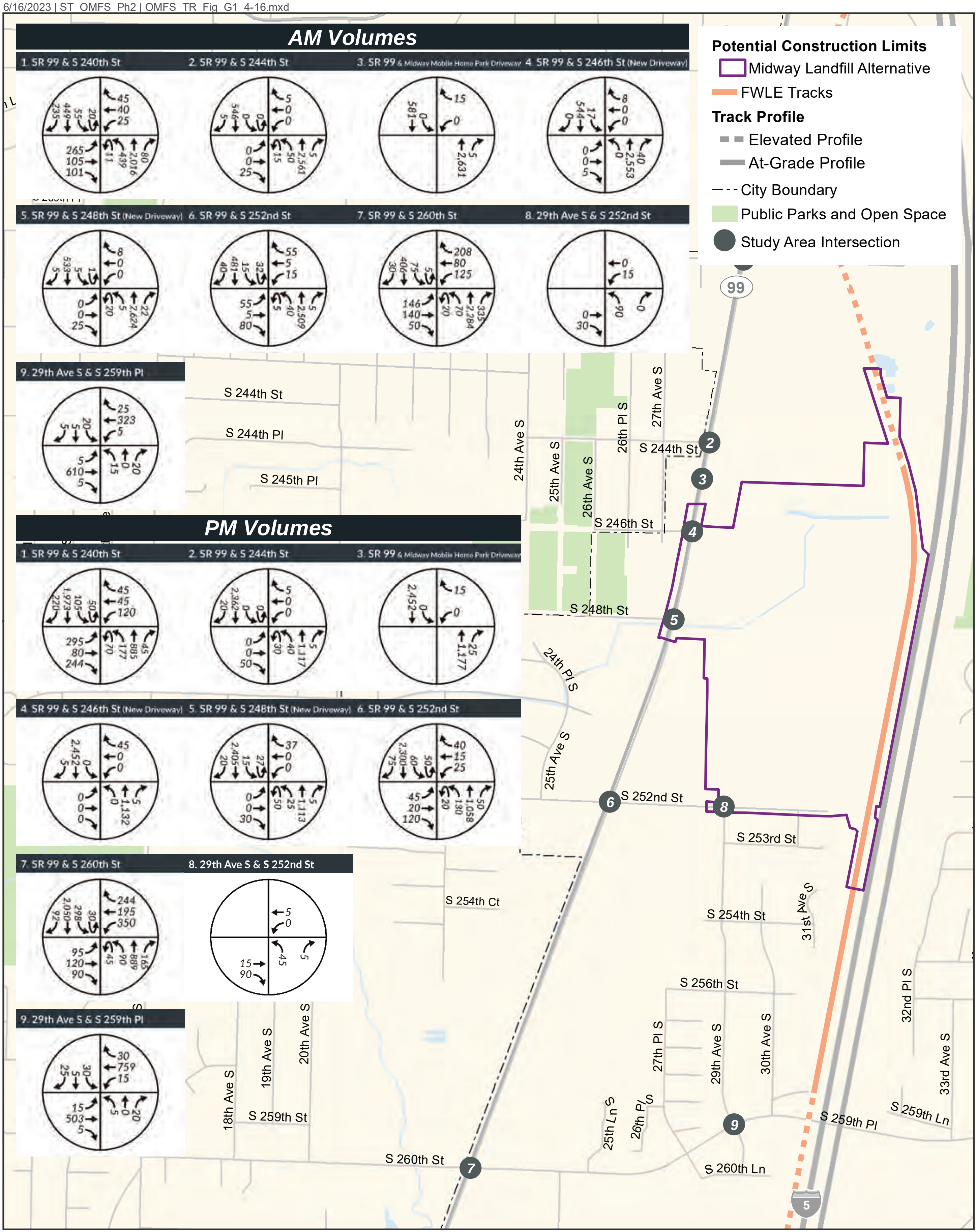
FIGURE G1.4-19

2042 Build Alternative AM and PM Vehicle Trips
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-16.mxd


AM Volumes
1. SR 99 & S 240th St
2. SR 99 & S 244th St
3. SR 99 & Midway Mobile Home Park Driveway
4. SR 99 & S 246th St (New Driveway)
5. SR 99 & S 248th St (New Driveway)
6. SR 99 & S 252nd St
7. SR 99 & S 260th St
8. 29th Ave S & S 252nd St
9. 29th Ave S & S 259th Pl
PM Volumes
1. SR 99 & S 240th St
2. SR 99 & S 244th St
3. SR 99 & Midway Mobile Home Park Driveway
4. SR 99 & S 246th St (New Driveway)
5. SR 99 & S 248th St (New Driveway)
6. SR 99 & S 252nd St
7. SR 99 & S 260th St
8. 29th Ave S & S 252nd St
9. 29th Ave S & S 259th Pl
Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Study Area Intersection
99
5
S 244th St
S 244th Pl
S 245th Pl
24th Ave S
25th Ave S
26th Ave S
26th Pl S
27th Ave S
S 246th St
S 248th St
24th Pl S
25th Ave S
S 252nd St
S 253rd St
S 254th Ct
S 254th St
31st Ave S
S 256th St
32nd Pl S
18th Ave S
19th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
33rd Ave S
S 259th St
25th Ln S
26th Pl S
S 259th Pl
S 259th Ln
S 260th St
S 260th Ln
1
2
3
4
5
6
7
8
9

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-20

2042 Build Alternative AM and PM Traffic Volumes
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.2.4.3 Intersection Operations

The forecast project alternatives for the 2042 AM and PM peak hour LOS as well as delay for the study area intersections evaluated are discussed below.

Midway Landfill Alternative 2042 AM Analysis

As shown in Table G1.4-15, four intersections are forecast to operate below the LOS standards for the Midway Landfill Alternative study area during the AM peak period. The four intersections are intersection #2 (SR 99/S 244th Street), intersection #3 (SR 99/Midway Mobile Home Park Driveway), intersection #4 (SR 99/S 246th Street), and intersection #5 (SR 99/S 248th Street). Intersections #2, #3, and #5 are forecast to operate below the LOS standard under the No-Build Alternative, and the project would not add any delay at these intersections.

As stated above, LOS for signalized intersections is based on average intersection delay, while LOS for unsignalized intersections is based on the worst approach. Intersection #4 is not forecast to operate below the LOS standard for the highway under the No-Build Alternative because it is a t-intersection with right-in/right-out access for the southbound direction only. With the build alternative, the configuration would be changed to allow southbound left turns that must cross three lanes of traffic to access the site. This change in intersection configuration would result in LOS F operations. There are only 17 vehicles forecast to cross the northbound traffic for access into the Midway Landfill site, but the opposing northbound morning peak hour traffic volume of over 2,550 vehicles using three lanes of traffic is high enough that the southbound left turn delay would exceed the LOS F threshold. The remaining legs of the intersection operate within an acceptable LOS.

Vehicles turning left into the OMF South facility access point at S 246th Street would experience 84 seconds of delay. These vehicles may instead choose to continue traveling south to make a U-turn at S 252nd Street and turn right into the access point at S 246th Street.

For intersections #4 and #5 (the driveway entrances to the site), southbound queueing at the intersections is not anticipated to extend beyond the current and constructed storage lengths of the left-turn lanes. While still operating below the LOS standard for SR 99 with the project, operations at intersection #5 would improve with the project, as trips currently using the driveway would no longer do so.

Figure G1.4-21 shows the 2042 AM peak hour operations at the Midway Landfill Alternative study intersections.

Table G1.4-15 Midway Landfill Alternative 2042 AM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2, 3, 4	No Build Alternative Delay (seconds) 1, 2, 3, 4	Midway Landfill Alternative LOS 1, 2, 3, 4	Midway Landfill Alternative Delay (seconds) 1, 2, 3, 4
1	SR 99/ S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	C	23	C	22
2	SR 99/ S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***43***	***E***	***43***
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***E***	***38***	***E***	***38***
4	SR 99/ S 246th Street (New Driveway)	TWSC	WSDOT Highways of Statewide Significance (LOS D)	B	11	***F***	***84***
5	SR 99/ S 248th Street (New Driveway)	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***F***	***53***	***E***	***36***
6	SR 99/ S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	A	7	A	7
7	SR 99/ S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	47	D	47
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	C	22	C	22

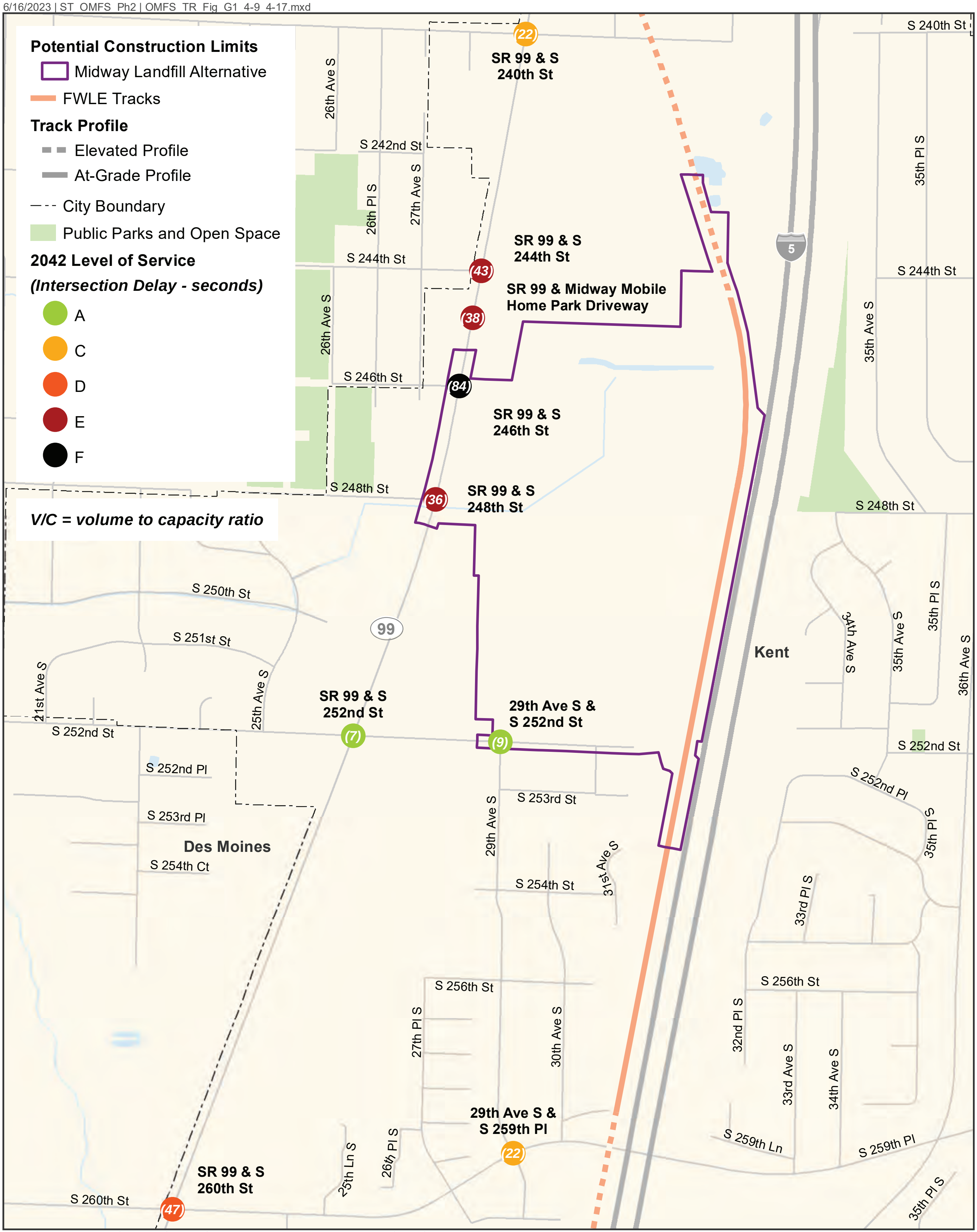
Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.

(3) Intersections were analyzed using the Synchro outputs for signalized intersections and 2010 Highway Capacity Manual (Transportation Research Board 2010) outputs for unsignalized intersections.

(4) At signalized intersections utilizing HCM 6th Edition methodology (Transportation Research Board 2016), U-turn movements were added to left-turn movements to allow for analysis.


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
C
D
E
F
V/C = volume to capacity ratio
(22) SR 99 & S 240th St
(43) SR 99 & S 244th St
(38) SR 99 & Midway Mobile Home Park Driveway
(84) SR 99 & S 246th St
(36) SR 99 & S 248th St
(7) SR 99 & S 252nd St
(9) 29th Ave S & S 252nd St
(22) 29th Ave S & S 259th Pl
(47) SR 99 & S 260th St
S 240th St
26th Ave S
S 242nd St
26th Pl S
27th Ave S
S 244th St
S 246th St
S 248th St
S 250th St
S 251st St
21st Ave S
25th Ave S
S 252nd St
S 252nd Pl
S 253rd Pl
S 254th Ct
Des Moines
99
5
35th Pl S
35th Ave S
Kent
34th Ave S
36th Ave S
S 252nd Pl
S 253rd St
29th Ave S
31st Ave S
S 254th St
33rd Pl S
S 256th St
32nd Pl S
33rd Ave S
34th Ave S
27th Pl S
30th Ave S
S 259th Ln
S 259th Pl
25th Ln S
26th Pl S
S 260th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-21
2042 Build Alternative AM Peak Hour Traffic Operations
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Midway Landfill Alternative 2042 PM Analysis

As shown in Table G1.4-16, Intersections #2 (SR 99/S 244th Street) and #5 (SR 99/S 248th Street) are forecast to operate below the LOS standard for the highway in the project alternatives, with forecast increases in delay of 5 seconds for both intersections. Since the increased delay is less than 10 seconds, it would not be considered an impact that would require mitigation. No other intersections under the Midway Landfill Alternative are forecast to operate below the LOS standard for the roadway or highway.

Figure G1.4-22 shows the 2042 PM peak hour operations at the Midway Landfill Alternative study intersections.

Table G1.4-16 Midway Landfill Alternative 2042 PM Peak Hour Traffic Operations

ID	Intersection	Control Type	Agency Standard	No Build Alternative LOS 1, 2, 3, 4	No Build Alternative Delay (seconds) 1, 2, 3, 4	Midway Landfill Alternative LOS 1, 2, 3, 4	Midway Landfill Alternative Delay (seconds) 1, 2, 3, 4
1	SR 99/ S 240th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	37	D	39
2	SR 99/ S 244th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***F***	***122***	***F***	***127***
3	SR 99/Midway Mobile Home Park Driveway	TWSC	WSDOT Highways of Statewide Significance (LOS D)	C	15	C	15
4	SR 99/ S 246th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	A	0	C	15
5	SR 99/ S 248th Street	TWSC	WSDOT Highways of Statewide Significance (LOS D)	***F***	***97***	***F***	***102***
6	SR 99/ S 252nd Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	36	D	36
7	SR 99/ S 260th Street	Signal	WSDOT Highways of Statewide Significance (LOS D)	D	41	D	41
8	29th Avenue S/ S 252nd Street	TWSC	City of Kent (LOS E)	A	9	A	9
9	29th Avenue S/ S 259th Street	TWSC	City of Kent (LOS E)	E	38	E	38

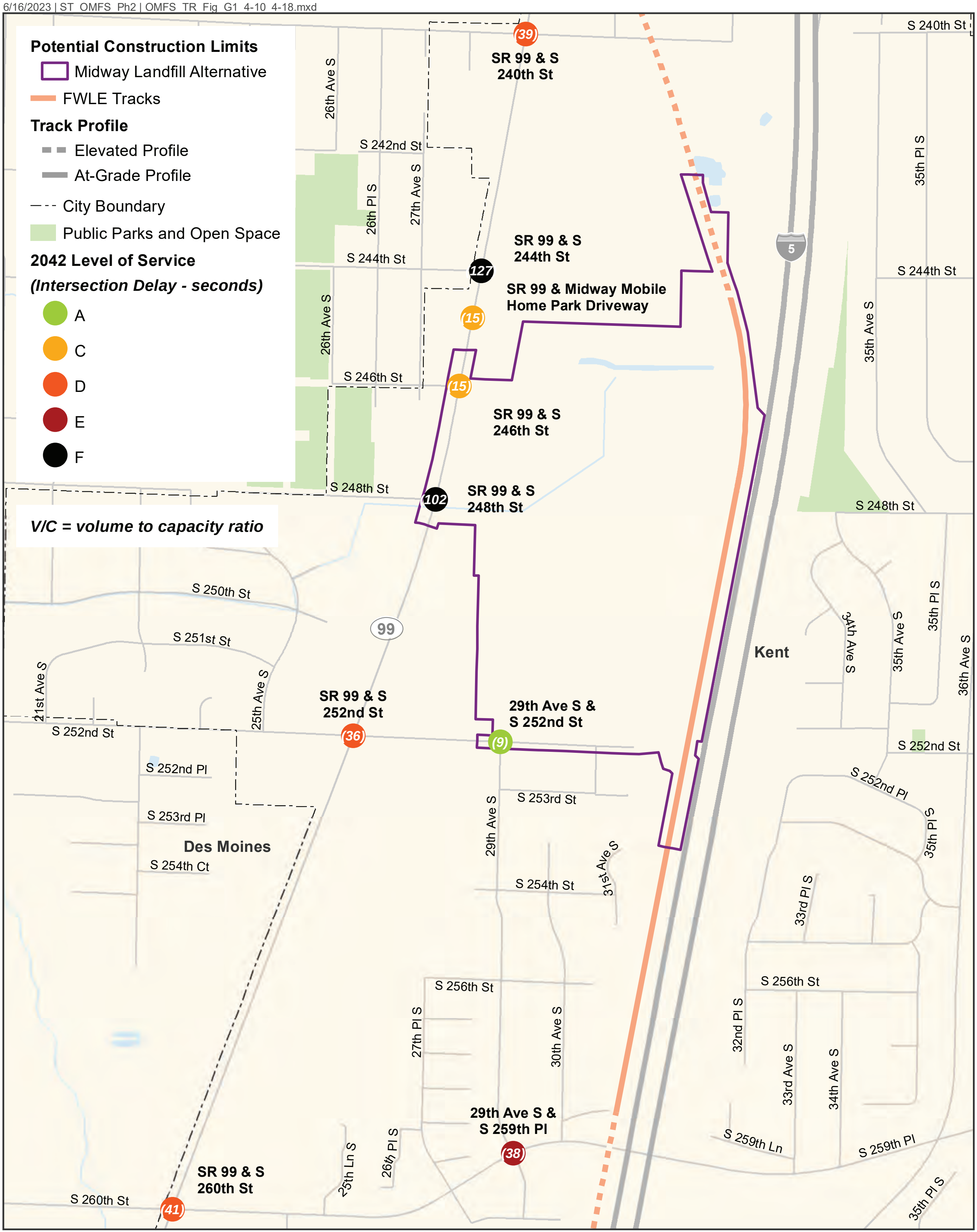
Notes:

(1) Synchro analyzes intersections in isolation and does not take into account downstream congestion. Actual intersection operations may have more delay based on intersection interactions and queuing propagating upstream and downstream between intersections.

(2) Intersections were analyzed using the Synchro outputs for signalized intersections and 2010 Highway Capacity Manual (Transportation Research Board 2010) outputs for unsignalized intersections.

(3) At signalized intersections utilizing HCM 6th Edition methodology (Transportation Research Board 2016), U-turn movements were added to left-turn movements to allow for analysis.

(4) Cells highlighted in ***gray bold and italicized*** identify intersections that operate below the LOS standard for the roadway/highway.


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
2042 Level of Service
(Intersection Delay - seconds)
A
C
D
E
F
V/C = volume to capacity ratio
SR 99 & S 240th St
(39)
S 240th St
26th Ave S
S 242nd St
26th Pl S
27th Ave S
35th Pl S
5
SR 99 & S 244th St
127
S 244th St
SR 99 & Midway Mobile Home Park Driveway
(15)
26th Ave S
35th Ave S
S 246th St
(15)
SR 99 & S 246th St
S 248th St
102
SR 99 & S 248th St
S 248th St
S 250th St
S 251st St
99
Kent
34th Ave S
35th Ave S
35th Pl S
36th Ave S
21st Ave S
25th Ave S
SR 99 & S 252nd St
(36)
29th Ave S & S 252nd St
(9)
S 252nd St
S 252nd St
S 252nd Pl
S 252nd Pl
S 253rd Pl
S 253rd St
35th Pl S
Des Moines
S 254th Ct
29th Ave S
31st Ave S
S 254th St
33rd Pl S
S 256th St
S 256th St
27th Pl S
30th Ave S
32nd Pl S
33rd Ave S
34th Ave S
29th Ave S & S 259th Pl
(38)
S 259th Ln
S 259th Pl
SR 99 & S 260th St
(41)
S 260th St
25th Ln S
26th Pl S
35th Pl S

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-22

2042 Build Alternative PM Peak Hour Traffic Operations
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.2.4.4 Freight

Impacts to freight would be similar to those for the No-Build Alternative. There are no at-grade light rail track profiles that would result in additional crossings or delays for trucks. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections.

4.2.4.5 Transit

It is assumed the bus service network under the build alternatives would be the same as the No-Build Alternative. Additional bus service levels or rerouting to the facility are not anticipated for any alternatives. The existing pair of Metro RapidRide stops at SR99/S 246th Street would need to be relocated to accommodate development of the Midway Landfill Alternative.

Due to the lack of a dedicated test track, Sound Transit would continue testing LRVs on existing mainline tracks during off-peak periods and at night during non-revenue hours when the rail system is closed to passenger service. This limits the daily time available to test and commission vehicles because those same tracks are used for passenger service and movement of rail vehicles during maintenance and inspection periods. The lack of a dedicated test track would increase the amount of time required to commission new LRVs and could therefore result in insufficient vehicle quantities available to meet system expansion requirements under Sound Transit 3. In addition, the lack of a dedicated test track would slow the rehabilitation and replacement of the existing fleet of LRVs. As a result, light rail operations would be less efficient than they would otherwise be, and Sound Transit may not be able to meet expected ridership demand.

4.2.4.6 Nonmotorized Facilities

Nonmotorized volumes would increase similarly to the No-Build Alternative. Pedestrian and bicycle facilities would generally be developed in a manner comparable to the No-Build Alternative. However, facilities that were planned to cross through the site could not be developed. These include the unfunded north-south improvements connecting S 244th Street to S 252nd Street facilities that were planned to cross through the conceptual layout areas, as described in the No-Build Alternative, within the Midway Landfill Alternative study area.

Right-of-way improvements, which may include the development of new pedestrian and/or bicycle facilities are planned for each alternative. These areas include SR 99 between approximately S 244th Street and S 248th Street.

Impacts on nonmotorized facilities included a qualitative assessment of the potential for the build alternatives to alter operations of pedestrian and bicycle facilities in the study area. There are limited nonmotorized facilities in the Midway Landfill Alternative study area, none of which are impacted by the project. The project also would not impact circulation through or connections to existing nonmotorized facilities in the study area, as the Midway Landfill currently serves as a barrier. Pedestrians and cyclists could continue to use the existing facilities on SR 99. The planned nonmotorized improvements within the project footprint, including the north-south path and internal pedestrian and bike paths, could not be developed.

Should future nonmotorized facilities be developed north of the Midway Landfill Alternative, a north-south shared-use path could be developed by others to provide a connection to the area south of the project site. S 244th Street could be developed as a complete street along a part of its length. The project would not impact the potential to develop a bicycle-pedestrian bridge across I-5 at S 240th Street.

4.2.4.7 Parking

Impacts to parking are described under Long-Term Impacts Common to all Build Alternatives.

4.2.4.8 Safety

Impacts to safety would be similar to those for the No-Build Alternative.

4.3 Construction Impacts

All the build alternatives would require some preparatory demolition activities and earthwork that would generate truck trips. Material delivery and general construction vehicle activity would also contribute to construction-related traffic. As most of this activity would occur during import and export of material to and from the site during site preparation, the estimated volumes of truck traffic presented in the following sections focus on that early period of peak construction traffic to present the worst-case scenario.

Impacts associated with construction truck activities were calculated by assigning a passenger car equivalent (PCE) to each truck trip. The PCE factor converts the number of trucks to an estimated number of passenger cars. The HCM recommends a range of PCE factors for trucks from 1.1 to 2.5.

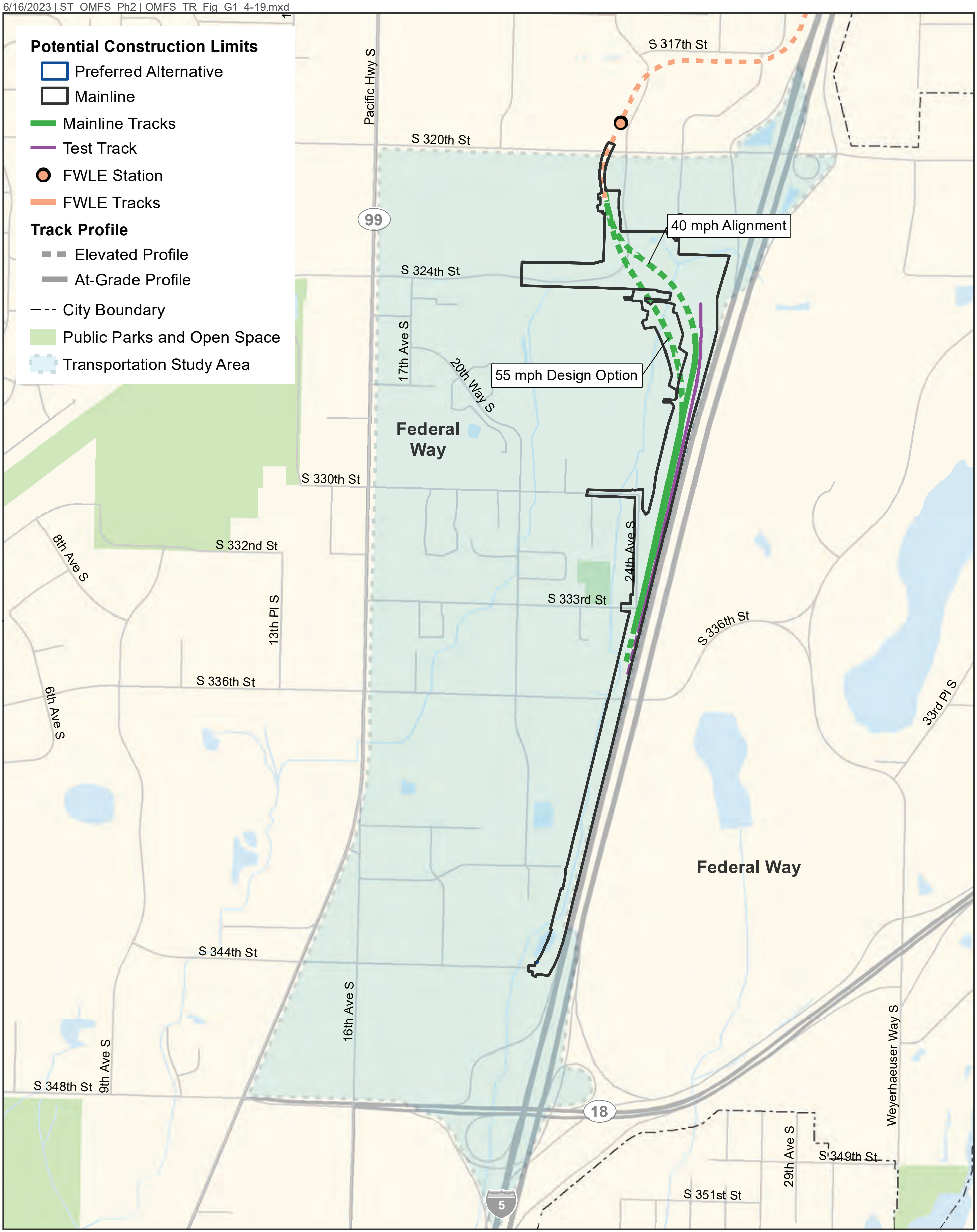
For the purposes of this analysis, it was assumed that all export and import material would be transported to and from the site in dump trucks with trailers that have a capacity of 20 cubic yards. Given their size and slower operating speeds, trucks were assigned a PCE value of 2.5, meaning one construction truck is equivalent to two-and-a-half passenger cars. Using a factor of 2.5 for this analysis provides a reasonable impact estimate for the size and weight of the trucks and allows for an equal comparison across alternatives. The PCE factor was calculated for both inbound and outbound trips.

4.3.1 Preferred Alternative

Only one development scenario is assumed for the Preferred Alternative OMF site. It would require demolition of existing structures, export of building debris and excavated material, and import of in-place fill material. This development scenario assumes reuse of 80 percent of on-site material, resulting in lower truck volumes than if all excavated material is exported and all fill material is imported.[4] The construction impact area for the Preferred Alternative would extend from the Federal Way Downtown Station and include portions of the S 320th Street Park & Ride and the Belmor Park Golf and Country Club as well as other residential properties near I-5. The construction impact area for the site associated is shown in Figure G1.4-23.

---

[4] Does not include excavation associated with columns for aerial mainline tracks, repaving roadways (mostly at grade), or other construction-related quantities. Import volumes assume importation of 60,000 cubic yards of fill material.


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
S 317th St
Pacific Hwy S
S 320th St
99
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
Federal Way
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
S 348th St
18
Weyerhaeuser Way S
29th Ave S
S 349th St
S 351st St
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G1.4-23

Construction Impact Area
Preferred Alternative

OMF South

4.3.1.1 Estimation of Construction Truck Traffic

Site preparation work is expected to last approximately 1 year and 5 months, assuming 12-hour workdays, 6 days per week. All export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Export activity would result in approximately 24 truck trips per day and import activity would result in approximately 21 truck trips per day. Table G1.4-17 summarizes the quantity of export and import material estimated for development of the Preferred Alternative, the associated truck trips, and the estimated durations of work.

Table G1.4-17 Truck Activity Associated with Site Preparation for the Preferred Alternative

Export Material (ton)	Export Total Truck Trips per Day	Export Total Project Truck Trips	Import In Place (cubic yards)	Import Total Truck Trips per Day	Import Total Project Truck Trips	Site Preparation Duration
205,000	24	10,250	185,000	21	9,250	1 yr, 5 mos

4.3.1.2 Potential Construction Access and Truck Haul Routes

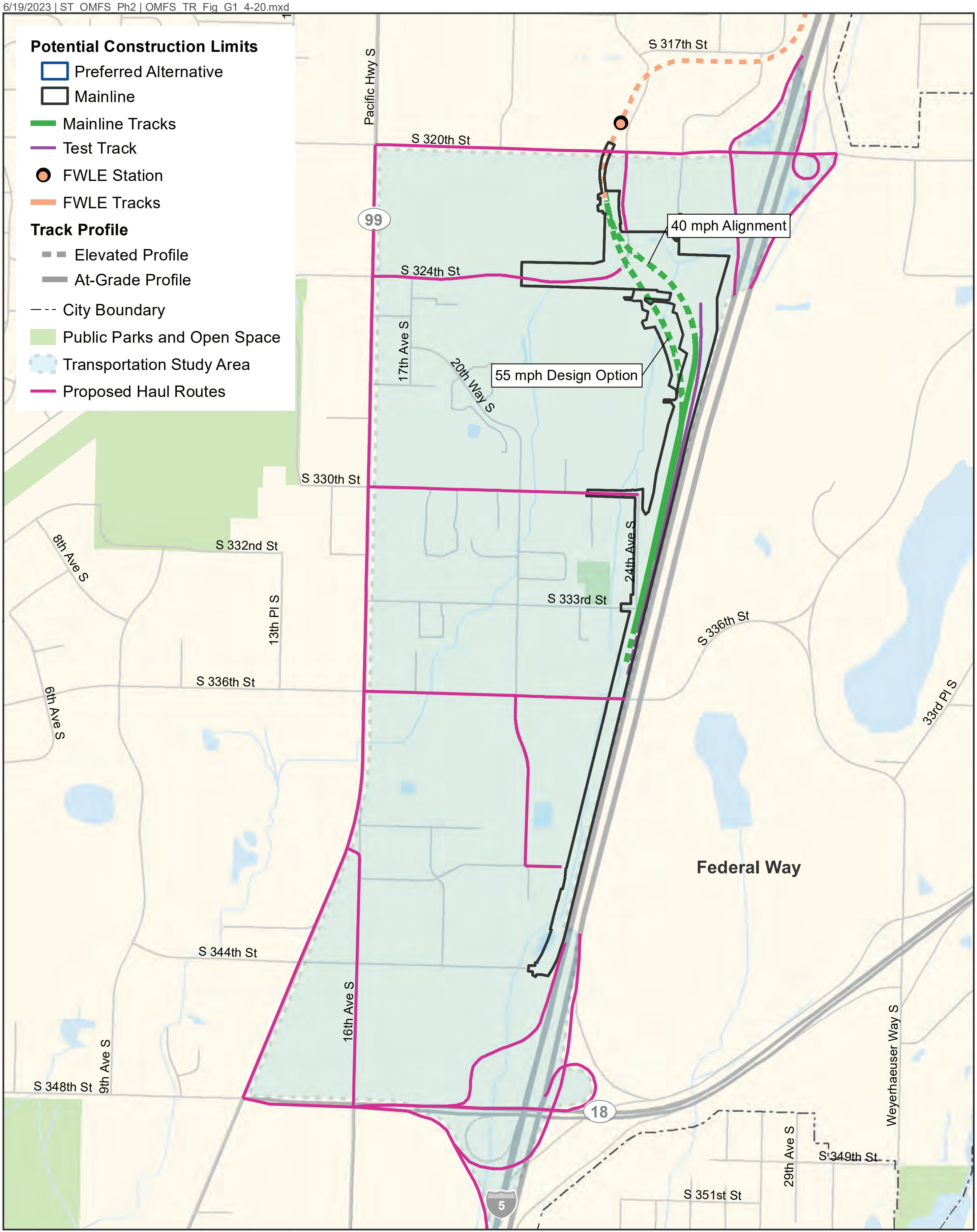
Construction access at the Preferred Alternative would be provided at three locations: S 336th Street at 20th Avenue S, SR 99 at the existing driveway to the Christian Faith Center, and S 341st Place at 20th Avenue S. Construction access for the potential mainline track construction from the Federal Way Downtown Station to S 344th Street would occur at S 324th Street, S 330th Street, and S 336th Street. Trucks would access northbound and southbound I-5 at the S 320th Street and S 348th Street interchanges via SR 99. Construction access and truck routes are shown in Figure G1.4-24. To minimize impacts to traffic circulation during construction and meet Federal Way requirements, Sound Transit would extend 18th Place S or construct a temporary public roadway through the construction site prior to closure of 20th Avenue S.

4.3.1.3 Changes to Traffic Volumes

OMF South Site Construction

Trucks would traverse the haul routes during the entirety of the 12-hour daily construction period, to and from the site during AM and PM peak periods. As described in Section 4.3.1.1, this equates to approximately 24 round trips per day associated with export and 21 round trips per day associated with import. With 45 truck trips during the daily construction period, the average number of truck trips per hour would be 3 to 4.

Each truck round trip includes an outbound and inbound segment, resulting in a total of 113 PCE daily trips in the study area associated with export activity (45 truck trips x 2.5 PCE).


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Proposed Haul Routes
S 317th St
Pacific Hwy S
S 320th St
99
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
S 348th St
18
Weyerhaeuser Way S
29th Ave S
S 349th St
S 351st St
5
N
0
1,000
2,000 Feet

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-24
Construction Access and Truck Routes
Preferred Alternative

OMF South

To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the daily construction period and are based on the ability of the yard and receiving facility to process the trucks.[5] A similar 2.5 PCE factor is applied to the truck volume to estimate the number of new trips that would need to be accommodated along the truck routes. Table G1.4-18 summarizes the number of peak hour trucks and associated PCEs for each construction scenario.

Table G1.4-18 Hourly Truck Activity Associated with Preferred Alternative Development Approaches

Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	PCE
2	1–2	3–4	8-10

The PCEs shown in the table would be distributed with half exiting the site and half entering the site during the peak hour.

The haul routes would be located on state facilities, including SR 99, SR 18 (S 348th Street), and I-5, as well as several collector and arterial streets. Because the construction staging, origin of the import material, and destination for export material are unknown at this time, the volumes forecast on each roadway segment represent the highest possible volumes for all daily construction activity. A single potential roadway identified as a haul route could be used for all daily truck trips or the total daily volumes could be distributed among multiple roadways. Trucks would travel in a single direction on roadways along the haul routes. The estimated daily truck PCE trips associated with site preparation would represent up to 22.6 percent of existing single-direction traffic on collector and arterial roadways. Estimated daily truck PCE trips would represent up to 1.9 percent of the existing single-direction AADT for all state facilities, with the highest percentages at on- and off-ramps. Table G1.4-19 summarizes AADT on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT. Figure G1.4-25 displays the location of AADT counts.

Table G1.4-19 Estimated Hourly Truck Activity at the Preferred Alternative Compared with Existing AADT

Intersection/Roadway Segment	Existing AADT (Both Directions)[1]	Existing AADT (Single Direction)[1]	Daily Truck Trips as a Percentage of Single Direction AADT
S 320th Street: SR 99 to I-5	>35,000	>17,500	<0.6%
S 324th Street: SR 99 to 23rd Avenue S	5,000-15,000	2,500-7,500	1.5-4.5%
S 330th Street: SR 99 to 24th Avenue S	1,000-5,000	500-2,500	4.5-22.6%
S 336th Street: SR 99 to I-5	5,000-15,000	2,500-7,500	1.5-4.5%
S 344th Street: SR 99 to I-5	<1,000	<500	>22.6%
I-5 Off-Ramp: I-5 SB to SW 320th Street	N/A	15,000	0.8%
I-5 On-Ramp: EB SW 320th to NB I-5	N/A	9,900	1.1%
I-5 On-Ramp: EB SW 320th to SB I-5	N/A	9,400	1.2%

---

[5] Irregularity or bunching at the beginning and end of the day is possible.

Table G1.4-19 Estimated Hourly Truck Activity at the Preferred Alternative Compared with Existing AADT (continued)

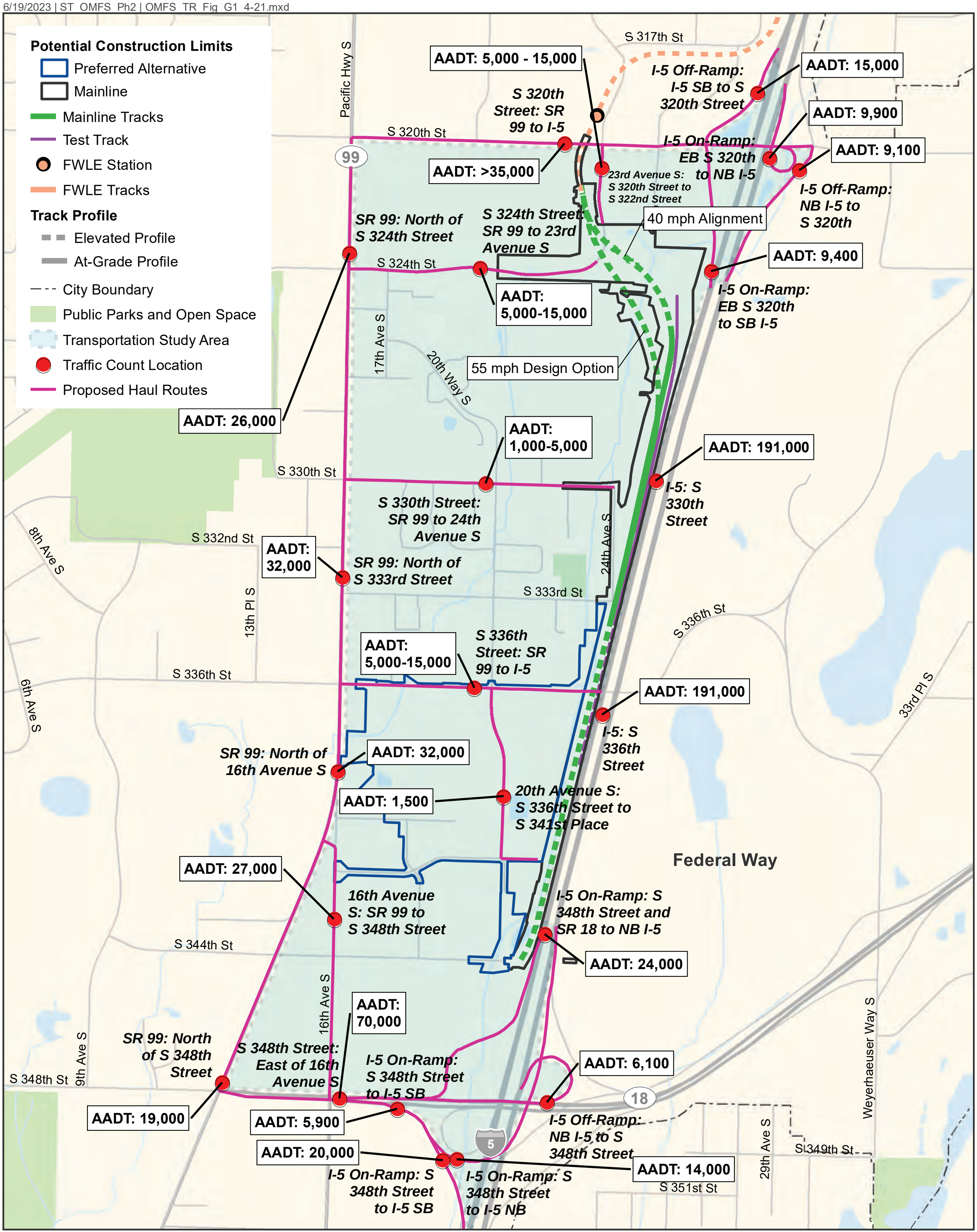
Intersection/Roadway Segment	Existing AADT (Both Directions)[1]	Existing AADT (Single Direction)[1]	Daily Truck Trips as a Percentage of Single Direction AADT
I-5 Off-Ramp: NB I-5 to SW 320th	N/A	9,100	1.2%
I-5: S 330th Street	191,000	95,500	0.1%
I-5: S 336th Street	191,000	95,500	0.1%
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5	N/A	24,000	0.5%
I-5 Off-Ramp: NB I-5 to S 348th Street	N/A	6,100	1.9%
I-5 On-Ramp: S 348th Street to I-5 NB	N/A	14,000	0.8%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	5,900	1.9%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	20,000	0.6%
S 348th Street: East of 16th Avenue S	70,000	35,000	0.3%
SR 99: North of S 348th Street	19,000	9,500	1.2%
SR 99: North of 18th Place S	32,000	16,000	0.7%
SR 99: North of S 333rd Street	32,000	16,000	0.7%
SR 99: North of S 324th Street	26,000	13,000	0.9%
23rd Avenue S: S 320th Street to S 322nd Street	5,000-15,000	2,500-7,500	1.5-4.5%
20th Avenue S: S 336th Street to S 341st Place	1,500	750	15.1%
16th Avenue S: SR 99 to S 348th Street	27,000	13,500	0.8%

Sources: WSDOT Traffic GeoPortal (2020a); City of Federal Way 2010 Estimated Weekday Average Daily Traffic. (2011).

Note:

(1) WSDOT and the city of Federal Way report annual average daily trips (AADT) for roadways. Where roadways are bi-directional, the AADT reported reflects both directions. Single-direction volumes were determined by dividing bi-directional volumes in two.

6/19/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-21.mxd


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Traffic Count Location
Proposed Haul Routes
S 317th St
AADT: 5,000 - 15,000
AADT: 15,000
I-5 Off-Ramp: I-5 SB to S 320th Street
S 320th Street: SR 99 to I-5
AADT: 9,900
Pacific Hwy S
S 320th St
99
I-5 On-Ramp: EB S 320th to NB I-5
AADT: 9,100
AADT: >35,000
23rd Avenue S: S 320th Street to S 322nd Street
I-5 Off-Ramp: NB I-5 to S 320th
S 324th Street: SR 99 to 23rd Avenue S
40 mph Alignment
SR 99: North of S 324th Street
AADT: 9,400
S 324th St
AADT: 5,000-15,000
I-5 On-Ramp: EB S 320th to SB I-5
17th Ave S
20th Way S
55 mph Design Option
AADT: 26,000
AADT: 1,000-5,000
AADT: 191,000
S 330th St
I-5: S 330th Street
S 330th Street: SR 99 to 24th Avenue S
8th Ave S
S 332nd St
AADT: 32,000
SR 99: North of S 333rd Street
24th Ave S
S 333rd St
13th Pl S
S 336th St
AADT: 5,000-15,000
S 336th Street: SR 99 to I-5
S 336th St
6th Ave S
AADT: 191,000
33rd Pl S
I-5: S 336th Street
SR 99: North of 16th Avenue S
AADT: 32,000
AADT: 1,500
20th Avenue S: S 336th Street to S 341st Place
Federal Way
AADT: 27,000
16th Avenue S: SR 99 to S 348th Street
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5
S 344th St
AADT: 24,000
16th Ave S
AADT: 70,000
Weyerhaeuser Way S
9th Ave S
SR 99: North of S 348th Street
S 348th Street: East of 16th Avenue S
I-5 On-Ramp: S 348th Street to I-5 SB
AADT: 6,100
S 348th St
18
AADT: 19,000
AADT: 5,900
I-5 Off-Ramp: NB I-5 to S 348th Street
29th Ave S
S 349th St
5
AADT: 20,000
AADT: 14,000
I-5 On-Ramp: S 348th Street to I-5 SB
I-5 On-Ramp: S 348th Street to I-5 NB
S 351st St

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE G1.4-25
Existing Annual Average Daily Traffic Along Truck Haul Routes
Preferred Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Mainline Construction

Mainline construction, including the mainline tail tracks, is expected to take 15 months. Construction of the mainline would require temporary full and/or partial closures to streets that travel beneath the mainline.

As with site construction, all export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Peak truck trips during mainline construction are estimated to be up to 10 trucks per hour for concrete delivery, or up to 120 trips per day (300 PCE), assuming 12 hours per day of active construction, some of which may occur at night. A similar level of truck activity is expected for earthwork activities, but this would be focused on trucks hauling material during excavation and would not overlap with concrete delivery trucks. Haul routes for mainline construction are anticipated to be the same as described above for OMF site construction.

Truck trips on roadways would be expected to increase proportionately above those associated with site construction should mainline and site construction occur concurrently. Streets with the lowest existing AADT, such as S 336th Street and S 344th Street, would experience the highest relative growth in traffic compared to existing volumes.

4.3.1.4 Impacts to Property Access

Impacts to property access for sites in the vicinity of the Preferred Alternative would be minimal. Trucks entering or exiting the site are not expected to block driveways along the haul routes. Access to properties fronting SR 99, S 336th Street, S 340th Street, S 341st Place, 18th Place S, and 21st Avenue S would be impacted during construction of right-of-way improvements in these areas. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours.

4.3.1.5 Impacts to Transit

During construction of the Preferred Alternative, transit service on S 324th Street, S 336th Street, and 23rd Avenue S would likely be impacted. Buses may need to be rerouted and bus stops may need to be temporarily relocated in response to construction-related road closures. Bus service may also be slower and less reliable in construction areas. Bus service into the Federal Way/S 320th Park & Ride may need to be rerouted to avoid construction areas. Of the 877 parking spaces at the Federal Way/S 320th Street Park & Ride, about 650 spaces would be temporarily closed during mainline track construction. In the first quarter of 2023, utilization of the Park & Ride was at 1.3 percent. While this lot has not been used at capacity in recent years, utilization could change with the opening of FWLE, which has a forecasted in-service date of 2026.

4.3.1.6 Impacts to Nonmotorized Facilities

Because the construction area includes all of the S 336th Street programmed site area, the impacts to pedestrian and bicycle facilities during construction and upon completion of the facility would be similar. The current north-south greenway would be closed, and bicycle lanes would be reopened with construction of the extended 18th Place S roadway. Pedestrian and bicycle facilities on S 324th Street, S 330th Street, S 336th Street, S 340th Street, S 341st Place, 18th Place S, 21st Avenue S, and 23rd Avenue S would be impacted during construction of right-of-way improvements in these areas.

4.3.1.7 Impacts to Parking

Most construction activity, including staging, is expected to occur within the boundaries of the Preferred Alternative. Construction of the mainline would require the temporary closure of parking stalls at The Commons at Federal Way shopping mall. On-street parking along streets where roadway frontage improvements are planned would be prohibited within the active construction area. However, these impacts would be temporary and transitory as construction activity progressed.

4.3.2 South 344th Street Alternative

Only one development scenario is assumed for the South 344th Street Alternative OMF site. It would require demolition of existing structures, export of building debris and excavated material, and import of in-place fill material.[6] This development scenario assumes reuse of 80 percent of on-site material, resulting in lower truck volumes than if all excavated material is exported and all fill material is imported. The construction impact area for the South 344th Street Alternative would extend from the Federal Way Downtown Station and include portions of the Federal Way/S 320th Street Park & Ride and Belmor as well as other properties near I-5. It would include the entirety of the permanent impact area. The construction impact area for the site is shown in Figure G1.4-26.

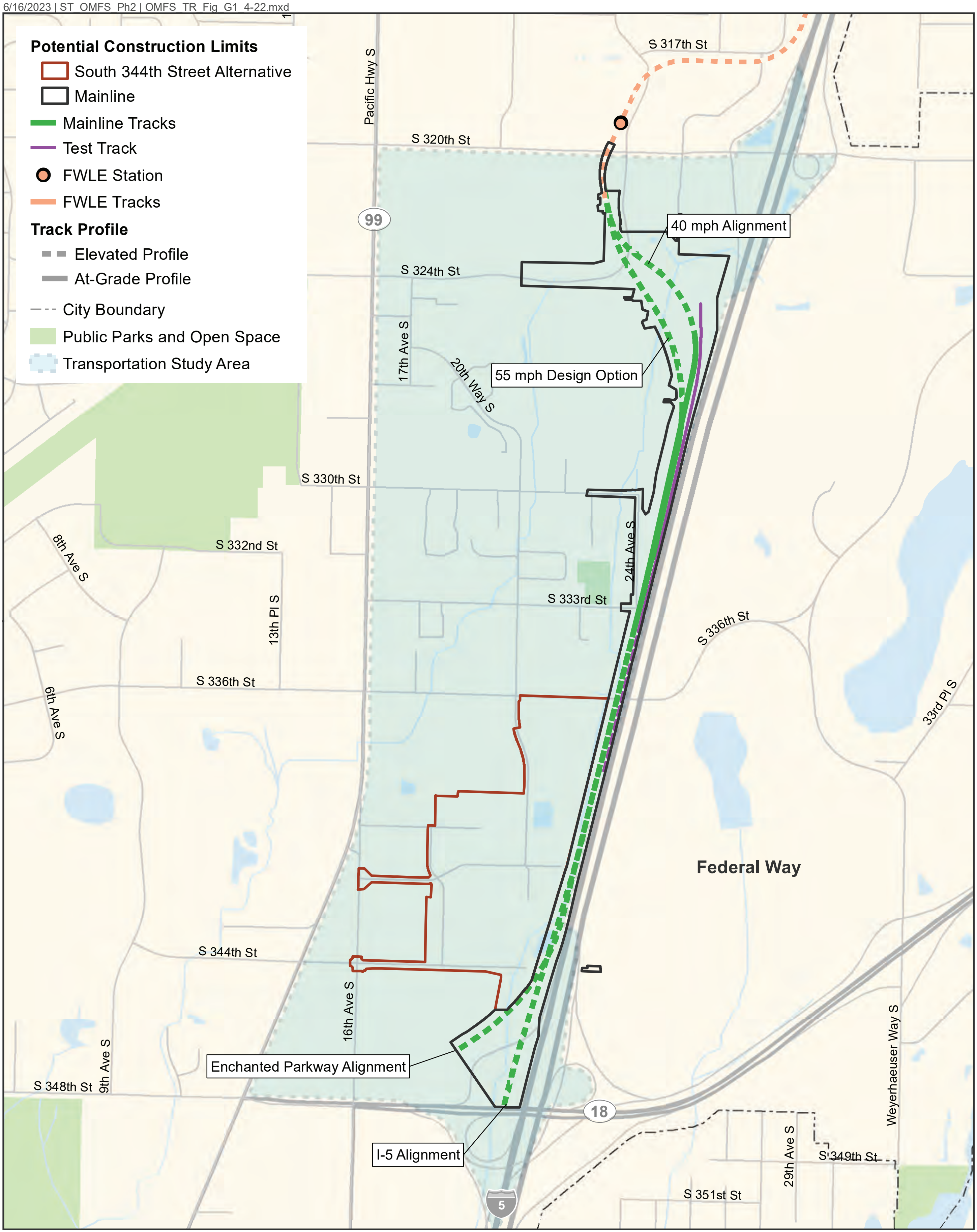
4.3.2.1 Estimation of Construction Truck Traffic

Site preparation work is expected to last approximately 1 year and 6 months, assuming 12-hour workdays, 6 days per week. All export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Export activity would result in approximately 67 truck trips per day, and import activity would result in approximately 10 truck trips per day. Table G1.4-20 summarizes the quantity of export and import material estimated for development of the South 344th Street Alternative, the associated truck trips, and the estimated durations of work.

---

[6] Does not include excavation associated with columns for aerial mainline tracks, repaving roadways (mostly at grade), or other construction-related quantities. Import volumes assume importation of 60,000 cubic yards of fill material.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-22.mxd



Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Pacific Hwy S
S 317th St
S 320th St
99
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
8th Ave S
S 332nd St
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
Enchanted Parkway Alignment
S 348th St
18
Weyerhaeuser Way S
I-5 Alignment
29th Ave S
S 349th St
S 351st St
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G1.4-26
Construction Impact Area
South 344th Street Alternative

OMF South

Table G1.4-20 Truck Activity Associated with Site Preparation for South 344th Street Alternative Development Approaches

Export Material (ton)	Export Total Truck Trips per Day	Export Total Project Truck Trips	Import In Place (cubic yards)	Import Total Truck Trips per Day	Import Total Project Truck Trips	Site Preparation Duration
420,000	67	21,000	60,000	10	3,000	1 yr, 6 mos

4.3.2.2 Potential Construction Access and Truck Haul Routes

Construction access at the South 344th Street Alternative would be provided at two locations: S 336th Street at 20th Avenue S and via direct access from S 344th Street. Construction access for the potential lead track construction from the Federal Way Downtown Station to S 344th Street would occur at S 324th Street, S 330th Street, and S 336th Street. Trucks would access northbound and southbound I-5 at the S 320th Street and S 348th Street interchanges via SR 99. Construction access and truck routes are shown in Figure G1.4-27.

4.3.2.3 Changes to Traffic Volumes

OMF South Site Construction

Trucks would traverse the haul routes during the entirety of the 12-hour daily construction period, to and from the site during AM and PM peak periods. As described in Section 8.1.1, this equates to approximately 67 round trips per day associated with export and 10 round trips per day associated with import. With 77 truck trips during the daily construction period, the average number of truck trips per hour would be 7.

Each truck round trip includes an outbound and inbound segment, resulting in a total of 193 PCE daily trips in the study area associated with export activity (77 truck trips x 2.5 PCE).

To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the daily construction period and are based on the ability of the yard and receiving facility to process the trucks.[7] A similar 2.5 PCE factor is applied to the truck volume to estimate the number of new trips that would need to be accommodated along the truck routes. Table G1.4-21 summarizes the number of peak hour trucks and associated PCEs for each construction scenario.

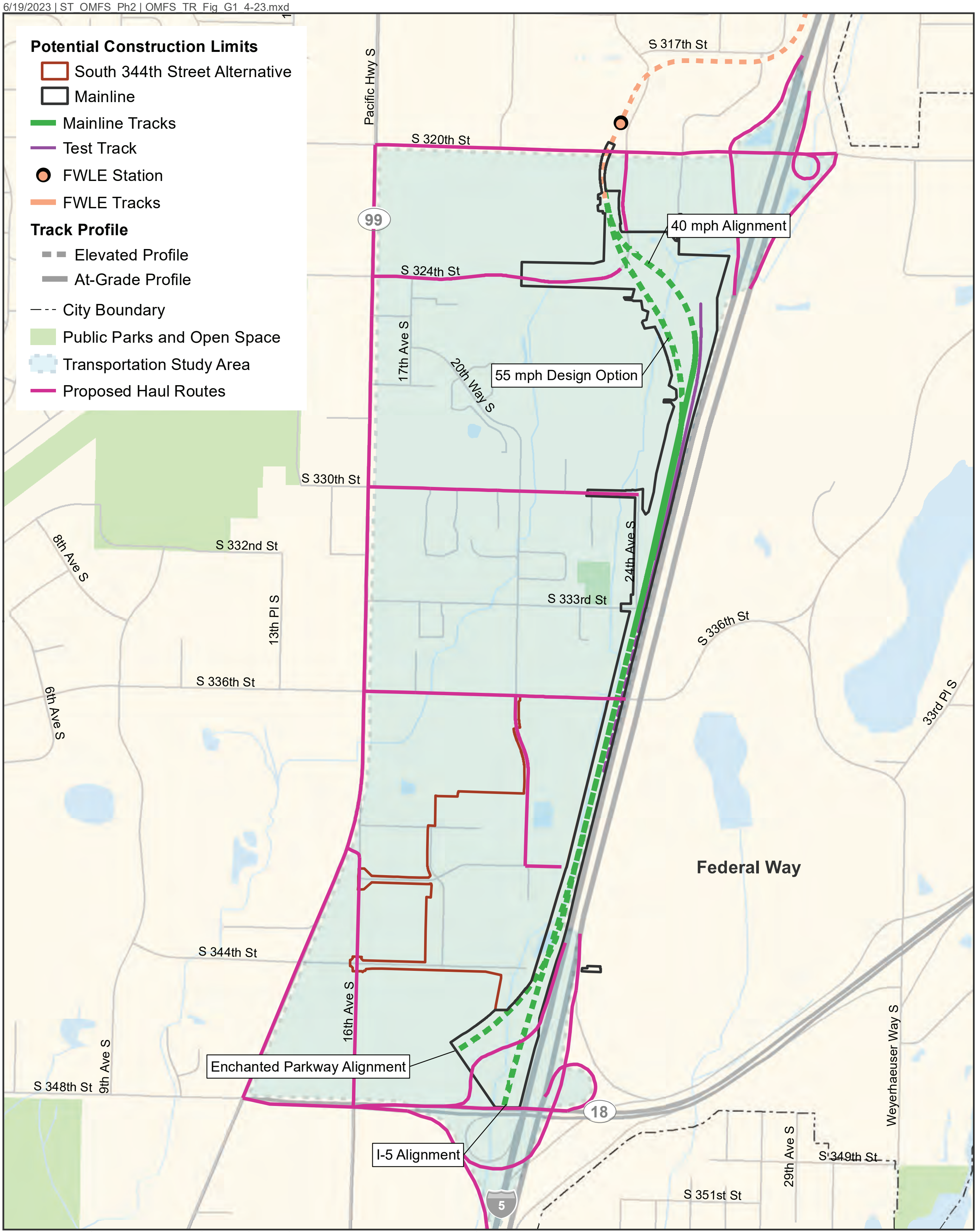
Table G1.4-21 Hourly Truck Activity Associated with South 344th Street Alternative Development Approaches

Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	PCE
6	1	7	18

The PCEs shown in the table would be distributed with half exiting the site and half entering the site during the peak hour.

---

[7] Irregularity or bunching at the beginning and end of the day is possible.


Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Proposed Haul Routes
Pacific Hwy S
S 317th St
S 320th St
99
40 mph Alignment
S 324th St
17th Ave S
20th Way S
55 mph Design Option
S 330th St
S 332nd St
8th Ave S
24th Ave S
S 333rd St
13th Pl S
S 336th St
S 336th St
6th Ave S
33rd Pl S
Federal Way
S 344th St
16th Ave S
9th Ave S
Enchanted Parkway Alignment
S 348th St
18
I-5 Alignment
29th Ave S
Weyerhaeuser Way S
S 349th St
S 351st St
5

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

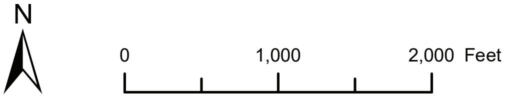

N
0
1,000
2,000 Feet

FIGURE G1.4-27
Construction Access and Truck Routes
South 344th Street Alternative

OMF South

The haul routes would be located on state facilities, including SR 99, SR 18 (S 348th Street), and I-5, as well as several collector and arterial streets. Because the construction staging, origin of the import material, and destination for export material are unknown at this time, the volumes forecast on each roadway segment represent the highest possible volumes for all daily construction activity. A single potential roadway identified as a haul route could be used for all daily truck trips or the total daily volumes could be distributed among multiple roadways. The estimated daily truck PCE trips associated with site preparation could represent up to 38.6 percent of existing traffic on collector and arterial roadways. Daily truck PCE trips could represent as much as 3.2 percent of the existing single day AADT for all state facilities, with the highest percentages at on- and off-ramps. Table G1.4-22 summarizes AADT on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT. Figure G1.4-28 displays the location of AADT counts.

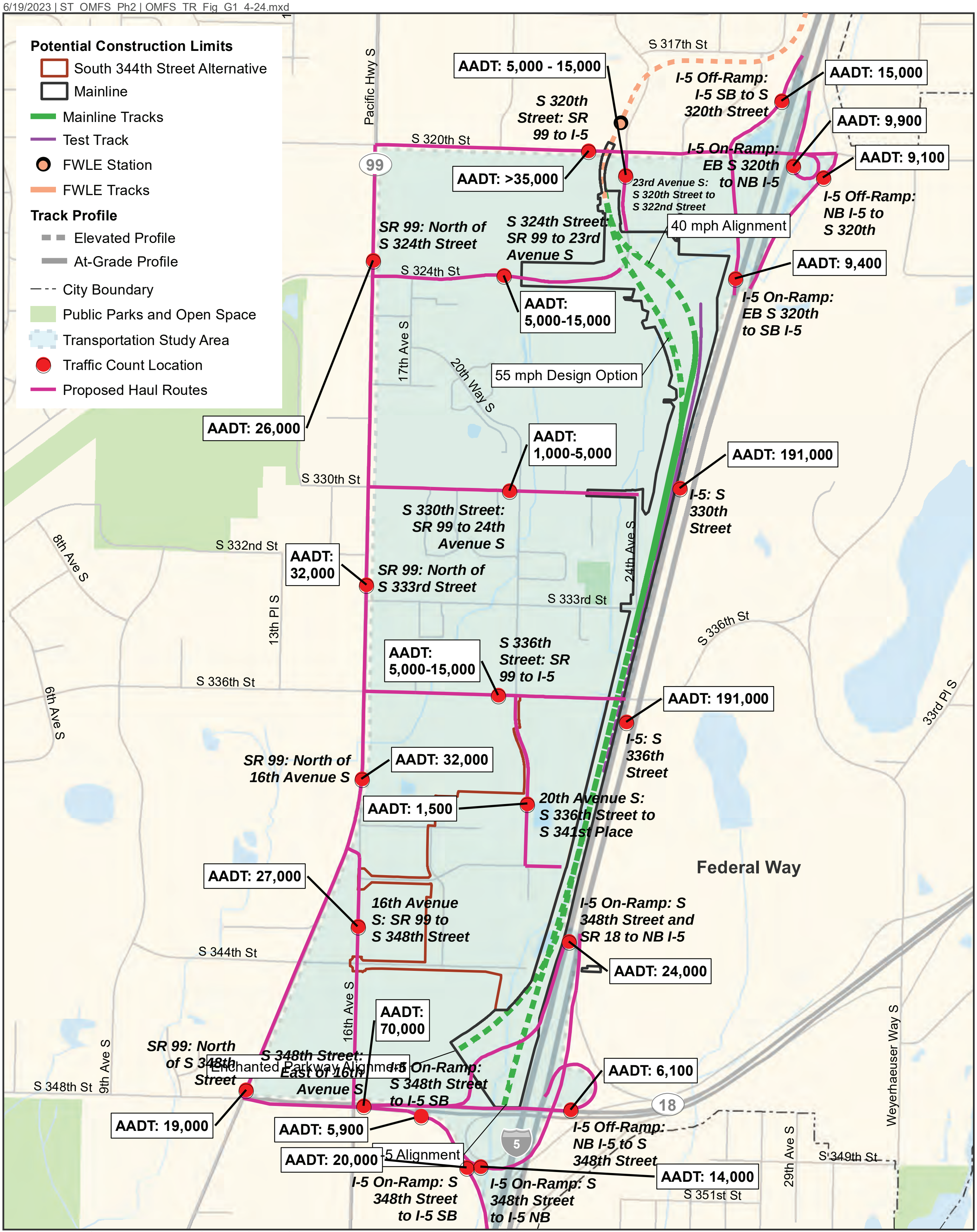
Table G1.4-22 Estimated Hourly Truck Activity at the South 344th Street Alternative Compared with Existing AADT

Intersection/Roadway Segment	Existing AADT (Both Directions)	Existing AADT (Single Direction)	Daily Truck Trips as a Percentage of Single Direction AADT
S 320th Street: SR 99 to I-5	>35,000	>17,500	<1.1%
S 324th Street: SR 99 to 23rd Avenue S	5,000-15,000	2,500-7,500	2.3-7.7%
S 330th Street: SR 99 to 24th Avenue S	1,000-5,000	500-2,500	7.7-38.6%
S 336th Street: SR 99 to I-5	5,000-15,000	2,500-7,500	2.3-7.7%
S 344th Street: SR 99 to I-5	<1,000	<500	>38.6%
I-5 Off-Ramp: I-5 SB to SW 320th Street	N/A	15,000	1.3%
I-5 On-Ramp: EB SW 320th to NB I-5	N/A	9,900	1.9%
I-5 On-Ramp: EB SW 320th to SB I-5	N/A	9,400	2.1%
I-5 Off-Ramp: NB I-5 to SW 320th	N/A	9,100	2.1%
I-5: S 330th Street	191,000	95,500	0.2%
I-5: S 336th Street	191,000	95,500	0.2%
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5	N/A	24,000	0.8%
I-5 Off-Ramp: NB I-5 to S 348th Street	N/A	6,100	3.2%
I-5 On-Ramp: S 348th Street to I-5 NB	N/A	14,000	1.4%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	5,900	3.3%
I-5 On-Ramp: S 348th Street to I-5 SB	N/A	20,000	1.0%
S 348th Street: East of 16th Avenue S	70,000	35,000	0.6%
SR 99: North of S 348th Street	19,000	9,500	2.0%
SR 99: North of 18th Place S	32,000	16,000	1.2%
SR 99: North of S 333rd Street	32,000	16,000	1.2%
SR 99: North of S 324th Street	26,000	13,000	1.5%

Sources: WSDOT Traffic GeoPortal (2020a); City of Federal Way 2010 Estimated Weekday Average Daily Traffic (2011).

Note:

(1) WSDOT and the city of Federal Way report annual average daily trips (AADT) for roadways. Where roadways are bi-directional, the AADT reported reflects both directions. Single-direction volumes were determined by dividing bi-directional volumes in two.


Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Traffic Count Location
Proposed Haul Routes
AADT: 5,000 - 15,000
S 317th St
AADT: 15,000
I-5 Off-Ramp: I-5 SB to S 320th Street
S 320th Street: SR 99 to I-5
AADT: 9,900
Pacific Hwy S
S 320th St
99
I-5 On-Ramp: EB S 320th to NB I-5
AADT: 9,100
AADT: >35,000
23rd Avenue S: S 320th Street to S 322nd Street
I-5 Off-Ramp: NB I-5 to S 320th
SR 99: North of S 324th Street
S 324th Street: SR 99 to 23rd Avenue S
40 mph Alignment
AADT: 9,400
S 324th St
AADT: 5,000-15,000
I-5 On-Ramp: EB S 320th to SB I-5
17th Ave S
20th Way S
55 mph Design Option
AADT: 26,000
AADT: 1,000-5,000
AADT: 191,000
S 330th St
I-5: S 330th Street
S 330th Street: SR 99 to 24th Avenue S
8th Ave S
S 332nd St
AADT: 32,000
SR 99: North of S 333rd Street
24th Ave S
S 333rd St
13th Pl S
S 336th St
AADT: 5,000-15,000
S 336th Street: SR 99 to I-5
S 336th St
6th Ave S
AADT: 191,000
33rd Pl S
I-5: S 336th Street
SR 99: North of 16th Avenue S
AADT: 32,000
AADT: 1,500
20th Avenue S: S 336th Street to S 341st Place
Federal Way
AADT: 27,000
16th Avenue S: SR 99 to S 348th Street
I-5 On-Ramp: S 348th Street and SR 18 to NB I-5
S 344th St
AADT: 24,000
AADT: 70,000
16th Ave S
Weyerhaeuser Way S
SR 99: North of S 348th Street
S 348th Street: East of 16th Avenue S
Enchanted Parkway Alignment
I-5 On-Ramp: S 348th Street to I-5 SB
AADT: 6,100
9th Ave S
S 348th St
18
AADT: 19,000
AADT: 5,900
5
I-5 Off-Ramp: NB I-5 to S 348th Street
29th Ave S
S 349th St
AADT: 20,000
I-5 Alignment
AADT: 14,000
I-5 On-Ramp: S 348th Street to I-5 SB
I-5 On-Ramp: S 348th Street to I-5 NB
S 351st St

Data Sources: Google Maps, King County; Cities of Des Moines, Federal Way, Kent (2019).

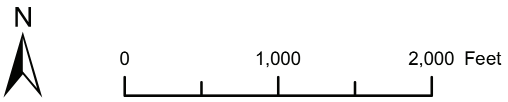

N
0
1,000
2,000 Feet

FIGURE G1.4-28

Existing Annual Average Daily Traffic Along Truck Haul Routes
South 344th Street Alternative

OMF South

Mainline Construction

Mainline construction, including the mainline tail tracks, is expected to take 15 months. Construction of the mainline would require temporary full and/or partial closures to streets that travel beneath the mainline. As with site construction, all export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Peak truck trips during mainline construction are estimated to be up to 10 trucks per hour for concrete delivery, or up to 120 trips per day (300 PCE), assuming 12 hours per day of active construction, some of which may occur at night. A similar level of truck activity is expected for earthwork activities, but this would be focused on trucks hauling material during excavation and would not overlap with concrete delivery trucks. Haul routes for mainline construction are anticipated to be the same as described above for OMF site construction.

Truck trips on roadways would be expected to increase proportionately above those associated with site construction should mainline and site construction occur concurrently. Streets with the lowest existing AADT, such as S 336th Street and S 344th Street, would experience the highest relative growth in traffic compared to existing volumes.

4.3.2.4 Impacts to Property Access

Impacts to property access for sites in the vicinity of the South 344th Street Alternative would be minimal. Trucks entering or exiting the site are not expected to block driveways along the haul routes. Access to properties fronting S 341st Place, S 344th Street, and 18th Place S would be impacted during construction of right-of-way improvements in these areas. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours.

4.3.2.5 Impacts to Transit

During construction of the South 344th Street Alternative, transit service on S 324th Street, S 336th Street, and 23rd Avenue S would likely be impacted. Buses may need to be rerouted and bus stops may need to be temporarily relocated in response to construction-related road closures. Bus service may also be slower and less reliable in construction areas. Bus service into the Federal Way/S 320th Park & Ride may need to be rerouted to avoid construction areas. Of the 877 parking spaces, about 650 spaces within the Federal Way/S 320th Street Park & Ride would be temporarily closed during mainline track construction. In the first quarter of 2023, utilization of the Park & Ride was at 1.3 percent. While this lot has not been used at capacity in recent years, utilization could change with the opening of FWLE, which has a forecasted in-service date of 2026.

4.3.2.6 Impacts to Nonmotorized Facilities

Because the construction area includes all of the South 344th Street Alternative, the impacts to pedestrian and bicycle facilities during construction and upon completion of the facility would be the same. The greenway between S 336th Street and S 344th Street would be closed. The South 344th Street Alternative would also close portions of 18th Place S and S 341st Place, effectively eliminating much of the existing street grid network in the southern part of the study area. Pedestrian facilities on S 324th Street, S 330th Street, S 341st Place, S 344th Street, 18th Place S, and 23rd Avenue S would be impacted during construction of right-of-way improvements in these areas.

4.3.2.7 Impacts to Parking

Most construction activity, including staging, is expected to occur within the boundaries of the South 344th Street Alternative. Construction of the mainline would require the temporary closure of parking stalls at The Commons at Federal Way shopping mall and Walmart properties. On-street parking along streets where roadway frontage improvements are planned would be prohibited within the active construction area. However, these impacts would be temporary and transitory as construction activity progressed.

4.3.3 Midway Landfill Alternative

The Midway Landfill Alternative has three subsurface construction design options to address the risk of settlement and the presence of contaminated material. Each of these subsurface construction design options would have different construction and transportation impacts. The options generally have the same horizontal layout and above-grade features but vary in subgrade and foundation approaches. The options include Platform, Hybrid, and Full Excavation and are discussed briefly below. The construction impact area for the site associated with all subsurface construction design options is shown in Figure G1.4-29.

Platform

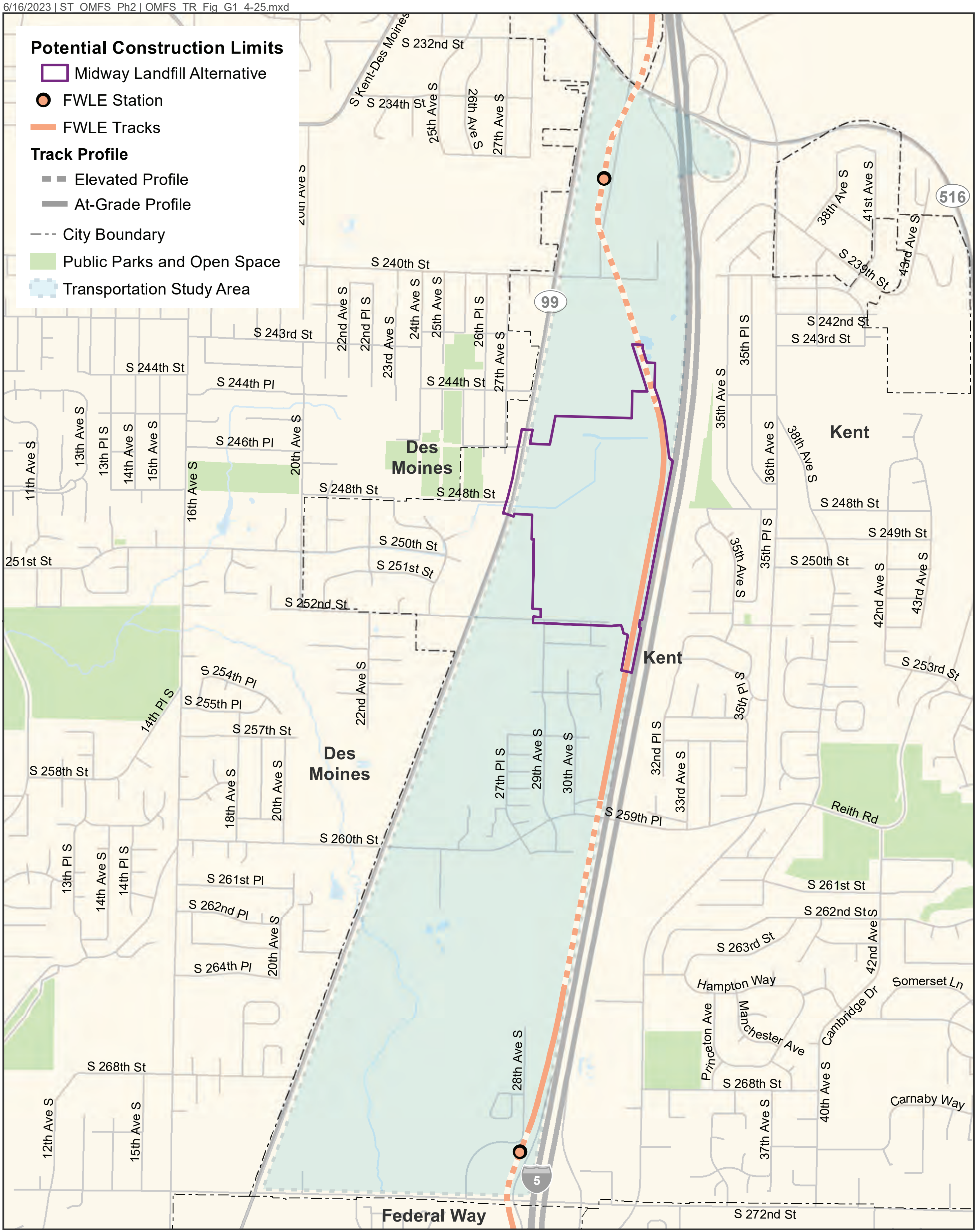
Under this subsurface construction design option, OMF South would be built on a 6-inch thick, cast-in-place concrete slab supported on drilled shafts. The drilled shafts would be 10 feet in diameter, distributed on a 35-foot by 70-foot grid under the buildings, track, and drainage vault area. Average shaft lengths would range from 130 feet to 180 feet deep below finished grade. No new fill material is anticipated to be imported for this subsurface construction design option.

Hybrid

Under this subsurface construction design option, the entire landfill cap system would be removed and replaced. Approximately 4.3 million cubic yards of loose landfill material would be excavated, and a ground improvement process called deep dynamic compaction would be used to prepare the site for construction. A concrete slab like the one described for the Platform subsurface construction design option would be built beneath buildings sensitive to settlement, to provide additional support where needed. Tracks, parking, and roads would be built on a slab without underlying drilled shafts. Approximately 1.2 million cubic yards of loose material would need to be brought to the site.

Full Excavation

This subsurface construction design option was designed to completely excavate the landfill, which would produce roughly 4.9 million cubic yards of loose material, 3.0 million cubic yards of which would be hauled off site. Roughly 1.6 million cubic yards of competent soil would be imported. The OMF South site would be constructed on the new, imported soil.


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Des Moines
Des Moines
Kent
Kent
Federal Way
99
516
5
S Kent-Des Moines
S 232nd St
S 234th St
S 240th St
S 242nd St
S 243rd St
S 244th St
S 244th Pl
S 246th Pl
S 248th St
S 249th St
S 250th St
S 251st St
S 252nd St
S 253rd St
S 254th Pl
S 255th Pl
S 257th St
S 258th St
S 259th Pl
S 260th St
S 261st Pl
S 261st St
S 262nd Pl
S 262nd St
S 263rd St
S 264th Pl
S 268th St
S 272nd St
S 239th St
Reith Rd
Hampton Way
Manchester Ave
Princeton Ave
Cambridge Dr
Somerset Ln
Carnaby Way
11th Ave S
12th Ave S
13th Ave S
13th Pl S
14th Ave S
14th Pl S
15th Ave S
16th Ave S
18th Ave S
20th Ave S
22nd Ave S
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Ave S
26th Pl S
27th Ave S
27th Pl S
28th Ave S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
35th Ave S
35th Pl S
36th Ave S
37th Ave S
38th Ave S
40th Ave S
41st Ave S
42nd Ave S
43rd Ave S
251st St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0 500 1,000 Feet

FIGURE G1.4-29
Construction Impact Area
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.3.3.1 Estimation of Construction Truck Traffic

Depending on which subsurface construction design option is chosen, site preparation at the Midway Landfill Alternative could take up to approximately 5 years and 7 months, assuming 12-hour workdays, 6 days per week. For all the subsurface construction design options, excavated material for export off site is assumed to be loaded into 20-foot intermodal containers on waiting trucks. The intermodal containers would be loaded only to a maximum capacity of 30 tons due to roadway load restrictions. The containers would be transported off site for direct load onto rail at an intermodal facility, from which they would then travel to a Subtitle D landfill. The site is assumed to be able to accommodate four active truck-loading locations with an on-site load time of 10 minutes each. Each load station at the Midway Landfill would be able to accommodate up to 10 trucks, for a total of up to 40 trucks operating throughout the day, including AM and PM peak periods.

The estimated total round-trip time for a truck exporting material from the site would be 100 minutes. Based on a 12-hour workday, each truck could make seven trips per day. At 40 operating trucks, there would be as many as 280 truck trips per day associated with excavation. This is an approximate value that does not account for irregularity at the beginning and end of the day.

Imported material would need to be delivered separately from the export operation. Trucks would need to be dump trucks with trailers with an assumed capacity of 20 cubic yards, and the export trucks with their intermodal containers would not be compatible with the backfill operation. It is estimated that up to 284 additional truck trips (Hybrid) would be needed to provide import material.

The estimated total round-trip time for import trucks is 100 minutes, consistent with export trucks. This assumption is not based on a particular location. When on site, trucks would dump either in the fill area or at a stockpile location. The demand for import material is expected to be less than the export effort for each subsurface construction design option. The total number of import trucks is assumed to be equally distributed throughout the export duration.

Concrete import for shafts and slabs is assumed to arrive in 9 cubic yard truckloads. The import is assumed to be equally distributed throughout the landfill preparation. Concrete will be locally sourced from an unknown location and is expected to be imported following the same site access requirements as other import and export operations.

Table G1.4-23 summarizes the quantity of export and import material estimated for each subsurface construction design option, the associated truck trips, and the estimated durations of work. Depending on the subsurface construction design option chosen, there could be up to 564 round trip truck trips per day during site preparation work. The estimates of truck traffic are conservative because at this time it is unknown how much excavated material could be used as fill material elsewhere on the same site.

Table G1.4-23 Truck Activity Associated with Site Preparation for Midway Landfill Alternative Subsurface Construction Design Options

Subsurface Construction Design Options	Export Material (ton)	Total Export Truck Trips per Day	Soil Import (cubic yards)	Concrete Import	Total Import Truck Trips per Day	Total Truck Trips per Day	Total Site Preparation Duration (years, months)
Platform	678,000	20	0	531,000	51	71	4 y, 1 m
Hybrid	2,592,000	280	1,240,000	165,000	284	564	5 y, 7 m
Full Excavation	2,956,500	280	1,610,000	0	274	554	4 y, 4 m

4.3.3.2 Potential construction access and truck haul routes

Construction access to the site would be limited to a single driveway at SR 99 and S 246th Street. Outbound trucks exiting the site to transport excavated materials would travel north on SR 99 and access I-5 via Kent-Des Moines Road (SR 516) to reach the intermodal terminal. Inbound trucks would travel south on I-5, exiting at S 272nd Street. They would travel westbound on S 272nd Street to SR 99, where they would turn north and travel to the site. Access to the site for outbound and inbound trucks would be via right turns into and out of the site. No left turns into or out of the site are assumed. Trucks importing material would follow the same routes, although the assumed origin for import material is unknown.

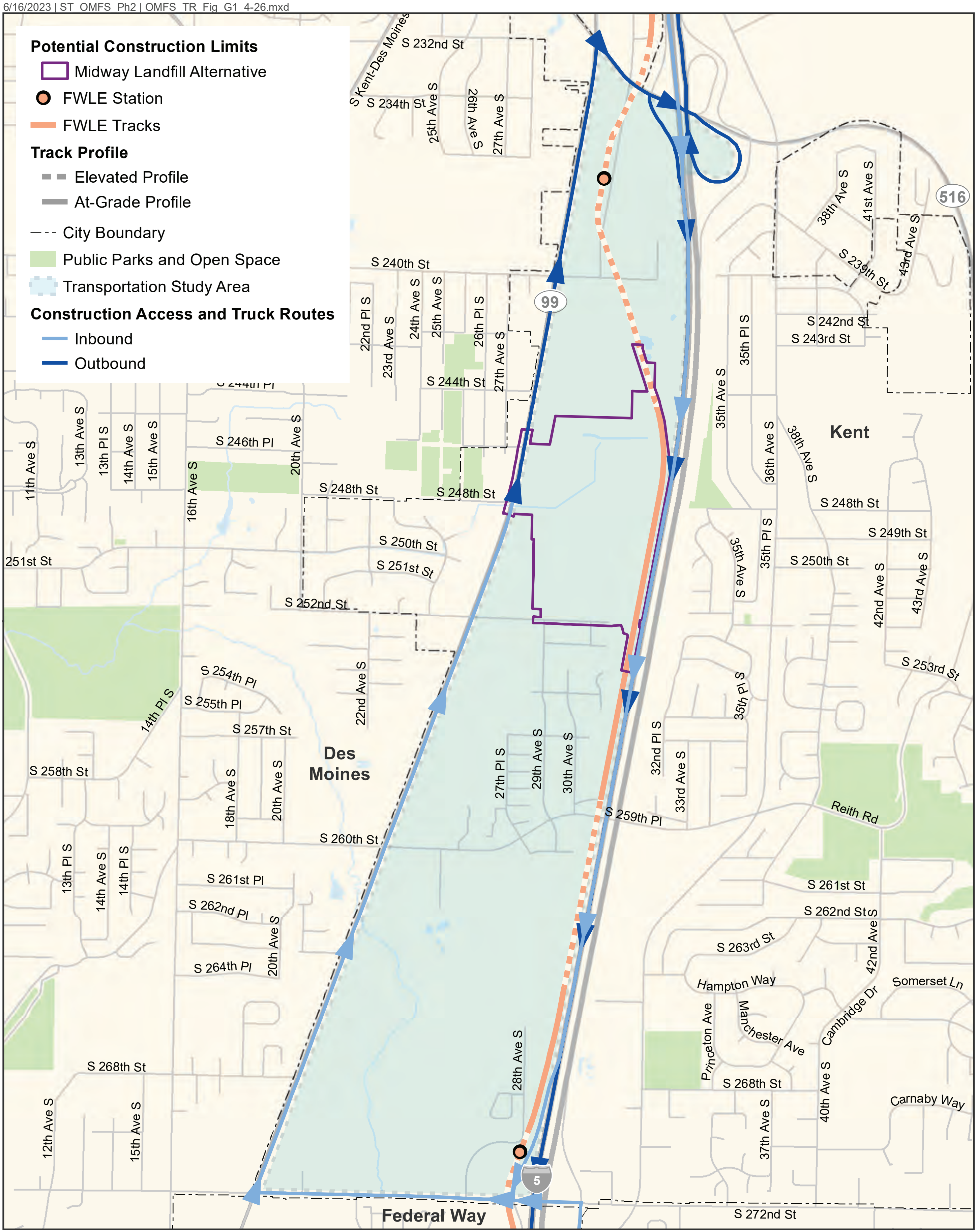
Construction access and truck routes are shown in Figure G1.4-30.

Due to their weight, large trucks would require additional time to accelerate to general-purpose traffic speeds on SR 99 when leaving the site and additional time to decelerate when entering the site. The substantial number of truck trips required for the Hybrid and Full Excavation subsurface construction design options would result in a greater potential to increase traffic congestion along SR 99 than the Platform subsurface construction design option or the Preferred or South 344th Street alternatives.

4.3.3.3 Changes to Traffic Volumes

Trucks would traverse the haul routes during the entirety of the 12-hour daily construction period, including both directions during AM and PM peak periods. As described in Section 4.3.1.1, the maximum number of export trucks operating at the site is 40, each performing 7 round trips per day, for a total of 280 daily truck trips. With 280 truck trips during the daily construction period, the average number of truck trips per hour would be 23 to 24. The maximum forecast daily truck trip volume associated with soil and/or concrete import is estimated at 284 trips per day, which equates to 24 additional trucks operating at the site each day.

Each truck round trip includes an outbound and inbound segment, resulting in a total of 700 PCE daily trips in the study area associated with export activity (280 truck trips x 2.5 PCE). Import activity would result in up to 710 PCE daily trips in the study area (284 truck trips x 2.5 PCE).


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Construction Access and Truck Routes
Inbound
Outbound
S Kent-Des Moines
S 232nd St
S 234th St
25th Ave S
26th Ave S
27th Ave S
516
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 240th St
99
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 242nd St
S 243rd St
35th Pl S
35th Ave S
S 244th St
S 244th Pl
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
S 246th Pl
20th Ave S
S 248th St
S 248th St
Kent
36th Ave S
38th Ave S
S 248th St
S 249th St
251st St
S 250th St
S 251st St
35th Ave S
35th Pl S
S 250th St
42nd Ave S
43rd Ave S
S 252nd St
S 253rd St
S 254th Pl
S 255th Pl
14th Pl S
22nd Ave S
35th Pl S
S 257th St
Des Moines
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
Reith Rd
S 259th Pl
S 260th St
13th Pl S
14th Ave S
14th Pl S
S 261st Pl
S 261st St
S 262nd Pl
S 262nd St
20th Ave S
S 263rd St
42nd Ave S
S 264th Pl
Hampton Way
Somerset Ln
Princeton Ave
Manchester Ave
Cambridge Dr
28th Ave S
S 268th St
S 268th St
12th Ave S
15th Ave S
37th Ave S
40th Ave S
Carnaby Way
5
Federal Way
S 272nd St

Data Sources: Google Maps; King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE G1.4-30

Construction Access and Truck Routes
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

To estimate traffic impacts, the truck trips are assumed to be distributed evenly throughout the daily site preparation period and are based on the ability of the yard and receiving facility to process the trucks.[8] This information was developed to inform the Conceptual Landfill Site Reuse Plan, part of a preliminary engineering effort for the site (Sound Transit 2020b). A similar 2.5 PCE factor is applied to the truck volume to estimate the number of new trips that would need to be accommodated along the truck routes. Table G1.4-24 summarizes the number of peak hour trucks and associated PCEs for each construction scenario.

Table G1.4-24 Hourly Truck Activity Associated with Midway Landfill Alternative Subsurface Construction Design Options

Subsurface Construction Design Option	Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	Hourly PCE
Platform	2	5	7	18
Hybrid	24	24	48	120
Full Excavation	24	24	48	120

Source: Sound Transit (2020b).

The PCEs shown in the table would be distributed with half exiting the site and half entering the site during the peak hour. The Hybrid and Full Excavation subsurface construction design option would have the same daily truck traffic, with 120 PCE per hour.

The haul routes would be located predominantly on state facilities, including SR 99, SR 516, and I-5, as well as S 272nd Street. Trucks would travel in a single direction on roadways along the haul routes. Because the location of the intermodal facility and the origin of the import material are unknown at this time, the volumes forecast on the I-5 on- and off-ramps represent the maximum forecast for a given direction and would not be present on all ramps. For example, if the intermodal facility and the origin of the import material are located to the north of the Midway Landfill Alternative, there would be no truck activity on the southbound I-5 on-ramp from SR 516 or the S 272nd Street off-ramp from northbound I-5. The estimated daily PCE truck trips associated with site preparation for the Platform option would represent no more than 2.9 percent of the existing single direction annual average daily traffic (AADT) for all roadway segments. For the Hybrid and Full Excavation options, estimated daily PCE truck trips on all segments of the haul route, except I-5 and the ramps, would range from 7.7 percent to 12.8 percent of existing single-direction AADT. Daily PCE truck trips would range from 11.5 percent to 22.7 percent of single-direction AADT on I-5 on- and off-ramps. Table G1.4-25 summarizes AADT on streets that are part of the Midway Landfill Alternative haul routes as well as the estimated truck trips as a percentage of AADT. Figure G1.4-31 displays the location of AADT counts.

---

[8] Irregularity or bunching at the beginning and end of the day is possible.

Table G1.4-25 Estimated Daily Truck Activity for the Midway Landfill Alternative Compared with Existing AADT

Intersection/Roadway Segment	Existing AADT (Both Directions)[1]	Existing AADT (Single Direction)[1]	Daily Truck Trips as a Percentage of Single Direction AADT Platform Option	Daily Truck Trips as a Percentage of Single Direction AADT Hybrid Option	Daily Truck Trips as a Percentage of Single Direction AADT Full Excavation Option
SR 99: South of SR 516	35,000	17,500	1.0%	8.1%	7.9%
SR 516: East of SR 99	35,000	17,500	1.0%	8.1%	7.9%
SR 516: East of 30th Avenue S	36,000	18,000	1.0%	7.8%	7.7%
I-5 On-Ramp: Eastbound SR 516 to I-5 Southbound	N/A	10,000	1.8%	14.1%	13.9%
I-5 On-Ramp: Eastbound SR 516 to I-5 Northbound	N/A	6,800	2.6%	20.7%	20.4%
I-5: S 240th Street	215,000	107,500	0.2%	1.3%	1.3%
I-5: S 224th Street	225,000	112,500	0.2%	1.3%	1.2%
I-5: S 252nd Street	215,000	107,500	0.2%	1.3%	1.3%
I-5: S 265th Street	215,000	107,500	0.2%	1.3%	1.3%
I-5 Off-Ramp: I-5 SB to S 272nd Street	N/A	12,000	1.5%	11.8%	11.5%
I-5 Off-Ramp: I-5 NB to S 272nd Street	N/A	6,200	2.9%	22.7%	22.3%
S 272nd Street: I-5 to SR 99	22,100	11,050	1.6%	12.8%	12.5%
SR 99: North of S 272nd Street	32,000	16,000	1.1%	8.8%	8.7%
SR 99: South of 252nd Street	29,000	14,500	1.2%	9.7%	9.6%

Sources: WSDOT Traffic GeoPortal (2020a); City of Kent Average Daily Traffic Volume (2009).

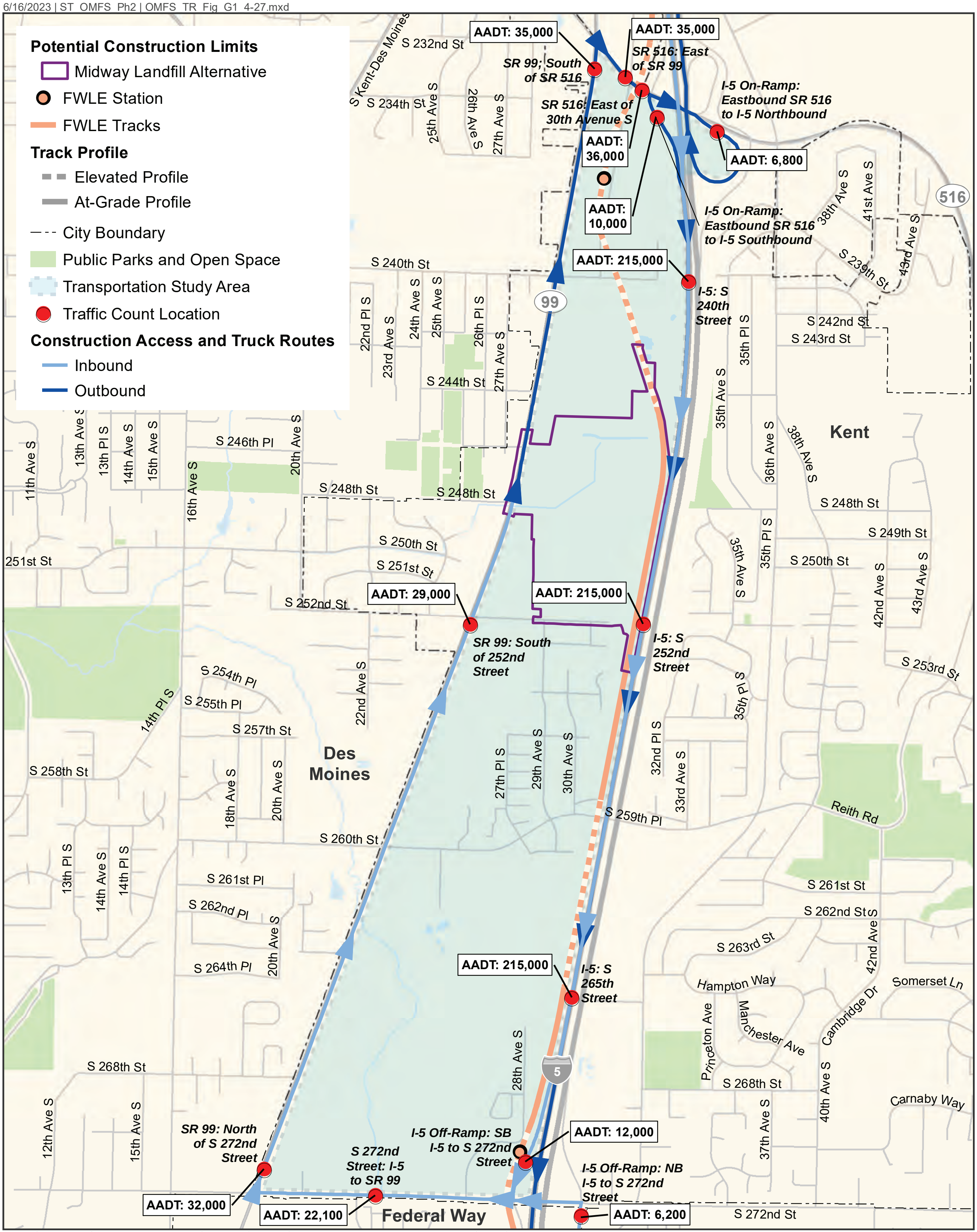
Note:

(1) WSDOT and the city of Kent report annual average daily trips (AADT) for roadways. Where roadways are bi-directional, the AADT reported reflects both directions. Single-direction volumes were determined by dividing bi-directional volumes in two.

4.3.3.4 Impacts to Property Access

Impacts to property access for sites in the vicinity of the Midway Landfill Alternative would be minimal. Trucks entering or exiting the site are not expected to block driveways along the haul routes. Properties with access to SR 99 between approximately S 244th Street and S 248th Street and with access to S 252nd Street from 29th Avenue S to the eastern terminus of the street would experience intermittent impacts to access associated with right-of-way improvements constructed as part of the project. Access to properties fronting SR 99 and S 252nd Street would be impacted during construction of right-of-way improvements in these areas.

6/16/2023 | ST_OMFS_Ph2 | OMFS_TR_Fig_G1_4-27.mxd


Potential Construction Limits
Midway Landfill Alternative
FWLE Station
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Public Parks and Open Space
Transportation Study Area
Traffic Count Location
Construction Access and Truck Routes
Inbound
Outbound
AADT: 35,000
SR 99; South of SR 516
AADT: 35,000
SR 516: East of SR 99
I-5 On-Ramp: Eastbound SR 516 to I-5 Northbound
SR 516: East of 30th Avenue S
AADT: 36,000
AADT: 6,800
AADT: 10,000
I-5 On-Ramp: Eastbound SR 516 to I-5 Southbound
AADT: 215,000
I-5: S 240th Street
AADT: 29,000
SR 99: South of 252nd Street
AADT: 215,000
I-5: S 252nd Street
AADT: 215,000
I-5: S 265th Street
AADT: 12,000
I-5 Off-Ramp: SB I-5 to S 272nd Street
I-5 Off-Ramp: NB I-5 to S 272nd Street
AADT: 6,200
SR 99: North of S 272nd Street
AADT: 32,000
S 272nd Street: I-5 to SR 99
AADT: 22,100
Des Moines
Kent
Federal Way
99
516
5
S 232nd St
S Kent-Des Moines
S 234th St
25th Ave S
26th Ave S
27th Ave S
S 240th St
22nd Pl S
23rd Ave S
24th Ave S
25th Ave S
26th Pl S
27th Ave S
S 244th St
S 246th Pl
S 248th St
S 248th St
S 250th St
S 251st St
S 252nd St
251st St
11th Ave S
13th Ave S
13th Pl S
14th Ave S
15th Ave S
16th Ave S
20th Ave S
S 254th Pl
S 255th Pl
14th Pl S
S 257th St
22nd Ave S
S 258th St
18th Ave S
20th Ave S
27th Pl S
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
S 259th Pl
S 260th St
S 261st Pl
13th Pl S
14th Ave S
14th Pl S
S 262nd Pl
S 264th Pl
20th Ave S
S 268th St
12th Ave S
15th Ave S
28th Ave S
S 272nd St
38th Ave S
41st Ave S
43rd Ave S
S 239th St
S 242nd St
S 243rd St
35th Pl S
35th Ave S
36th Ave S
38th Ave S
S 248th St
S 249th St
35th Ave S
35th Pl S
S 250th St
42nd Ave S
43rd Ave S
S 253rd St
35th Pl S
Reith Rd
S 261st St
S 262nd St
42nd Ave S
S 263rd St
Hampton Way
Somerset Ln
Manchester Ave
Princeton Ave
Cambridge Dr
S 268th St
37th Ave S
40th Ave S
Carnaby Way
N
0
1,000
2,000 Feet

Data Sources: Google Maps; King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G1.4-31
Existing Annual Average Daily Traffic Along Truck Haul Routes
Midway Landfill Alternative

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

4.3.3.5 Impacts to Transit

During construction of the Midway Landfill Alternative, transit service on SR 99 would likely be impacted. Buses may need to be rerouted off SR 99, and bus stops at S 246th Street and 252nd Street, served by King County Metro A Line, may need to be temporarily relocated in response to construction related road closures. Bus service may also be slower and less reliable in construction areas. Because FWLE would be operational by the time construction would begin, there would be some disruption of light rail service in order to connect the lead tracks of the OMF.

4.3.3.6 Impacts to Nonmotorized Facilities

Because all construction activity, including staging, is expected to occur within the boundaries of the Midway Landfill Alternative study area, minimal impacts to pedestrian and bicycle facilities are anticipated. The only existing pedestrian or bicycle facilities in the Midway Landfill Alternative study area are on SR 99 along the project frontage. This frontage is expected to remain open during construction. Pedestrians or cyclists may experience additional delay waiting for trucks to enter or exit the property. Pedestrians and cyclists traveling on SR 99 between approximately S 244th Street and S 248th Street and with access to S 252nd Street from 29th Avenue S to the eastern terminus of the street would experience intermittent impacts access associated with right-of-way improvements constructed as part of the project.

4.3.3.7 Impacts to Parking

Most construction activity, including staging, is expected to occur within the boundaries of the Midway Landfill Alternative. On-street parking along streets where roadway frontage improvements are planned would be prohibited within the active construction area. However, these impacts would be temporary and transitory as construction activity progressed.

4.4 Avoidance and Minimization of Impacts

For all build alternatives, a construction transportation management plan addressing site access, traffic control, hauling routes, impacts to transit, construction employee parking, impacts to local businesses, and pedestrian and bicycle control in the area would be prepared per city of Kent or city of Federal Way requirements and in coordination with WSDOT, as applicable. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours or whether the parking and users of this access could be accommodated at an alternative location. Any properties temporarily impacted during construction would be restored as closely as possible to their previous condition.

Other avoidance and minimization measures that would be determined during the final design and permitting process could include the following:

- Install advance warning signs and highly visible construction barriers and use flaggers where needed.
- Clearly sign and provide reasonable detour routes when cross streets are closed.
- Use lighted or reflective signage to direct drivers to truck-haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Use tools such as print, radio, posted signs, websites, and email to communicate information regarding street closures, hours of construction, business access, and parking impacts.

- Coordinate with transit providers to post advance notice signs prior to construction when bus stops need to be temporarily relocated or closed.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays, where practical.
- Cover potholes and open trenches, where possible, and use barriers to protect drivers from open trenches.

For the Preferred or South 344th Street alternatives, in locations where the mainline tracks do not meet clear zone standards and the tracks cannot be relocated, Sound Transit would work with WSDOT and FHWA to meet roadway standards by taking certain measures, such as regrading to reestablish a clear zone or installing guardrails, barriers, or impact attenuators. These measures would not adversely affect transportation safety in the study area.

4.5 Indirect Impacts

Indirect impacts are reasonably foreseeable impacts that could occur as a result of an action at some future time and in areas beyond the action's direct impacts. As an example, indirect impacts often relate to additional changes in land use that could occur beyond those changes immediately caused by a development's construction and operation, which could result in a change to overall traffic patterns. The OMF South alternatives are not expected to cause future land use changes beyond their respective sites, which could otherwise result in indirect impacts to transportation.

Development of OMF South would provide Sound Transit with capacity to receive, test, commission, store, maintain, and deploy the fleet of light rail vehicles to support the Sound Transit 3 expanded Link light rail system. This capacity would provide for more efficient operations of the existing system and allow Sound Transit to accommodate the planned future expansions of the Link light rail system to meet the expected ridership demand. Expansion of the Link light rail system would have positive indirect impacts to transportation by providing an alternative to privately owned vehicles, which could reduce the amount of vehicle miles travelled.

4.6 Cumulative Impacts

The transportation access analysis presented in the previous sections reflects conditions with assumed growth between existing conditions and the design year (2042). The traffic growth assumptions also reflect changes in traffic volumes that are projected in the traffic forecasts prepared for FWLE and TDLE. As a result, the traffic analyses reflect the cumulative impacts of these Link extensions and other planned and foreseen developments as well as associated increases in traffic within the study areas for each build alternative.

FWLE is under construction and has a forecasted in-service date of 2026. Design and construction for OMF South is planned from 2024 to 2029 or 2037, depending on the alternative. Should OMF South be located at the Midway Landfill Alternative, the FWLE construction period may overlap the planned construction period for OMF South. Both projects could potentially use the same construction staging areas and truck haul routes, including an area just to the north of the landfill and the future mainline area adjacent to I-5. There is also a potential for construction period overlap with TDLE, which is further to the south.

Federal Way's City Center Access project would construct a new I-5 interchange at S 324th Street and improvements to the existing I-5/S 320th Street interchange. This project is planned to be constructed as soon as 2027, but at this point in time, it does not have construction funding. If constructed, the project would remove a portion of parking spaces in the Federal Way/S 320th Street Park & Ride. This would be in addition to the 50 parking spaces that would be removed as part of the OMF South Preferred Alternative. Because it has not completed environmental review and is not currently fully funded, the change in traffic patterns due to the construction of the City Center Access project were not reflected in the 2042 traffic analyses for OMF South.

In addition to the parking spaces removed by OMF South, further loss of parking spaces at The Commons at Federal Way shopping mall (due to FWLE) and at Walmart (due to TDLE) are not expected to affect access to those properties due to the abundance of off-street parking within and adjacent to those properties. Any future development in those areas would need to comply with Federal Way parking requirements.

4.7 Long-Term Mitigation Measures

OMF South is not anticipated to result in long-term operational impacts to freight, transit, nonmotorized transportation, parking, or safety. Therefore, no mitigation is proposed for those transportation elements. Construction impact mitigation measures are discussed below.

Depending on the subsurface construction design option, construction of the Midway Landfill Alternative could require ingress and egress by a substantially greater number of large trucks than for the Preferred or South 344th Street alternatives. To avoid potential traffic impacts on SR 99 from the number additional trucks, short acceleration and deceleration lanes could be added to the construction entrance to the landfill site to allow outbound trucks to get up to speed and allow inbound trucks to slow down outside of the general-purpose lanes. Additional strategies to reduce impacts to local traffic during construction could include limiting truck activity during the peak traffic hours, which could extend the construction duration, or providing a direct connection to the I-5 corridor from the construction site. Such a connection would require approval by WSDOT and FHWA. If the Midway Landfill Alternative is selected, these mitigation measures would be confirmed during final design and permitting in coordination with Federal Way, WSDOT, and, if needed, FHWA.

Prior to closing a portion of the Federal Way/S 320th Street Park & Ride for construction, Sound Transit would work with King County Metro and WSDOT to determine its utilization rates and that of the nearby Federal Way Downtown Station. If the lots are at or near capacity, Sound Transit would implement alternative measures, such as routing transit riders that use these locations to available spaces at nearby park-and-ride lots, such as the Star Lake Park & Ride, or leasing parking lots or new parking areas within the vicinity of the temporarily closed lot.

5 REFERENCES

AASHTO (American Association of State and Highway Transportation Officials). 2014. Highway Safety Manual. 1st Edition. Washington, DC.

City of Des Moines. 2009. The Comprehensive Transportation Plan. Prepared by Fehr & Peers|Mirai. Kirkland, WA.

City of Federal Way. 2011. 2010 Estimated Weekday ADT (PDF). Electronic document, https://www.cityoffederalway.com/sites/default/files/Documents/Department/PW/Traffic/Resources/ADTmap.PDF. Accessed June 2020.

City of Federal Way. 2015 (revised). Final Comprehensive Plan.

City of Federal Way. 2019. Development Standards Manual. Federal Way Department of Public Works, 2019. Available at: https://docs.cityoffederalway.com/WebLink/DocView.aspx?id=789818&dbid=0&repo=CityofFederalWay&cr=1. Accessed December 2022.

City of Kent. 2021. Transportation Master Plan. Available at: https://www.kentwa.gov/home/showpublisheddocument/16620/637505338640970000. Accessed December 2022.

City of Kent. 2009. Average Daily Traffic Volume (PDF). Available at: https://www.kentwa.gov/home/showdocument?id=4052. Accessed June 2020.

City of Kent. 2011. City of Kent Midway Subarea Plan. Ordinance No. 4009 Adopted December 13, 2011. Kent, WA.

City of Kent. 2015. Comprehensive Plan. Kent, WA.

FHWA (Federal Highway Administration). 2019.Traffic Analysis Toolbox Volume IIIA: Guidelines for Applying Traffic Microsimulation Modeling Software. 2019 update to the 2004 version. Washington, DC.

Google. 2020. Google Maps. Available at: https://www.google.com/maps. Accessed 2020. King County Metro. 2015. King County Metro Strategic Plan for Public Transportation, 2011-2021. 2015 update. Seattle, WA

King County Metro. 2021. Metro Connects Long-Range Plan. Adopted November 2021. Available at: http://www.kcmetrovision.org/view-plan/. Accessed December 2022.

King County Metro. 2020. King County Metro Homepage. Available at: https://kingcounty.gov/depts/transportation/metro.aspx. Accessed November 2020.

King County Metro. 2023. Utilization data for Federal Way S 320th Street Park & Ride: Q3 2018 to Q4 2023. Unpublished Excel file from S. Weinberger, Intern, King County Metro to Parametrix, Seattle, WA. March 2.

Pierce Transit. 2015. Strategic Plan 2015–2020.

Pierce Transit. 2020. Pierce Transit Bus Routes. Available at: https://www.piercetransit.org/pierce-transit-routes/. Accessed November 2022.

PSRC. (Puget Sound Regional Council). 2020. VISION 2050. Seattle, WA.

Sound Transit. 2016. Federal Way Link Extension Final Environmental Impact Statement. Prepared by U.S. Department of Transportation Federal Transit Administration and Central Puget Sound Regional Transit Authority (Sound Transit). Seattle, WA.

Sound Transit. 2020a. Operations and Maintenance Facility: South Review Environmental Methodology Report. Prepared by Parametrix. July 2019. Seattle, WA.

Sound Transit. 2020b. OMF South Conceptual Landfill Site Reuse Plan. Prepared by HDR Engineering, Inc. September 2020. Seattle, WA.

Transportation Research Board. 1980. Transportation Research Circular Number 212. Interim Materials on Highway Capacity. Washington, DC.

Transportation Research Board. 2000. Highway Capacity Manual 2000. Transportation Research Board, Washington, DC.

Transportation Research Board. 2010. Highway Capacity Manual 2010, Fifth edition. Transportation Research Board, Washington, DC.

Transportation Research Board. 2016. Highway Capacity Manual 6th Edition. Transportation Research Board, Washington, DC.

WSDOT (Washington State Department of Transportation). 2014. WSDOT Protocol for Vissim Simulation. Olympia, WA.

WSDOT. 2018a. WSDOT Synchro & SimTraffic Protocol. Olympia, WA.

WSDOT. 2018b. Washington Transportation Plan, Phase 2–Implementation 2017 – 2040. Washington State Department of Transportation. Olympia, WA.

WSDOT. 2018c. Traffic Manual M 51-02.09. Washington State Department of Transportation Engineering and Regional Operations, Traffic Operations. Olympia, WA.

WSDOT. 2019a. WSDOT Traffic Analysis Guidebook. Olympia, WA.

WSDOT. 2019b. WSDOT Sidra Policy Settings. Washington State Department of Transportation. Olympia, WA.

WSDOT. 2019c. Design Manual M 22-01.18. Washington State Department of Transportation, Engineering and Regional Operations, Development Division, Design Office. Olympia, WA.

WSDOT. 2020a. Traffic GeoPortal. Available at: https://www.wsdot.wa.gov/data/tools/geoportal/?config=traffic. Accessed June 2020.

WSDOT. 2020b. Washington State Freight and Goods Transportation System (FGTS) 2019 Update. Available at: https://wsdot.wa.gov/sites/default/files/2006/02/13/washington-freight-and-goods-transportation-system-2019.pdf. Accessed November 6, 2020.

Operations and Maintenance Facility South

ATTACHMENT G1-1

Transportation Technical Analysis Methodology Memorandum

Federal Transit Administration

SOUNDTRANSIT

1 TRANSPORTATION

1.1 Introduction

This technical analysis methodology memorandum describes the methods and assumptions for preparing the transportation element of the Operations and Maintenance Facility South (OMF South) Environmental Impact Statement (EIS). The analysis of local transportation and system-wide light rail transit impacts will identify and evaluate the impacts of the project alternatives on the following:

- Design year traffic service levels at key intersections affected by the project alternatives
- Short-term impacts to vehicular, bicycle, and pedestrian traffic resulting from construction activities
- Property access, freight and local traffic flow changes caused by street closures and/or modifications
- Safety
- Bicycle and pedestrian circulation
- Transit service

1.2 Guiding Regulations, Plans, and/or Policies

Relevant policies, laws, and regulations that govern or influence the transportation impact analysis include the following:

- Washington State Department of Transportation (WSDOT) Synchro and SimTraffic Protocol, 2018
- WSDOT Traffic Analysis Guidebook
- Cities of Kent and Federal Way Transportation Plans and Capital Improvement Programs
- Level of Service Standards for the City of Kent (Comprehensive Plan, Chapter 4) and City of Federal Way (Comprehensive Plan, Chapter 3), King County (Comprehensive Plan, Chapter 8), and Washington State Highways (Revised Code of Washington [RCW] 47.06.140(2))
- Washington Transportation Plan, Phase 2—Implementation 2017–2040 (WSDOT 2019)
- WSDOT Design Manual
- WSDOT Traffic Manual M 51-20
- Transportation Research Board Highway Capacity Manual (2010)
- AASHTO Highway Safety Manual
- WSDOT Protocol for Vissim Simulation, 2014
- WSDOT Sidra Policy Settings, 2015
- FHWA Guidelines for Applying Traffic Microsimulation Modeling Software
- Puget Sound Regional Council (PSRC), VISION 2040 (PSRC 2009)

- King County Metro Transit, Strategic Plan for Public Transportation, 2011–2021 (King County Metro Transit 2015)
- Pierce Transit Strategic Plan 2015–2020 (Pierce Transit 2015)

1.3 Data Needs and Sources

A variety of data will be collected and assembled to analyze the transportation-related effects of the project alternatives. These data sets will include the following:

- Existing peak-hour turning-movement counts at the intersections identified below under "Intersections to be Studied." These counts will be collected from the City of Kent, City of Federal Way, King County, and WSDOT for the PM peak hour for all locations, and for the AM peak hour for selected locations where AM peak-hour operations are determined to be as, or more, critical than PM peak-hour operations. If, for project construction impacts, data from I-5 is needed, the volume data from WSDOT's loop counters will be used to generate existing mainline and ramp volumes. If year 2016 or more recent turning movement counts are not available from the agencies listed above, new counts will be taken for a 3-hour period during the PM peak hour. The new counts will include automobiles; trucks classified by light, medium, and heavy types; buses; pedestrians; and bicyclists. AM peak-hour turning-movement counts will also be collected where AM peak-hour volumes are the highest or the existing and future traffic issues are considered critical during the AM time period (e.g., if an intersection provides access to a regional facility). These locations will be chosen based on area knowledge, a comparison of available AM versus PM peak-hour traffic volumes, and/or if identified by Sound Transit and local or state agency staff. All peak-hour turning-movement counts will be factored to a common base analysis year (2019) based on available historical data trends.
- Daily traffic counts in the study area, as available from local jurisdictions. These counts will be factored to a common base analysis year (2019).
- Physical characteristics of the existing street system that may be affected by project alternatives.
- Existing transit route information along the proposed project alternatives will be obtained from local transit agencies and compiled. This task will include information on selected bus routes that serve the vicinity of the project alternatives as well as light rail mainline operations.
- Accident data for the most recent available 5-year period will be obtained for the potentially affected intersections in the study area.
- Local, regional, and state agency Six-Year Transportation Improvement Plans/Capital Improvement Programs or Transportation Facilities Plans, as well as other planned improvements in proximity to the project alternatives, will be reviewed and summarized. This effort will include identification of all "committed" improvements assumed for the No-Build Alternative.

1.4 Study Area and Area of Effect

The transportation analysis will include evaluation measures that consider system-wide light rail transit operations as well as localized street intersection impacts in proximity to the project alternatives. Analysis of system-wide light rail transit impacts will address the effects of the project alternatives on light rail transit reliability and operations. The arterial and local street analysis will focus on locations assumed to be most likely affected by the project alternatives. The intersections that will be analyzed are those directly affected, such as by a change in channelization or signal control resulting from light rail lead track crossings and those affected by OMF South traffic volumes near each site.

1.5 Affected Environment

The affected environment for transportation includes components of the transportation system within the affected area. These components include traffic-related operations and performance on roadway facilities; transit, both road-based and light rail; bicycles; and pedestrians in the vicinity of the project alternatives. Effects on the regional light rail transportation system will also be considered. Measures for assessing impacts on these transportation elements, discussed in the following sections, will be both quantitative and qualitative and will be displayed both graphically and in a tabular format as appropriate. Primary issues of concern include impacts on overall mobility for these various modes (e.g., travel times, speeds, and accessibility) as well as reliability and safety. These issues need to be assessed for the construction stages of the proposed project as well as after completion, when the project is fully operational.

1.6 Environmental Impact Analysis

1.6.1 Direct Impacts

Transportation Analysis Years

Based on the project's schedule and available traffic forecasting data, the transportation analysis will focus on two distinct periods:

- Existing—2019.
- Design Year—2042. This year has been identified as the design year for analysis. The 2042 analysis will include evaluation of the No-Build Alternative.

In the absence of available traffic forecasting data, an estimated annual growth in traffic volume consistent with regional and local area plans and historic data will be developed and applied to existing traffic counts to generate reasonable future traffic volumes.

Local Surface Streets

The surface street system analysis will focus on intersection operations and safety analysis. Impacts on property access and circulation, parking, nonmotorized facilities, construction, and safety will be addressed. The methodologies proposed to analyze the surface street system will be described in this section.

Intersection Operations

Effects on intersection operations will be evaluated based on the calculated design year 2042 peak-hour intersection level of service (LOS). LOS measures the quality of traffic operations at an intersection in terms of both operational conditions and motorists' perceptions. LOS ratings range from "A" to "F." LOS A represents the best operation and LOS F the poorest operation.

Agency Thresholds

As part of each agency's comprehensive planning efforts, agency transportation goals and LOS standards are developed. While each agency accepts different levels of congestion, a delay-based intersection LOS analysis has been preliminarily accepted by each agency. Delay is expressed in terms of average delay per vehicle, in seconds, experienced due to the intersection operations. LOS definitions for signalized and unsignalized intersections are included in Table 1-1. Overall, if a given intersection's operations are better than the LOS standard for each agency with the build alternative, then that intersection is considered to meet the agency's standard and does not require mitigation. In situations where the intersection operates worse than the agency's LOS standard without the build alternative, then mitigation is only required if the intersection delay and/or LOS degrades further with the build alternative.

Table 1-1 Agency Level of Service Standards

Agency	LOS Standard
WSDOT	LOS D
Kent	LOS E
Des Moines	LOS D
Federal Way	Signalized v/c < 1.2 Unsignalized v/c < 1.0
King County	LOS E

v/c = volume-to-capacity ratio

Trip Generation

Information on 2042 trip generation for the OMF South facility will reflect employee ingress and egress and deliveries. These traffic volumes will be added to the future No-Build Alternative traffic volumes as the basis on which to analyze the project alternatives. However, employee trips to and from the facility are expected to occur outside of the peak-hour period. Therefore, traffic impacts from vehicular trips generated by the project are expected to be negligible. In locations where the facility will replace an existing land use that generates trips, the Institute of Transportation Engineers Trip Generation Manual will be used to estimate the change in peak trips for the existing land use.

Level of Service Analysis

Synchro (version 10.0) software will be used to determine the projected 2042 AM and PM peak-hour LOS at signalized and unsignalized intersections identified below, under "Intersections to be Studied." The Highway Capacity Manual (HCM) report from the Synchro software will be used to summarize average intersection delay, LOS, and critical queue lengths. The LOS at a signalized intersection will be defined in terms of average intersection delay. Delay is dependent on two factors: 1) the capacity of the intersection as defined by the number of lanes, lane widths, pedestrian volumes, and other features; and 2) signal timing. To provide consistent comparison between project alternatives, the signal timing will be optimized in the Synchro software to provide optimal levels of delay. Capacity, delay, and LOS are calculated for each traffic movement or group of traffic movements at an intersection. The weighted average delay across all traffic movements determines the overall LOS for a signalized intersection.

The LOS at an unsignalized intersection is also defined in terms of delay, but only for the approach that is stop-controlled, which is typically the minor street. For unsignalized intersections that are stop controlled on each approach, the average intersection delay is reported. LOS definitions for signalized and unsignalized intersections are provided in Table 1-2. Default values for the analysis will be developed for intersections where actual values are not available. These will include assumptions with respect to saturation flow rates, geometry, traffic, and signalization conditions.

Table 1-2 Level of Service Thresholds

LOS Rating	Average Delay for Signalized Intersections (seconds/vehicle)	Average Delay for Stop Controlled Intersections (seconds/vehicle)
A	0 – 10	0 – 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Intersections to be Studied

A preliminary list of intersection locations has been identified for analysis based on the project alternatives and associated lead track. Each of the intersections listed will be modeled for both the No Build Alternative and the project alternatives. Exhibits 1-1 and 1-2 show the locations of these intersections. The exhibits below represent a preliminary layout of the potential site locations and were developed to illustrate the intersections for analysis relative to possible site access locations. These exhibits should not be used to determine any right-of-way or other impacts.

Kent (Midway location):

- SR 99/S 240th Street
- SR 99/S 244th Street
- SR 99/Driveway (if easement pursued for access)
- SR 99/S 246th Street (if easement pursued for access)
- SR 99/S 248th Street (if access at this location)
- SR 99/S 252nd Street
- SR 99/S 260th Street
- S 252nd Street/29th Ave S (if access at this location)
- S 260th Street/29th Ave S (if access at 29th Street)

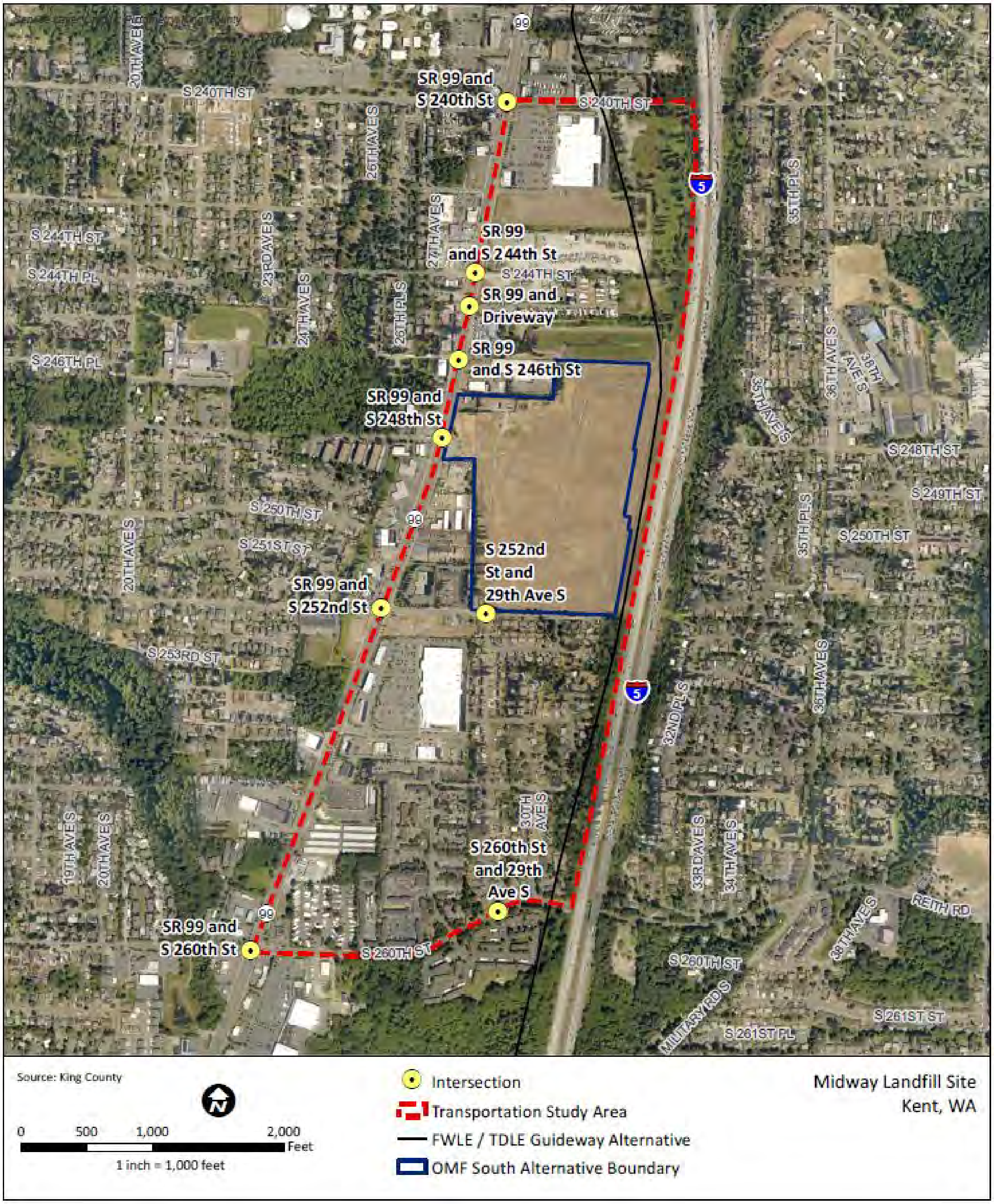

SR 99 and S 240th St
S 240TH ST
SR 99 and S 244th St
S 244TH ST
SR 99 and Driveway
SR 99 and S 246th St
SR 99 and S 248th St
S 252nd St and 29th Ave S
SR 99 and S 252nd St
S 260th St and 29th Ave S
SR 99 and S 260th St
S 260TH ST
20TH AVE S
25TH AVE S
27TH AVE S
23RD AVE S
24TH AVE S
26TH PL S
S 244TH PL
S 248TH PL
S 250TH ST
S 251ST ST
S 253RD ST
19TH AVE S
30TH AVE S
32ND PL S
33RD AVE S
34TH AVE S
35TH PL S
35TH AVE S
36TH AVE S
38TH AVE S
S 248TH ST
S 249TH ST
S 250TH ST
REITH RD
S 260TH ST
S 261ST ST
S 261ST PL
MILITARY RD S
99
5
Source: King County
0
500
1,000
2,000
Feet
1 inch = 1,000 feet
Intersection
Transportation Study Area
FWLE / TDLE Guideway Alternative
OMF South Alternative Boundary
Midway Landfill Site
Kent, WA

Exhibit 1-1 Midway Landfill Site Preliminary Study Area and Intersections

Federal Way (same intersections for both sites in Federal Way):

- S 336th Street/20th Ave S
- SR 99/S 336th Street
- SR 99/S 340th Street
- SR 99/S 341st Street
- 16th Ave S/S 341st Place
- S 341st Place/18th Ave S
- SR 99/S 344th Street
- S 344th Street/16th Ave S
- S 344th Street/18th Place S

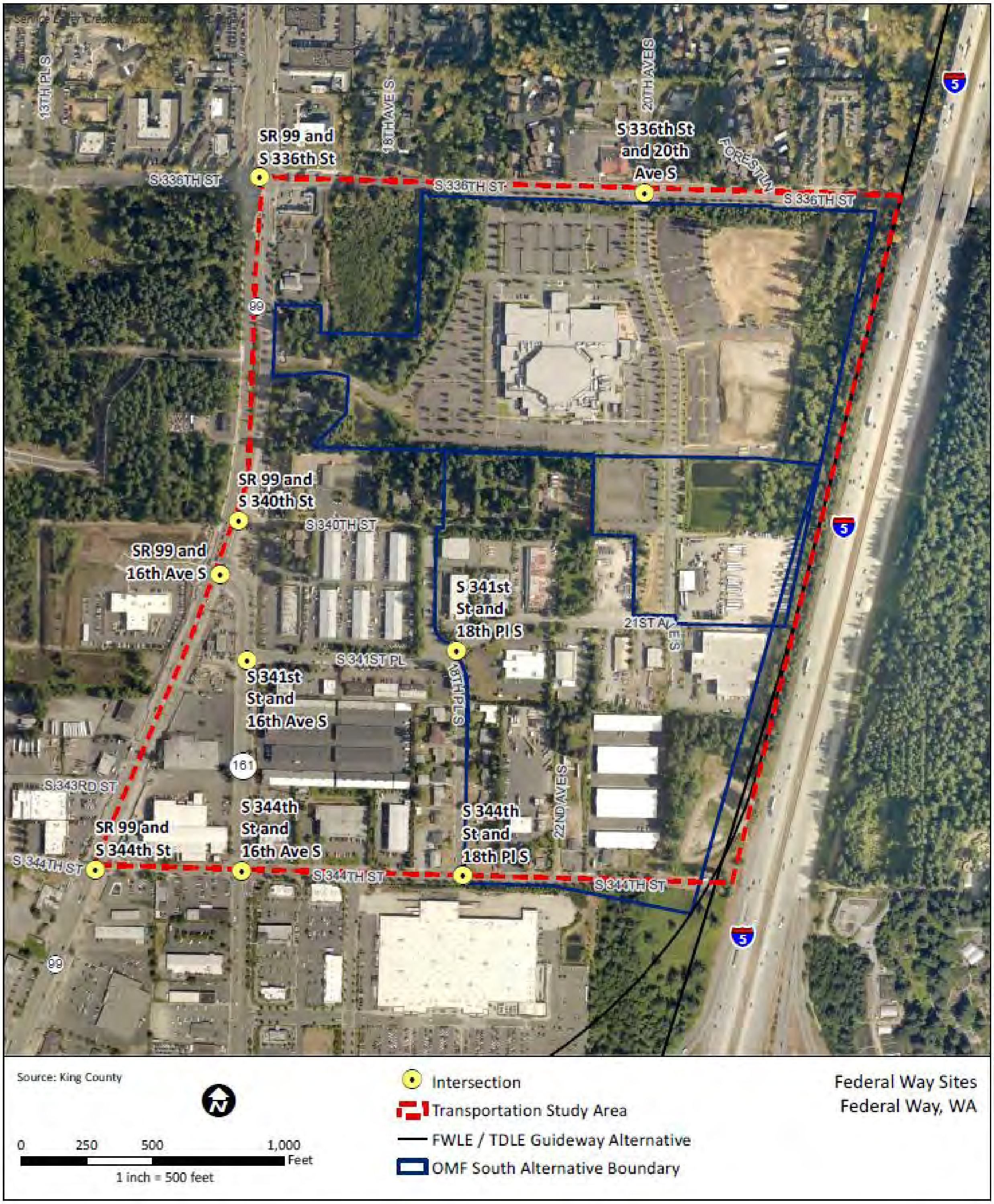

SR 99 and S 336th St
S 336th St and 20th Ave S
SR 99 and S 340th St
SR 99 and 16th Ave S
S 341st St and 18th Pl S
S 341st St and 16th Ave S
S 344th St and 16th Ave S
S 344th St and 18th Pl S
SR 99 and S 344th St
S 336TH ST
S 340TH ST
S 341ST PL
S 343RD ST
S 344TH ST
13TH PL S
18TH AVE S
20TH AVE S
21ST AVE S
22ND AVE S
18TH PL S
FOREST LN
99
161
5
Source: King County
0
250
500
1,000
Feet
1 inch = 500 feet
Intersection
Transportation Study Area
FWLE / TDLE Guideway Alternative
OMF South Alternative Boundary
Federal Way Sites
Federal Way, WA

Exhibit 1-2 Federal Way Sites Preliminary Study Area and Intersections

Property Access and Local Circulation

This area of evaluation will assess local area traffic impacts, including access to properties. The focus will be on impacts during both construction and full build out of the project (2042). The evaluation criteria will include any physical change in access to properties resulting from lead track alternative alignments. In addition to the analysis of intersection LOS and delay impacts, traffic impacts on local circulation will be assessed qualitatively.

Nonmotorized Facilities and Modes

The project alternatives will be qualitatively assessed regarding existing and future pedestrian and bicycle facilities. Specific issues to be discussed and assessed include the following:

- Direct (physical) effects on pedestrian and bicycle facilities in proximity to each project alternative and associated lead track.
- Barriers to nonmotorized (pedestrian and bicycle) traffic movement introduced by the project alternatives.

Transit

The project alternatives will be qualitatively assessed to evaluate:

- System-wide effects on regional light rail operations (e.g., service reliability).
- Local effects to bus or other rail transit services in proximity to the project alternatives.

Construction

Two primary sources of construction impacts on local traffic will be considered from a generally qualitative standpoint:

- Impacts on traffic operations, property access, and parking supply related to potential road, sidewalk, bicycle, or other transportation facility closures during construction.
- Impacts of construction-related traffic on traffic operations.

Construction traffic analysis will consider the following:

- Identification of changes in roadway capacity, including potential lane closure requirements, parking restrictions, pedestrian or bicycle facility impacts, areas of construction activity adjacent to travel lanes, or other reductions to capacity due to transit facility construction activity.
- Impacts on transit and emergency services.
- Impacts on school transportation services during construction.
- Impacts of construction-related activity on on-street parking supply.
- Identification of potential construction staging areas, including access and impact on roadway operations.
- Identification of potential construction access and truck routes and the impact of construction related traffic on these routes.
- Estimation of construction truck traffic.
- Development of mitigation measures.

The analysis will be summarized in a tabular format to identify the following:

- Impact location(s).
- Street characteristics.
- Type of construction activity, including likely duration of impact (short-term versus long-term).
- Level of construction traffic (characterized as high, moderate, or low). High truck traffic is associated with major fill, excavation, and concrete work such as with tunneling. Moderate truck traffic generally refers to activities not associated with major fill or excavation work. Low truck traffic occurs when none of the construction activities associated with moderate or high truck traffic occurs.
- Full or partial road closures.
- Availability of detour routes.
- Potential for detoured traffic to affect a residential neighborhood. This is characterized as high, medium, or low and is related to both potential for road closure and options for traffic detour.
- Loss of on-street parking. This may be characterized as “yes” for parking loss and “no” for no parking loss. Additionally, there may be some temporary loss of off-street parking due to the location and operation of construction staging, as well as construction worker parking.

Safety

Potential effects of the project on safety will be assessed qualitatively for all modes within the study area including general traffic, transit, bicycle, and pedestrian modes. The safety (accident/crash) analysis will use quantitative data to understand existing conditions and locations with potential issues to understand how future alternatives might affect those conditions. The safety analysis will be used to assess accidents currently occurring within the project limits in terms of type, cause, and frequency. Accident data from the latest 3 years will be compiled and summarized to identify any current safety deficiencies. Unique accident patterns (e.g., high frequency of a specific pattern) will be noted. The accident data will be collected for any directly affected local intersections and roadways. An intersection and roadway safety analysis will be conducted only where the project alternatives 1) include at grade lead track in semi-exclusive right-of-way, 2) include elevated track within or immediately adjacent to the road right-of-way, or 3) results in a physical change to a roadway. No accident analysis or safety conclusions for project alternatives proposed to operate outside the roadway right-of-way (exclusive right-of-way) will be conducted other than where (or if) the alternative physically changes the geometry of a roadway. Safety effects on bicycle and pedestrian travel will be assessed based on change in potential conflicts with motorized modes, as well as change in facilities provided for their travel.

1.6.2 Indirect Impacts

Indirect impacts are project effects that occur later in time or some distance from the project. Typical indirect impacts are those associated with changes in land use development patterns, typically consistent with adopted plans and zoning, and those associated with changes in transportation accessibility over time. These effects are described in the land use and specific resource reports, but the potential changes in transportation access that could lead to these effects will be discussed qualitatively.

1.6.3 Cumulative Impacts

The assessment of cumulative impacts related to transportation will include a qualitative evaluation and discussion of past, present, and reasonably foreseeable future actions that could interact with the project alternatives and that were not included in the traffic modeling. These may include, but are not limited to, consideration of effects from actions such as the following:

- Construction activities from other transportation projects that could affect or be influenced by the project construction activities.
- Local developments and public infrastructure projects that could contribute to cumulative traffic delays on local arterial streets over the construction period.

The discussion of cumulative impacts will be developed in coordination with the Federal Way Link Extension project, which is assumed to be part of the No-Build Alternative, and the Tacoma Dome Link Extension project, which is a reasonably foreseeable future project. Other projects that are reasonably foreseeable and will be considered in the cumulative impacts analysis are the SR 509 Completion project and the Federal Way City Center Access project.

1.7 Mitigation Measures

Potential mitigation measures will be described to address potential transportation impacts associated with the project alternatives.

Based on the design year (2042) traffic analysis, opportunities for mitigation of long-term impacts will be identified for intersections that do not meet the established LOS standards. These measures might include operational changes such as signal phasing or timing, or physical modification such as added lanes. For intersections that do not meet the established LOS standards in the No-Build Alternative, the project alternatives are only obligated to bring the operating conditions back to the No-Build condition. Determining if an intersection meets the agency LOS standards will be based on the conditions at each individual intersection. Mitigation measures related to other elements of the transportation analysis such as nonmotorized, parking, and safety will also be described. Mitigation measures aimed at addressing the local construction traffic impacts identified above will be developed and reviewed.

1.8 Proposed Exhibits, Maps, or Other Data

The EIS section will include exhibits illustrating LOS analysis for potentially affected intersections.

1.9 Documentation

For this element, the following documentation will be developed:

- A Transportation EIS section
- A technical report detailing the technical analyses discussed in this memorandum

1.10 Data Developed for Use by Other Disciplines

Noise Effect Analysis Data

If the project alternatives would result in roadway modifications that would increase roadway traffic capacity or move roadway travel lanes closer to sensitive receivers, the following types of data will be produced by the transportation team to support the noise effect analysis:

- AM and PM peak-hour Synchro model files for affected roadway intersections (including vehicle classes).
- The above information will be provided for existing conditions and the design year (2042).

1.11 References

King County Metro Transit. 2015. *Strategic Plan for Public Transportation, 2011–2021*. 2015 Update. Seattle, WA. April 27, 2016.

Pierce Transit. 2015. *Pierce Transit Strategic Plan 2015–2020*. Lakewood, WA. April 2015.

PSRC (Puget Sound Regional Council). 2009. *VISION 2040: The Growth Management, Environmental, Economic, and Transportation Strategy for the Central Puget Sound Region*. Seattle, WA. December 2009.

WSDOT (Washington State Department of Transportation). 2018. *Washington Transportation Plan, Phase 2—Implementation 2017–2040*. Olympia, WA. April 30, 2018.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix G2: Noise and Vibration Technical Report

SOUND TRANSIT
140A
154B
Link

Federal Transit Administration

SOUNDTRANSIT

June 2024

Summary

This technical report contains the noise and vibration impact assessment for the Central Puget Sound Regional Transit Authority (Sound Transit) Operations and Maintenance Facility South (OMF South) project. The report follows Federal Transit Administration (FTA) and Sound Transit guidance in evaluating impacts and potential mitigation measures. The FTA noise and vibration guidance has been adopted by Sound Transit in their environmental methodology to assess impacts from transit projects, regardless of the funding source. This technical report is intended to be a supplement to the noise and vibration chapter in the Final Environmental Impact Statement (EIS).

The results of the noise and vibration impact assessment indicate that there would be no FTA noise or vibration impacts from operation of any of the three OMF South alternatives. There would also be no exceedances of the Washington Administrative Code (WAC) from operation of any of the three OMF South alternatives. There would be FTA moderate noise impacts from the 55 mph Design Option for the mainline track for the Preferred or South 344th Street alternatives to the Federal Way Downtown Station. All exceedances and impacts could be mitigated through the implementation of noise barriers.

Table of Contents

1 INTRODUCTION G2-1

1.1 Project Description G2-1

2 NOISE AND VIBRATION BASICS G2-8

2.1 Noise Basics G2-8

2.2 Vibration Basics G2-10

3 IMPACT ASSESSMENT METHODOLOGY G2-12

3.1 Operational Noise Assessment Methodology G2-12
  3.1.1 OMF Site Noise Assessment Methodology G2-12
  3.1.2 Mainline and Test Track Noise Assessment Methodology G2-13
  3.1.3 Noise Measurement Procedures and Equipment Methodology G2-13

3.2 Operational Vibration Assessment Methodology G2-14
  3.2.1 Vibration Measurement Procedures Methodology G2-15

3.3 Construction Noise Assessment Methodology G2-16

3.4 Construction Vibration Assessment Methodology G2-18

4 IMPACT CRITERIA G2-19

4.1 FTA Operational Noise Impact Criteria G2-19

4.2 FTA Operational Vibration Impact Criteria G2-21

4.3 FTA Construction Noise Impact Criteria G2-24

4.4 FTA Construction Vibration Impact Criteria G2-25

4.5 Traffic Noise Criteria G2-25

4.6 Local Ordinances G2-26

5 AFFECTED ENVIRONMENT G2-27

5.1 Noise and Vibration Sensitive Land Use G2-27
  5.1.1 Preferred Alternative Site G2-27
  5.1.2 South 344th Street Alternative Site G2-27
  5.1.3 Midway Landfill Alternative G2-27
  5.1.4 Mainline Track G2-28

5.2 Existing Noise Conditions G2-28
  5.2.1 Noise Measurement Results G2-28

5.3 Existing Vibration Conditions G2-34

6 IMPACT ASSESSMENT G2-35

6.1 No-Build Alternative G2-35

6.2 Build Alternatives G2-35
  6.2.1 Preferred Alternative Site G2-36
  6.2.2 South 344th Street Alternative Site G2-37

6.2.3 Midway Landfill Alternative G2-38
6.3 Preferred and South 344th Street Alternatives Mainline and Test Track Noise G2-40
6.3.1 Traffic Noise G2-43
6.4 Vibration G2-45
6.5 Construction Noise G2-46
6.6 Construction Vibration G2-47
7 CUMULATIVE IMPACTS G2-48
8 MITIGATION G2-50
8.1 Operational Noise G2-50
8.1.1 Traffic Noise G2-51
8.2 Operational Vibration G2-51
8.3 Construction G2-53
9 REFERENCES G2-54

Figures

Figure G2.1-1 Project Vicinity: OMF South Alternatives G2-3
Figure G2.1-2 Conceptual Layout: Preferred Alternative G2-4
Figure G2.1-3 Conceptual Layout: South 344th Street Alternative G2-5
Figure G2.1-4 Conceptual Layout: Midway Landfill Alternative G2-6
Figure G2.1-5 Mainline Track Options G2-7
Figure G2.2-1 Typical A-Weighted Sound Levels G2-9
Figure G2.2-2 Typical Ldn Noise Exposure Levels G2-9
Figure G2.2-3 Typical Levels of Ground-Borne Vibration G2-11
Figure G2.3-1 Vehicle Force Density Levels at 25 mph G2-15
Figure G2.3-2 Vibration Propagation Measurement Schematic G2-16
Figure G2.4-1 FTA Noise Impact Criteria G2-20
Figure G2.4-2 FTA Cumulative Noise Impact Criteria G2-21
Figure G2.4-3 FTA Detailed Vibration Criteria G2-23
Figure G2.5-1 Measurement Locations for Existing Noise and Vibration: Preferred Alternative G2-29
Figure G2.5-2 Measurement Locations for Existing Noise and Vibration: South 344th Street Alternative G2-31
Figure G2.5-3 Measurement Locations for Existing Noise: Midway Landfill Alternative G2-33
Figure G2.6-1 Noise Impact Locations: 55 mph Design Option G2-42
Figure G2.6-2 Existing and Proposed Highway Noise Walls G2-44
Figure G2.7-1 Cumulative Transit and Traffic Noise Impacts G2-49
Figure G2.8-1 Noise Barrier Locations: 55 mph Design Option G2-52

Tables

Table G2.3-1 Construction Equipment Noise Emission Levels G2-17

Table G2.3-2 Construction Equipment Vibration Source Levels....................................G2-18

Table G2.4-1 Land Use Categories and Metrics for Transit Noise Impact Criteria G2-19

Table G2.4-2 Ground-Borne Vibration and Noise Impact Criteria for General Assessment..G2-22

Table G2.4-3 Ground-Borne Vibration and Noise Impact Criteria for Special Buildings...G2-22

Table G2.4-4 Interpretation of Vibration Criteria for Detailed Analysis G2-24

Table G2.4-5 FTA Construction Noise Criteria..G2-24

Table G2.4-6 FTA Construction Vibration Damage Criteria G2-25

Table G2.4-7 Washington State Noise Control Regulation G2-26

Table G2.4-8 Washington State Exemptions for Short-Term Noise Exceedances G2-26

Table G2.5-1 Summary of Existing Ambient Noise Measurements Results for Preferred Alternative G2-28

Table G2.5-2 Summary of Existing Ambient Noise Measurements Results for South 344th Street Alternative G2-30

Table G2.5-3 Summary of Existing Ambient Noise Measurements Results for the Midway Landfill Alternative...G2-32

Table G2.5-4 Summary of Existing Ambient Noise Measurements Results for Mainline Track Options G2-34

Table G2.6-1 Summary of FTA Category 2 Noise Impacts for the Preferred Alternative Site G2-36

Table G2.6-2 Summary of FTA Category 3 Noise Impacts for the Preferred Alternative Site..G2-36

Table G2.6-3 Summary of WAC Nighttime Noise Exceedances for the Preferred Alternative Site..G2-37

Table G2.6-4 Summary of FTA Category 2 Noise Impacts for the South 344th Street Alternative Site G2-37

Table G2.6-5 Summary of FTA Category 3 Noise Impacts for the South 344th Street Alternative Site G2-38

Table G2.6-6 Summary of WAC Nighttime Noise Exceedances for the South 344th Street Alternative Site G2-38

Table G2.6-7 Summary of FTA Category 2 Noise Impacts for the Midway Landfill Alternative...G2-39

Table G2.6-8 Summary of FTA Category 3 Noise Impacts for the Midway Landfill Alternative...G2-39

Table G2.6-9 Summary of WAC Nighttime Noise Exceedances for the Midway Landfill Alternative...G2-39

Table G2.6-10 Summary of FTA Category 2 Noise Impacts for the 40 mph Alignment Mainline Track...G2-40

Table G2.6-11 Summary of FTA Category 2 Noise Impacts: 55 mph Design Option Mainline Track G2-41

Table G2.6-12 Summary of FTA Category 2 Vibration Impacts for the 40 mph Alignment Mainline Track G2-45
Table G2.6-13 Summary of FTA Category 2 Vibration Impacts for the 55 mph Design Option Mainline Track G2-45
Table G2.6-14 Typical Construction Scenario, At-Grade Track G2-47
Table G2.6-15 Summary of Potential Construction Vibration Impacts G2-47
Table G2.8-1 Summary of Potential Noise Barrier Locations G2-51

Attachments

Attachment G2-1 Measurement Site Photographs

Attachment G2-2 Noise Measurement Data

Attachment G2-3 Vibration Measurement Data

Acronyms and Abbreviations

Belmor	Belmor Mobile Home Park
dB	decibel
dBA	A-weighted decibel
EIS	environmental impact statement
FDL	force density level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FWLE	Federal Way Link Extension
GIS	geographic information system
Hz	Hertz
I-5	Interstate 5
in/sec	inches per second
Ldn	day-night sound level
Leq	equivalent sound level
Lmax	maximum noise level
Ln	sound level exceeded n-percent of the time
LRV	light rail vehicle
LSTM	line source transfer mobility
Lv	vibration level
mph	miles per hour
NAC	noise abatement criteria
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
PPV	peak particle velocity
RMS	root mean square
SEL	sound exposure level
Sound Transit	Central Puget Sound Regional Transit Authority
Sound Transit 3	Sound Transit 3: The Regional Transit System Plan for Central Puget Sound
TDLE	Tacoma Dome Link Extension
U.F.	usage factor
VdB	vibration decibel
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

This technical report contains the noise and vibration impact assessment for the Central Puget Sound Regional Transit Authority (Sound Transit) Operations and Maintenance Facility South (OMF South) project. The report follows Federal Transit Administration (FTA) and Sound Transit policies and practices in evaluating impacts and potential mitigation measures. The FTA noise and vibration guidance is used by Sound Transit in their environmental methodology to assess impacts from transit projects.

The report includes a description of the existing noise and vibration conditions near the project alternatives, the noise and vibration assessment for sensitive receptors near the three OMF South alternatives, the noise and vibration assessment for the two mainline track options from the Preferred and the South 344th Street alternatives to the Federal Way Downtown Station, and mitigation options for impacts identified in the assessment.

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility in its South Corridor (OMF South) to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy approximately144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

Three site alternatives for the proposed project are evaluated in the Final EIS: two in Federal Way and one in Kent (Figure G2.1-1). These alternatives are named the Preferred Alternative (referred to as the South 336th Street Alternative in the 2021 Draft EIS), the South 344th Street Alternative, and the Midway Landfill Alternative, respectively.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which in southern King County is the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by alternative. The Preferred Alternative would require the construction of approximately 1.4 miles of mainline tracks and the South 344th Street Alternative would require approximately 1.8 miles of mainline tracks. The Midway Landfill Alternative is adjacent to FWLE and would connect by lead tracks directly to the FWLE mainline tracks. The Preferred and South 344th Street alternative mainlines include tail tracks that extend approximately 1,000 feet past the site to allow trains to turn around and access the site from the south if the northern lead tracks were out of service.

The Preferred and South 344th Street alternative would also include a test track to prepare new vehicles for service. The test track would run east of and parallel to the mainline connecting the sites to FWLE. (Figures G2.1-2 and G2.1-3). Figure G2.1-5 shows the mainline track options. The Midway Landfill Alternative would not include a test track because the varying grades of the existing mainline tracks make it infeasible. Due to this, this analysis assumes that LRV testing would occur on the mainline tracks.

In addition to the features identified above, the Preferred Alternative includes the extension of 18th Place S between S 340th Street and S 336th Street to replace the functions of 20th Avenue S, which would be vacated, and the extension of 21st Ave S south to S 344th Street to meet Federal Way code requirements.

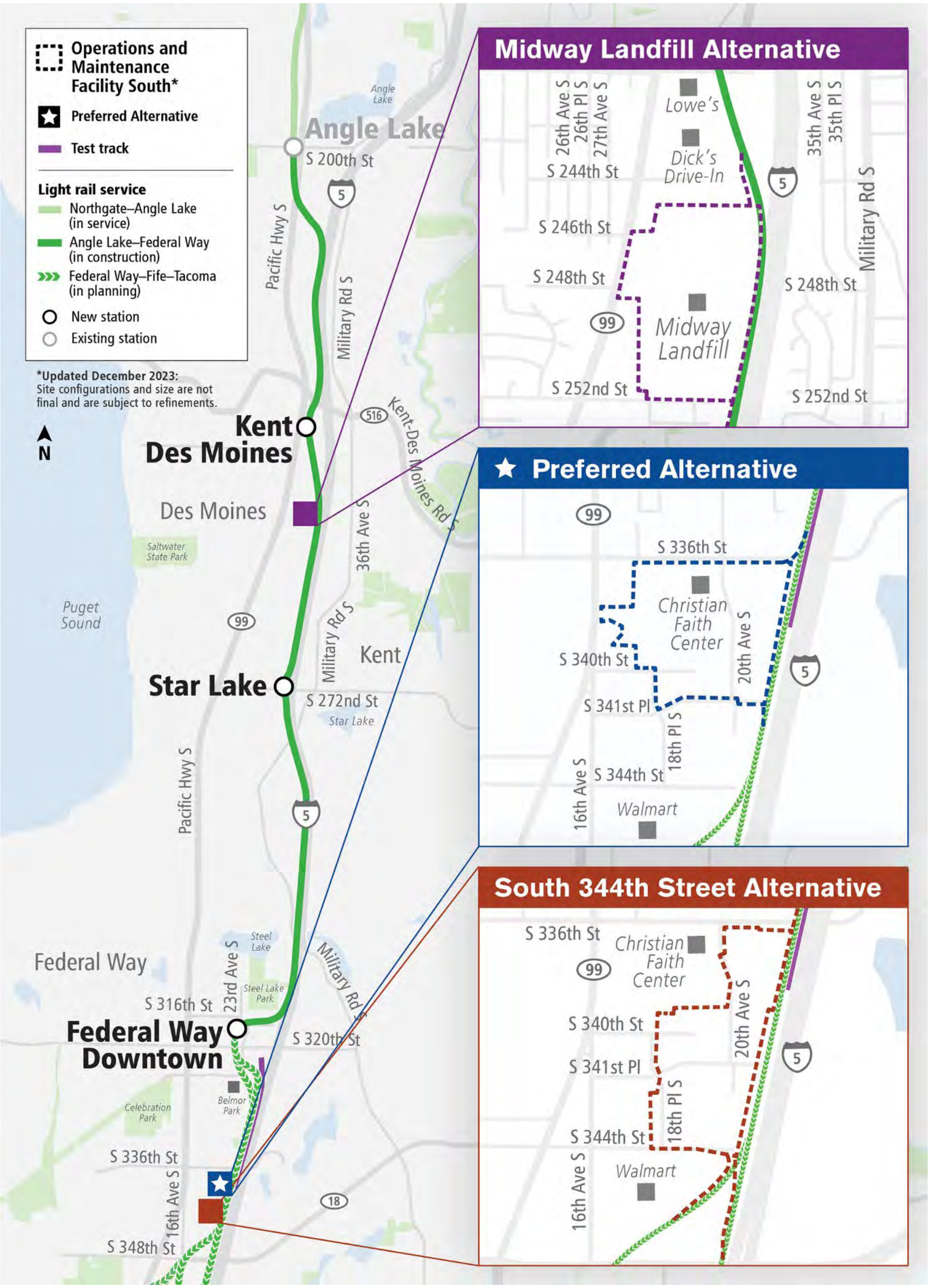
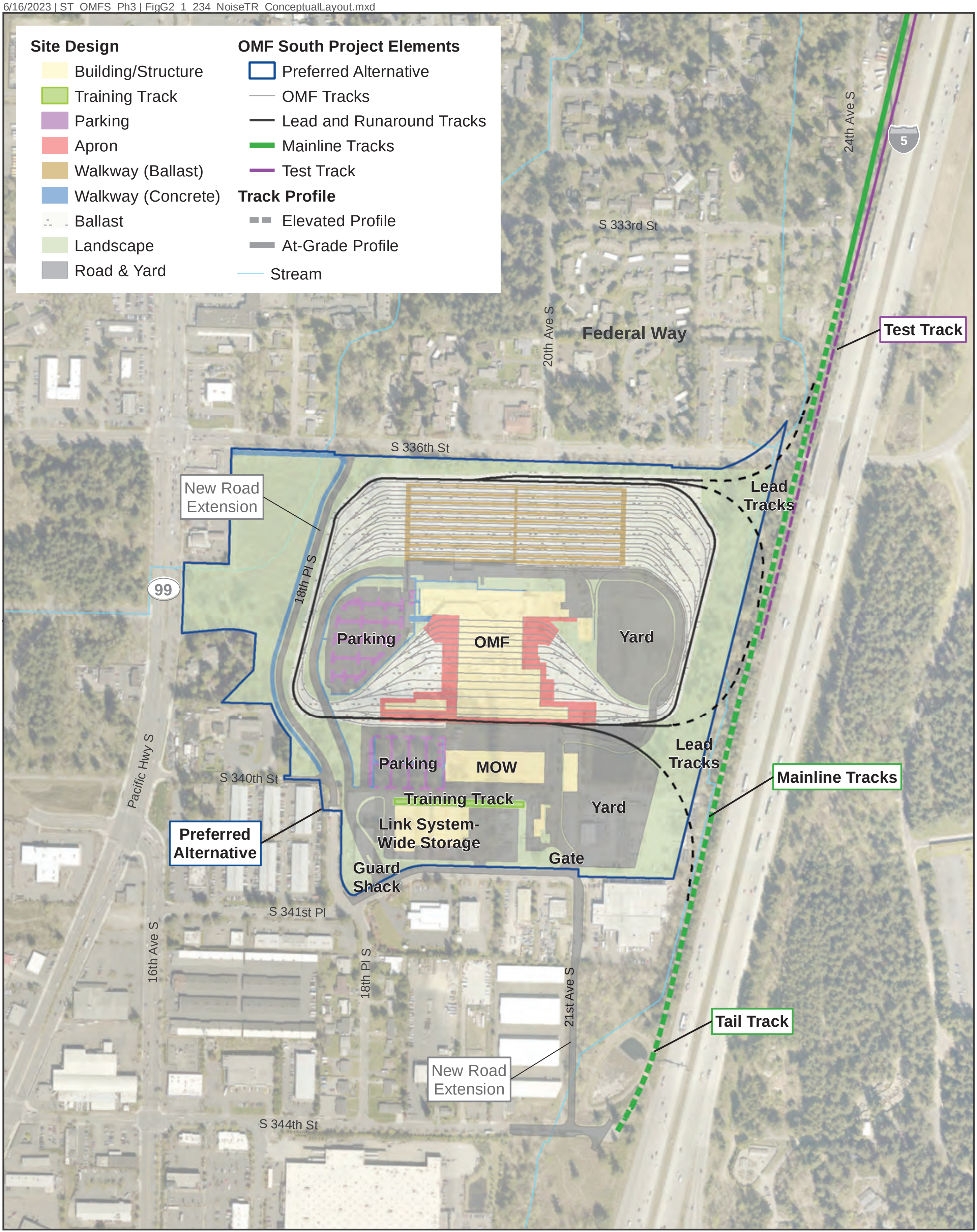

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
S 200th St
Kent Des Moines
Des Moines
Star Lake
Kent
Federal Way Downtown
Federal Way
Puget Sound
Midway Landfill Alternative
Preferred Alternative
South 344th Street Alternative
Christian Faith Center
Walmart
Lowe's
Dick's Drive-In
Midway Landfill

Figure G2.1-1 Project Vicinity: OMF South Alternatives

6/16/2023 | ST_OMFS_Ph3 | FigG2_1_234_NoiseTR_ConceptualLayout.mxd


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
24th Ave S
5
S 333rd St
Federal Way
20th Ave S
Test Track
S 336th St
New Road Extension
Lead Tracks
99
18th Pl S
Parking
OMF
Yard
Pacific Hwy S
S 340th St
Parking
MOW
Lead Tracks
Mainline Tracks
Training Track
Yard
Preferred Alternative
Link System-Wide Storage
Gate
Guard Shack
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

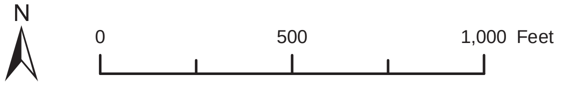
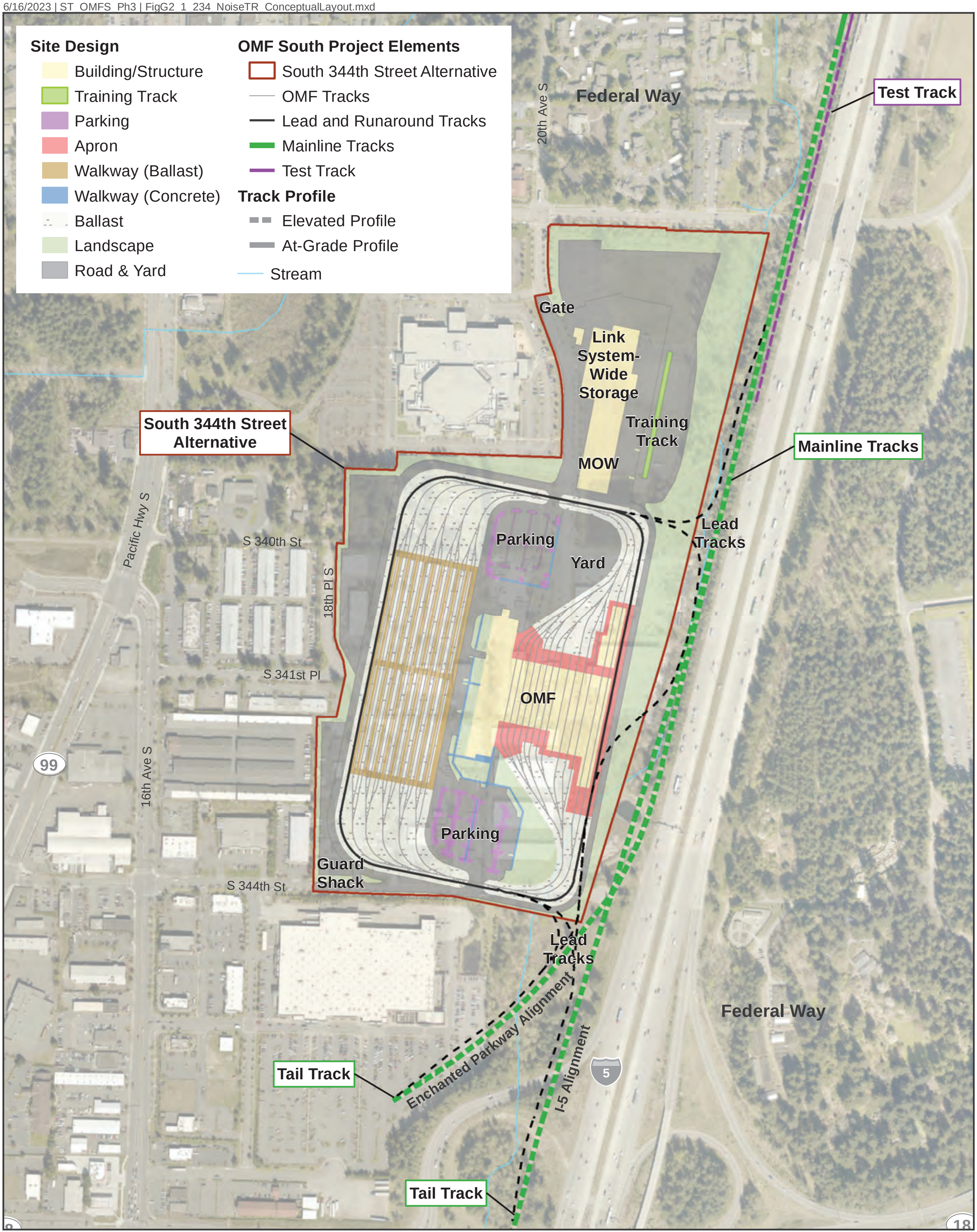

N
0
500
1,000 Feet

FIGURE G2.1-2
Conceptual Layout
Preferred Alternative

OMF South


Site Design
🟨 Building/Structure
🟩 Training Track
🟪 Parking
🟥 Apron
🟫 Walkway (Ballast)
🟦 Walkway (Concrete)
Ballast
Landscape
⬜ Road & Yard
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
Federal Way
20th Ave S
Test Track
Gate
Link System-Wide Storage
Training Track
MOW
South 344th Street Alternative
Mainline Tracks
Lead Tracks
Parking
Yard
Pacific Hwy S
S 340th St
18th Pl S
OMF
S 341st Pl
99
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
Enchanted Parkway Alignment
Federal Way
Tail Track
I-5 Alignment
5
Tail Track
18
N
0
500
1,000 Feet

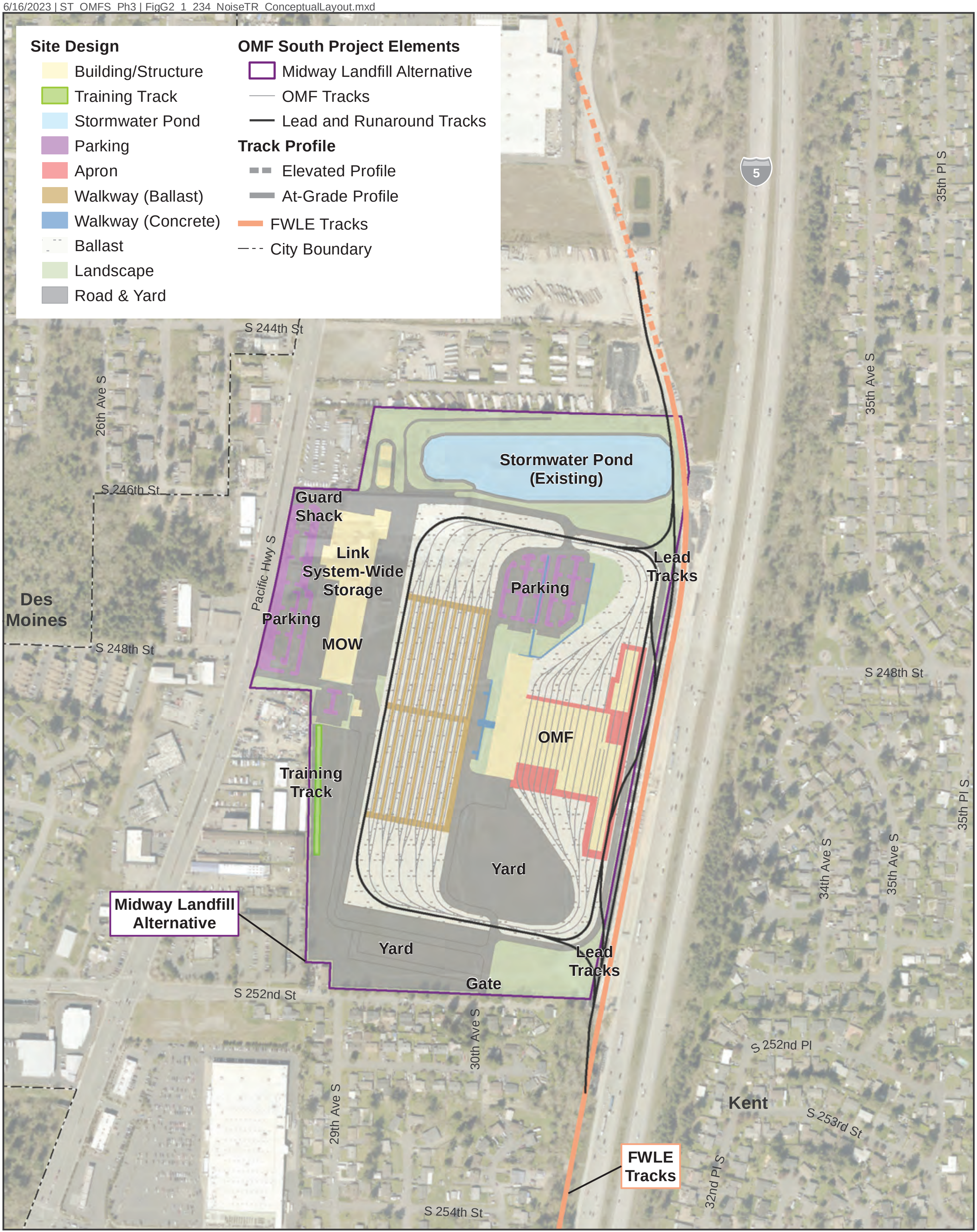
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G2.1-3

Conceptual Layout
South 344th Street Alternative

OMF South

6/16/2023 | ST OMFS Ph3 | FigG2 1 234 NoiseTR ConceptualLayout.mxd

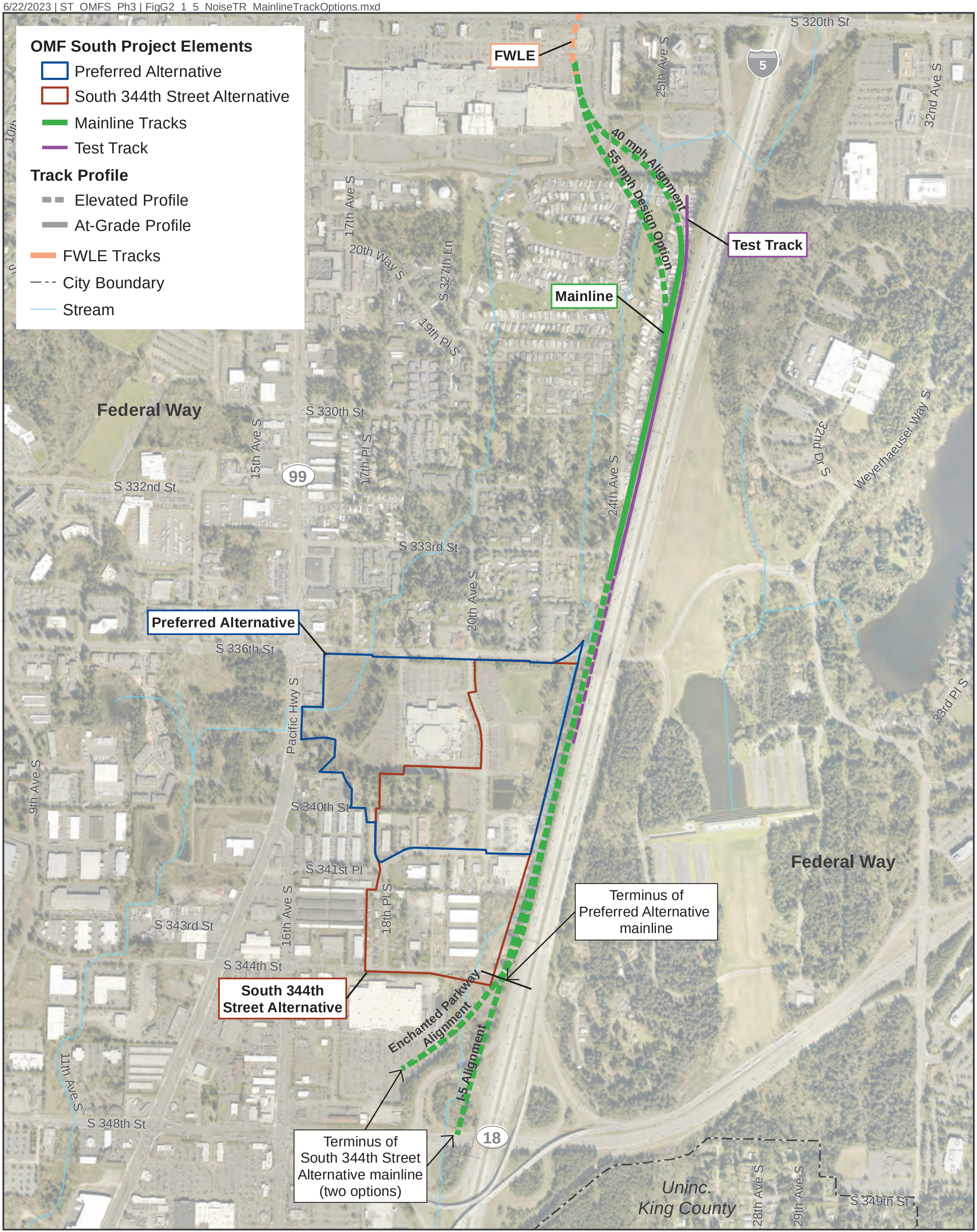

Site Design
Building/Structure
Training Track
Stormwater Pond
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
OMF South Project Elements
Midway Landfill Alternative
OMF Tracks
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
5
35th Pl S
S 244th St
26th Ave S
35th Ave S
Stormwater Pond (Existing)
S 246th St
Guard Shack
Link System-Wide Storage
Pacific Hwy S
Parking
Lead Tracks
Des Moines
Parking
S 248th St
MOW
S 248th St
OMF
Training Track
35th Pl S
Yard
34th Ave S
35th Ave S
Midway Landfill Alternative
Yard
Lead Tracks
Gate
S 252nd St
30th Ave S
S 252nd Pl
29th Ave S
Kent
S 253rd St
FWLE Tracks
32nd Pl S
S 254th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G2.1-4
Conceptual Layout
Midway Landfill Alternative

OMF South


OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
S 320th St
5
25th Ave S
32nd Ave S
10th
40 mph Alignment
55 mph Design Option
Test Track
Mainline
17th Ave S
20th Way S
S 327th Ln
19th Pl S
Federal Way
S 330th St
15th Ave S
17th Pl S
99
S 332nd St
32nd Dr S
Weyerhaeuser Way S
24th Ave S
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
Pacific Hwy S
33rd Pl S
9th Ave S
S 340th St
S 341st Pl
Federal Way
Terminus of Preferred Alternative mainline
16th Ave S
18th Pl S
S 343rd St
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 348th St
18
Terminus of South 344th Street Alternative mainline (two options)
Uninc. King County
28th Ave S
29th Ave S
S 349th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

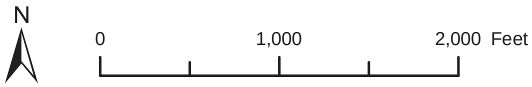

N
0
1,000
2,000 Feet

FIGURE G2.1-5

Mainline Track Options

Preferred and South 344th Street Alternatives

OMF South

2 NOISE AND VIBRATION BASICS

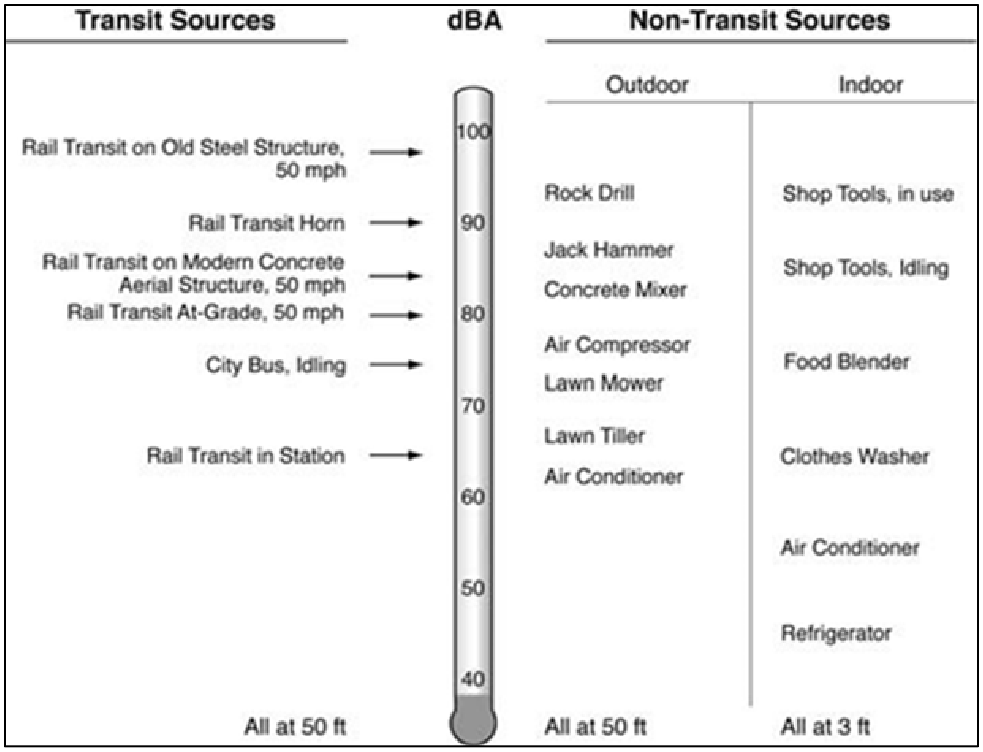
2.1 Noise Basics

Sound is defined as small changes in air pressure above and below the standard atmospheric pressure, and noise is usually considered to be unwanted sound. The three parameters that define noise include:

- **Level:** The level of sound is the magnitude of air pressure change above and below atmospheric pressure and is expressed in decibels (dB). Typical sounds fall within a range between 0 dB (the approximate lower limit of human hearing) and 120 dB (the highest sound level generally experienced in the environment). A 3-dB change in sound level is perceived as a barely noticeable change outdoors, and a 10-dB change in sound level is perceived as a doubling (or halving) of loudness.
- **Frequency:** The frequency (pitch or tone) of sound is the rate of air pressure change and is expressed in cycles per second, or Hertz (Hz). Human ears can detect a wide range of frequencies from around 20 Hz to 20,000 Hz; however, human hearing is not as sensitive at high and low frequencies, and the A-weighting system, which measures what humans hear in a more meaningful way by reducing the sound levels of higher- and lower-frequency sounds, is used to provide a measure (dBA) that correlates with human response to noise. Figure G2.2-1 shows typical maximum A-weighted sound levels for transit and non-transit sources. The A-weighted sound level has been widely adopted by acousticians as the most appropriate descriptor for environmental noise.
- **Time Pattern:** Because environmental noise is constantly changing, it is common to condense all of this information into a single number, called the equivalent sound level (Leq). The Leq represents the changing sound level over a period of time, typically 1 hour or 24 hours in transit noise assessments. For assessing the noise impact of rail projects at residential land uses, the day-night sound level (Ldn) is the noise descriptor commonly used, and it has been adopted by many agencies as the best way to describe how people respond to noise in their environment. Ldn is a 24-hour cumulative A-weighted noise level that includes all noises that occur during a day, with a 10-dB penalty for nighttime noise (10 p.m. to 7 a.m.). This nighttime penalty means that any noise events at night are equivalent to 10 similar events during the day.

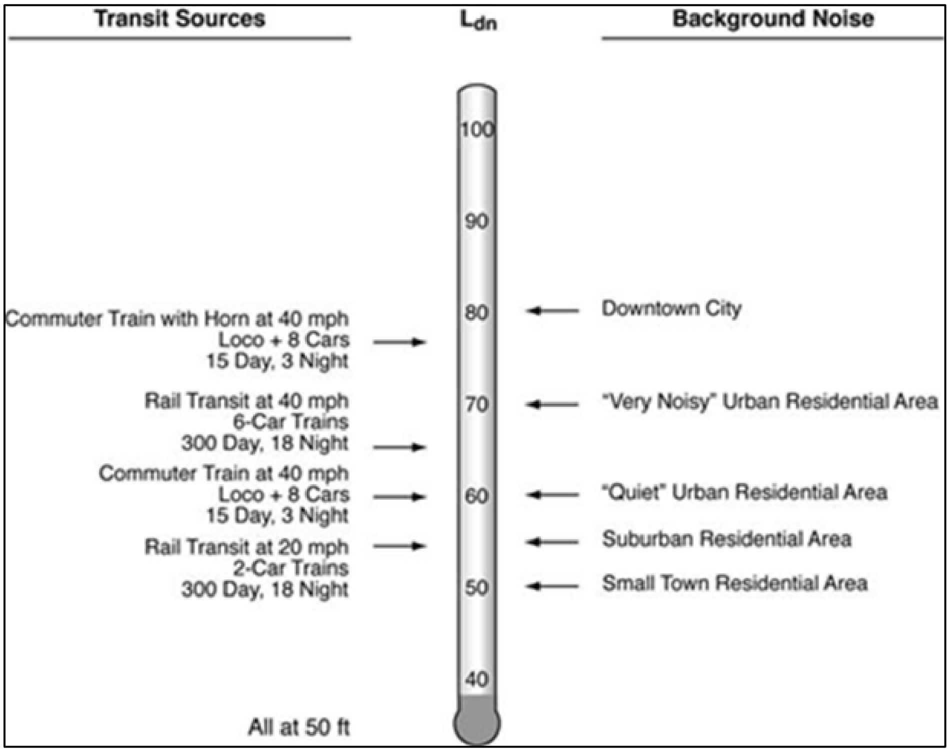
Typical Ldn values for various transit operations and environments are shown on Figure G2.2-2.

In addition to the Leq and Ldn, there are other metrics used to describe noise. The loudest 1 second of noise over a measurement period, or maximum A-weighted sound level (Lmax), is used in many local and state ordinances for noise emitted from private land uses and for construction noise impact evaluations. Environmental noise can also be viewed on a statistical basis using percentile sound levels (Ln), which refer to the sound level exceeded n-percent of the time.


Transit Sources
dBA
Non-Transit Sources
Outdoor
Indoor
Rail Transit on Old Steel Structure, 50 mph
Rail Transit Horn
Rail Transit on Modern Concrete Aerial Structure, 50 mph
Rail Transit At-Grade, 50 mph
City Bus, Idling
Rail Transit in Station
100
90
80
70
60
50
40
Rock Drill
Jack Hammer
Concrete Mixer
Air Compressor
Lawn Mower
Lawn Tiller
Air Conditioner
Shop Tools, in use
Shop Tools, Idling
Food Blender
Clothes Washer
Air Conditioner
Refrigerator
All at 50 ft
All at 50 ft
All at 3 ft

Source: FTA 2018

Figure G2.2-1 Typical A-Weighted Sound Levels


Transit Sources
Ldn
Background Noise
100
90
80
70
60
50
40
Commuter Train with Horn at 40 mph Loco + 8 Cars 15 Day, 3 Night
Rail Transit at 40 mph 6-Car Trains 300 Day, 18 Night
Commuter Train at 40 mph Loco + 8 Cars 15 Day, 3 Night
Rail Transit at 20 mph 2-Car Trains 300 Day, 18 Night
Downtown City
"Very Noisy" Urban Residential Area
"Quiet" Urban Residential Area
Suburban Residential Area
Small Town Residential Area
All at 50 ft

Source: FTA 2018

Figure G2.2-2 Typical Ldn Noise Exposure Levels

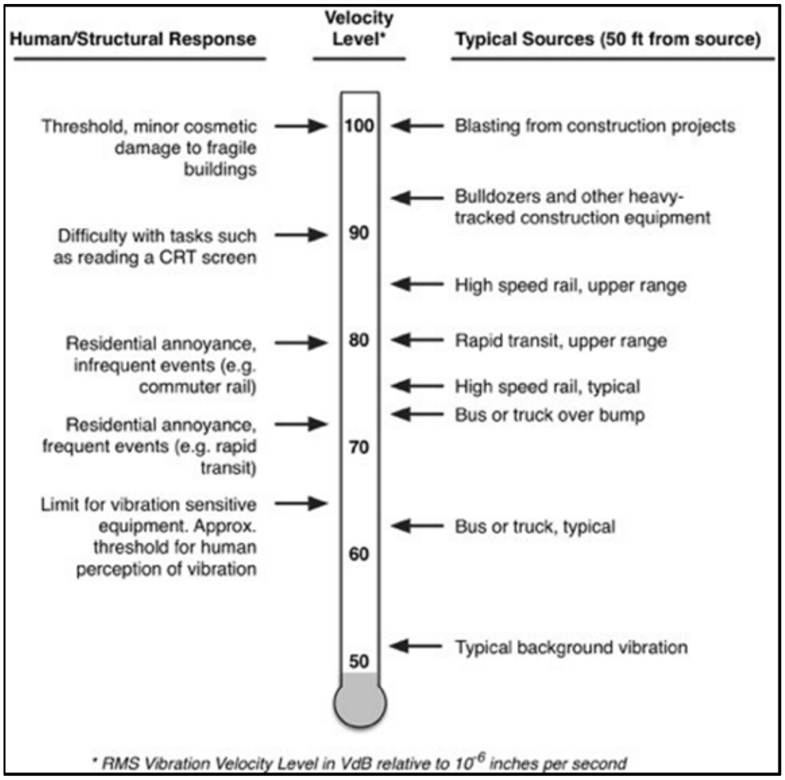
2.2 Vibration Basics

Ground-borne vibration from trains refers to the fluctuating or oscillatory motion experienced by persons on the ground and in buildings near railroad tracks. Vibration can be described in terms of displacement, velocity, or acceleration. Displacement is generally the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. Velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. Although displacement is easier to understand, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

Two methods are used for quantifying vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV often is used in the monitoring of blasting vibration, since it is related to the stresses experienced by buildings. Although PPV is appropriate for evaluating the potential of building damage, it is not suitable for evaluating human response. It takes some time for the human body to respond to vibration impulses. In a sense, the human body responds to an average of the vibration amplitude. Because the net average of a vibration signal is zero, the root mean square (RMS) amplitude is used to describe the "smoothed" vibration amplitude.

PPV and RMS velocities are normally described in inches per second in the U.S. and in meters per second in the rest of the world. Decibel notation is in common use for vibration and has been adopted by the FTA in their guidance. Decibel notation compresses the range of numbers required to describe vibration. Vibration levels in this report are referenced to 1 x 10^{-6} inches per second (in/sec). The abbreviation “VdB” is used in this document for vibration decibels to reduce the potential for confusion with sound decibels. Common vibration sources and human and structural response to ground-borne vibration are illustrated in Figure G2.2-3. Typical vibration levels can range from below 50 VdB to 100 VdB (0.000316 in/sec to 0.1 in/sec). The human threshold of perception is approximately 65 VdB.

Ground-borne vibration can lead to ground-borne noise, which is a low-volume, low-frequency rumble inside buildings, resulting when ground vibration causes the flexible walls of the building to resonate and generate noise. Ground-borne noise is normally not a consideration when trains are elevated or at grade. In these situations, the airborne noise usually overwhelms ground-borne noise, so the airborne noise level is the major consideration. However, ground-borne noise becomes an important consideration where there are sections of the corridor that are in a tunnel or where sensitive interior spaces are well isolated from the airborne noise. In these situations, airborne noise is not a major path and ground-borne noise becomes the most important path into the building. In unusual situations, ground-borne noise may also need to be considered in cases where the airborne noise from a project is mitigated by a sound wall.


Human/Structural Response
Velocity Level*
Typical Sources (50 ft from source)
Threshold, minor cosmetic damage to fragile buildings
Difficulty with tasks such as reading a CRT screen
Residential annoyance, infrequent events (e.g. commuter rail)
Residential annoyance, frequent events (e.g. rapid transit)
Limit for vibration sensitive equipment. Approx. threshold for human perception of vibration
100
90
80
70
60
50
Blasting from construction projects
Bulldozers and other heavy-tracked construction equipment
High speed rail, upper range
Rapid transit, upper range
High speed rail, typical
Bus or truck over bump
Bus or truck, typical
Typical background vibration
* RMS Vibration Velocity Level in VdB relative to 10^{-6} inches per second

Source: FTA 2018

Figure G2.2-3 Typical Levels of Ground-Borne Vibration

3 IMPACT ASSESSMENT METHODOLOGY

Noise and vibration from facility and mainline track operations were modeled using the methods described in the FTA guidance manual. Noise-generating activities would include vehicles moving within the OMF South facility, vehicle washing and drying, a traction power substation, vehicles moving on the mainline track (for the Preferred Alternative and the 344th Street Alternative) into service in the morning and back to the facility in the late evening, and operations on the test track. The only activity that would generate vibration would be LRVs moving on the mainline and test track options for the Preferred and the South 344th Street alternatives. The assessment described below, including all operational assumptions, is for the OMF South project only, and does not include the Tacoma Dome Link Extension (TDLE) project, which will be assessed in a separate EIS. Anticipated noise impacts from TDLE are discussed in the cumulative impacts section.

3.1 Operational Noise Assessment Methodology

3.1.1 OMF Site Noise Assessment Methodology

The OMF South noise assessment methodology was identical for each of the three alternatives. The reference noise levels were taken from the OMF East noise and vibration technical report (Sound Transit 2015), the FTA guidance manual, and the Sound Transit reference noise and vibration level report. The assessment assumes that the majority of the operations activities occur at night, when the LRVs are not in revenue service. The noise assessment includes the following assumptions:

- For the Preferred and South 344th Street alternatives, 104 LRVs would be based at the facility; 26 four-car LRVs would depart to the north before 7 a.m. and return after midnight. With the inclusion of TDLE, the number of LRVs based at the facility would increase to approximately 144; operations would also increase. The results of that assessment are covered in Section 7, Cumulative Impacts.
- For the Midway Landfill Alternative, 104 LRVs would be based at the facility; 13 four-car LRVs would depart to the north and 13 four-car LRVs would depart to the south before 7 a.m. and return after midnight. With the inclusion of TDLE, the number of LRVs based at the facility would increase to approximately 144; operations would also increase. The results of that assessment are covered in Section 7, Cumulative Impacts.
- LRVs would travel at 7 mph within the boundaries of the site. A four-car LRV traveling at 7 mph on ballast and tie tracks would generate a sound exposure level of 77.2 dBA at 50 feet.
- All LRVs would be washed each night inside the wash building. Each four-car train takes approximately 10 minutes to be washed, and the maximum noise level for the washers is 74 dBA at 50 feet from the blower end of the wash facility (Sound Transit 2015).
- Maintenance activities would take place inside the shop building and would not generate substantial noise levels.
- Wheel squeal is possible on curves with a radius of less than 600 to 1,000 feet depending on the speed and type of trackway. Wheel squeal is not included in the noise model because Sound Transit has committed to reducing any potential wheel squeal by installing wayside lubricators on all curves in noise-sensitive areas with a radius of less than 600 feet and by preparing all curves for wayside lubricators that have a radius of between 600 and 1,000 feet.

- The slow speeds within the OMF South alternatives would reduce any impact noise associated with crossovers within the facility. Crossovers connecting to the mainline tracks would have higher speed operations and the potential for additional noise from vehicles traveling over them.
- Limited testing of LRV train-mounted bells or horns would occur during the daytime.
- The traction power substation would generate a maximum noise level of 49 dBA at a distance of 50 feet and would operate 24 hours per day (Sound Transit 2015).

3.1.2 Mainline and Test Track Noise Assessment Methodology

For the Preferred and the South 344th Street alternatives, trains would depart to the north on the mainline track to the Federal Way Downtown Station. The projection of noise levels from light rail operations at sensitive receptors was determined using the model specified in the FTA guidance manual and current design of the proposed project, with the following assumptions:

- For the Preferred and South 344th Street alternatives, 26 four-car LRVs would depart on the mainline track to the north before 7 a.m. and return after midnight.
- For the test track, eight one-car LRVs would make roundtrips per hour for 4 hours during the daytime and 6 hours during the nighttime.
- LRV train speeds will be 25 mph on the mainline track and 55 mph on the test track.
- The sound exposure level (SEL) for four-car LRV trains on at-grade ballast and tie tracks traveling at 25 mph would be 82.7 dBA at 50 feet (Sound Transit 2019).
- The SEL for one-car LRV trains on at-grade ballast and tie tracks traveling at 55 mph would be 80.1 dBA at 50 feet (Sound Transit 2019).
- The SEL for one- and four-car LRV trains on direct fixation tracks on a concrete structure are increased by 4 dB relative to ballast and tie tracks (Sound Transit 2019).
- Locations of elevated structures, crossovers, and ballast and tie track were identified based on plan and profile maps provided. No crossovers are located on the mainline track other than where they connect with the lead track and test track.

3.1.3 Noise Measurement Procedures and Equipment Methodology

The noise measurement program consisted of long-term (24-hour) monitoring of the A-weighted sound level. All the measurement sites were located in or near noise-sensitive areas and were selected to represent a range of existing noise conditions near the OMF South alternatives and mainline track. Long-term noise measurements were conducted at eight locations near the three alternatives and mainline track. The noise measurement locations are shown in Figures G2.5-1 through G2.5-3, photographs of the measurement sites are included in Attachment G2-1, and detailed noise measurement data are presented in Attachment G2-2. Summary information regarding the noise measurements for each OMF South alternative and the mainline track is presented below in Sections 5.2.1.1 through 5.2.1.4.

At each of the measurement sites, the A-weighted sound levels were continuously monitored during the measurement periods. The noise measurements were performed with NTi Audio Model XL2 noise monitors that conform to American National Standards Institute Standard S1.4 for Type 1 (Precision) sound level meters. Calibrations, traceable to the U.S. National Institute of Standards and Technology, were carried out in the field before and after each set of measurements using an acoustical calibrator.

In all cases, the measurement microphone was protected by a windscreen and supported on a tripod at a height of 4 to 6 feet above the ground and was positioned to characterize the exposure of the site to the dominant noise sources in the area. For example, microphones were located at the approximate setback lines of the receptors from adjacent roads and were positioned to avoid acoustic shielding by landscaping, fences, or other obstructions.

3.2 Operational Vibration Assessment Methodology

The projection of ground-borne vibration from train operations was carried out using the model specified in the FTA guidance manual, supplemented by LRV vibration measurement data provided by Sound Transit, with the following assumptions:

- For the Preferred and South 344th Street alternatives, 26 four-car LRVs would depart on the mainline track options to the north before 7 a.m. and return after midnight.
- Vibration source (force density) levels were based on test data provided in the Sound Transit reference noise and vibration level report for both ballast and tie tracks and direct fixation tracks. The vehicle force density includes a 3 VdB safety factor.
- A vibration propagation test was conducted at a location near the mainline track options, as described in Section 3.2.1. The result of this test was combined with the LRV vibration source level measurement data to provide projections of vibration levels from trains operating on the mainline track. For the impact assessment, a 3 VdB safety factor has been added to the vibration test results.
- Vehicle operating speeds on the mainline track would be 25 mph and 55 mph on the test track.
- Locations of elevated structures, crossovers, and ballast and tie track were identified based on plan and profile maps.
- Vibration levels are reduced by 10 VdB for operations on elevated structures.

The assumed vehicle vibration characteristics are represented by the force density levels (FDL) spectra at 25 mph in Figure G2.3-1 for both ballast and tie tracks and direct fixation tracks. The force density is the vehicle input force, by frequency, which is measured for vehicles operating on different track structures. The results were combined with the ground vibration propagation test results (represented by transfer mobility spectra shown in Attachment G2-3) to project vibration levels as a function of distance. The formula for calculating the future vibration levels is as follows:

$$Lv = FDL + LSTM$$

Where:

Lv = projected train vibration level,
FDL = vehicle force density, and
LSTM = line source transfer mobility at a given site.

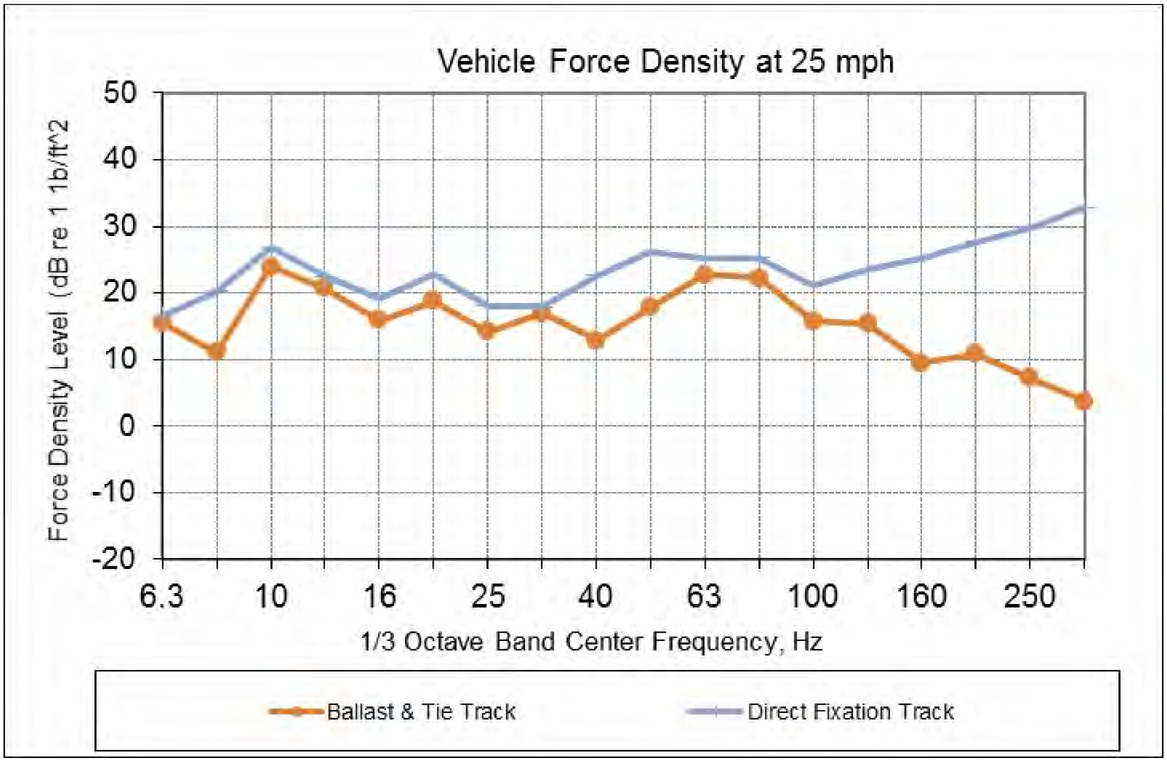


Figure G2.3-1 Vehicle Force Density Levels at 25 mph

3.2.1 Vibration Measurement Procedures Methodology

A vibration propagation measurement was conducted during November 2019 to determine the vibration response characteristics of the ground near vibration-sensitive locations close to the proposed mainline track design options. A custom-built instrumented hammer was used to impart an impulsive force to the ground to determine the ground response. The magnitude of the force was calculated based on the acceleration and mass of the falling hammer. The resulting vibration signals were measured using high-sensitivity accelerometers (PCB Models 393C and 393B05) mounted in a vertical direction on pavement or on steel spikes driven into the ground. The signals from the hammer and accelerometers were recorded using Data Translation DT9837A digital acquisition hardware. Data Translation's QuickDAQ software, running on a laptop computer, was used to review the measurement data.

The vibration propagation test procedure is shown schematically in Figure G2.3-2. The instrumented hammer was used to generate impulses at specific locations spaced 15 feet apart along a line on or parallel to the proposed alignment. A line of accelerometers was placed perpendicular to the line of impacts, as shown in the figure. The relationship between the input force and the resulting vibration measured by the accelerometers, called the transfer mobility, was calculated using proprietary software in the Cross-Spectrum Acoustics laboratory. The transfer mobility represents the vibration propagation characteristics of the ground at the measurement site and along the mainline track design options.

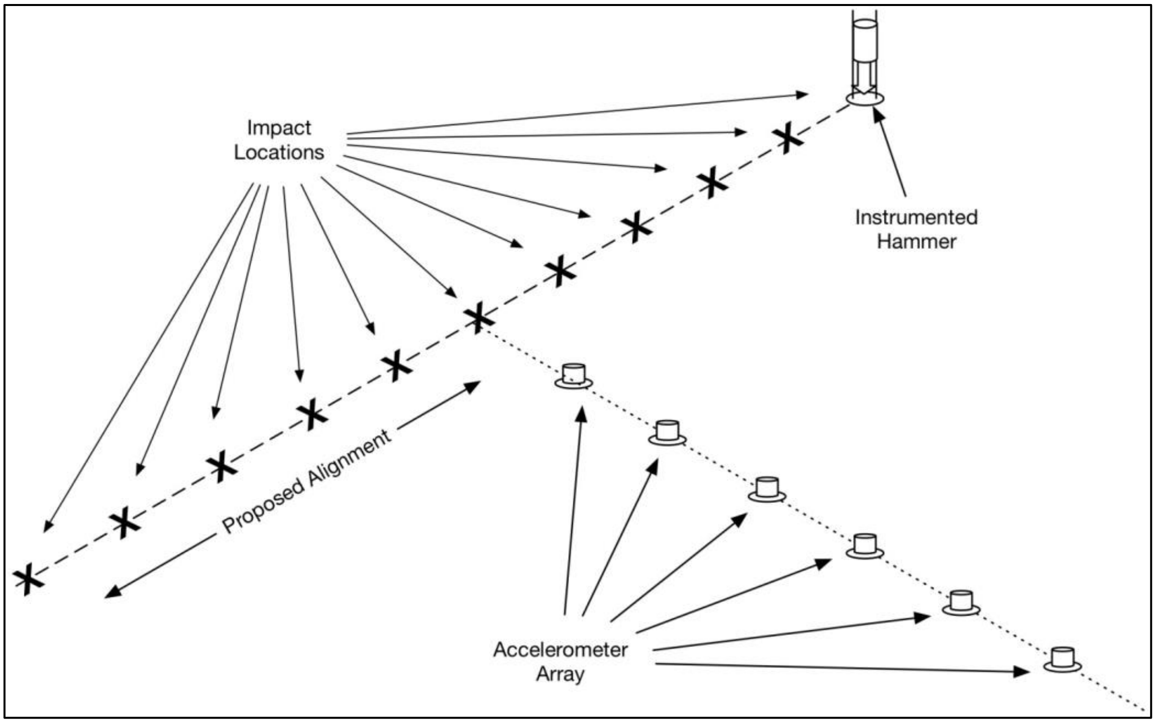


Figure G2.3-2 Vibration Propagation Measurement Schematic

3.3 Construction Noise Assessment Methodology

Construction noise and impacts are assessed using a combination of the methods and construction source data contained in the FTA guidance manual and the Federal Highway Administration (FHWA) Roadway Construction Noise Model from the FHWA Construction Noise Handbook (FHWA 2006). Typical noise levels generated by representative pieces of equipment are listed in Table G2.3-1. The noise exposure at a receiver location may be calculated using decibel addition of all operating construction equipment using the following equation:

$$Leq(n) = Lmax + 10 \times Log(U.F.) - 20 \times Log(D/50) - A_{shielding}$$

where:

Leq(n) = noise exposure at a receiver resulting from the operation of a single piece of equipment over n hours,
Lmax = noise emission level of the particular piece of equipment at the reference distance of 50 feet (taken from Table G2.3-1),
$A_{shielding}$ = shielding provided by barriers, building, or terrain,
D = distance from the receiver to the piece of equipment in feet, and
U.F. = usage factor that accounts for the fraction of time that the equipment is in use over the specified time period. For Leq (1) assume a U.F. equal to 100%, and for 8 hours or more use the values in Table G2.3-1.

The combination of noise from several pieces of equipment operating during the same time period is obtained from decibel addition of the Leq of each single piece of equipment calculated using the above equations.

Table G2.3-1 Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 Feet	Usage Factor (U.F.), %
Air compressor	80	40
Backhoe	80	40
Ballast equalizer	82	50
Ballast tamper	83	50
Compactor	82	20
Concrete mixer	85	40
Concrete pump	82	20
Crane, derrick	88	16
Crane, mobile	83	16
Dozer	85	16
Generator	82	50
Grader	85	40
Impact wrench	85	50
Jack hammer	88	20
Loader	80	40
Paver	85	50
Pile driver (impact)	101	20
Pile driver (vibratory)	95	20
Pneumatic tool	85	50
Pump	77	50
Rail saw	90	20
Rock drill	85	20
Roller	85	20
Saw	76	20
Scarifier	83	20
Scraper	85	40
Shovel	82	40
Spike driver	77	20
Tie cutter	84	20
Tie handler	80	20
Tie inserter	85	20
Truck	84	40

Source: FTA 2018; FHWA 2006

3.4 Construction Vibration Assessment Methodology

Construction vibration is assessed for areas where there is potential for impact from construction activities. Such activities include blasting, pile driving, demolition, and drilling or excavation in close proximity to sensitive structures. Typical vibration levels generated by representative pieces of equipment are listed in Table G2.3-2. For damage assessment, the following equation is used:

$$PPV_{equip} = PPV_{ref} \times [(25/D)]^{\wedge}1.5$$

where:

PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for distance,
PPV_{ref} = the reference vibration level in in/sec at 25 feet from Table G2.3-2, and
D = the distance from the equipment to the receiver in feet.

For annoyance assessment, the following equation is used:

$$Lv\ (D) = Lv\ (25\ ft) - 30 \times Log(D/25)$$

where:

Lv(D) = RMS vibration level at distance D,
Lv(25 ft) = RMS vibration level at 25 feet from Table G2.3-2, and
D = the distance from the equipment to the receiver in feet.

Table G2.3-2 Construction Equipment Vibration Source Levels

Equipment	PPV at 25 Feet (in/sec)	Approximate Level 1 at 25 Feet (VdB)
Pile driver (impact) – upper range	1.518	112
Pile driver (impact) – typical	0.644	104
Pile driver (vibratory) – upper range	0.734	105
Pile driver (vibratory) – typical	0.170	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall) – in soil	0.008	66
Hydromill (slurry wall) – in rock	0.017	75
Vibratory roller	0.210	94
Hoe ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: FTA 2018

Note:

(1) RMS velocity in decibels (VdB) re 1 micro-inch/second.

4 IMPACT CRITERIA

4.1 FTA Operational Noise Impact Criteria

The FTA operational noise impact criteria are based on well-documented research on community response to noise and are based on both the existing level of noise and the change in noise exposure due to a project. The FTA noise criteria compare the project noise with the existing noise (not the No-Build noise). This is because comparison of a noise projection with an existing noise condition is more accurate than comparison of a projection with another noise projection. Because background noise may increase by the time the project is operational, this approach of using existing noise conditions can possibly overestimate the number of impacts.

The FTA noise criteria are based on the land use category of the sensitive receptor. The descriptors and criteria for assessing noise impact vary according to land use categories adjacent to the project. For Category 2, land uses where people live and sleep (e.g., residential neighborhoods, hospitals, and hotels), the Ldn is the assessment parameter. For other land use types (Category 1 or 3) where there are noise-sensitive uses (e.g., outdoor concert areas, schools, and libraries), the Leq for an hour of noise sensitivity that coincides with train activity is the assessment parameter. Table G2.4-1 summarizes the three land use categories.

Table G2.4-1 Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Land Use Type	Noise Metric (dBA)	Description of Land Use Category
1	High Sensitivity	Outdoor Leq(h) [1]	Land where quiet is an essential element of its intended purpose. Example land uses include preserved land for serenity and quiet, outdoor amphitheaters and concert pavilions, and National Historic Landmarks with considerable outdoor use. Recording studios and concert halls are also included in this category.
2	Residential	Outdoor Ldn	This category is applicable to all residential land use and buildings where people normally sleep, such as hotels and hospitals.
3	Institutional	Outdoor Leq(h) [1]	This category is applicable to institutional land uses with primarily daytime and evening use. Example land uses include schools, libraries, theaters, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities are also included in this category.

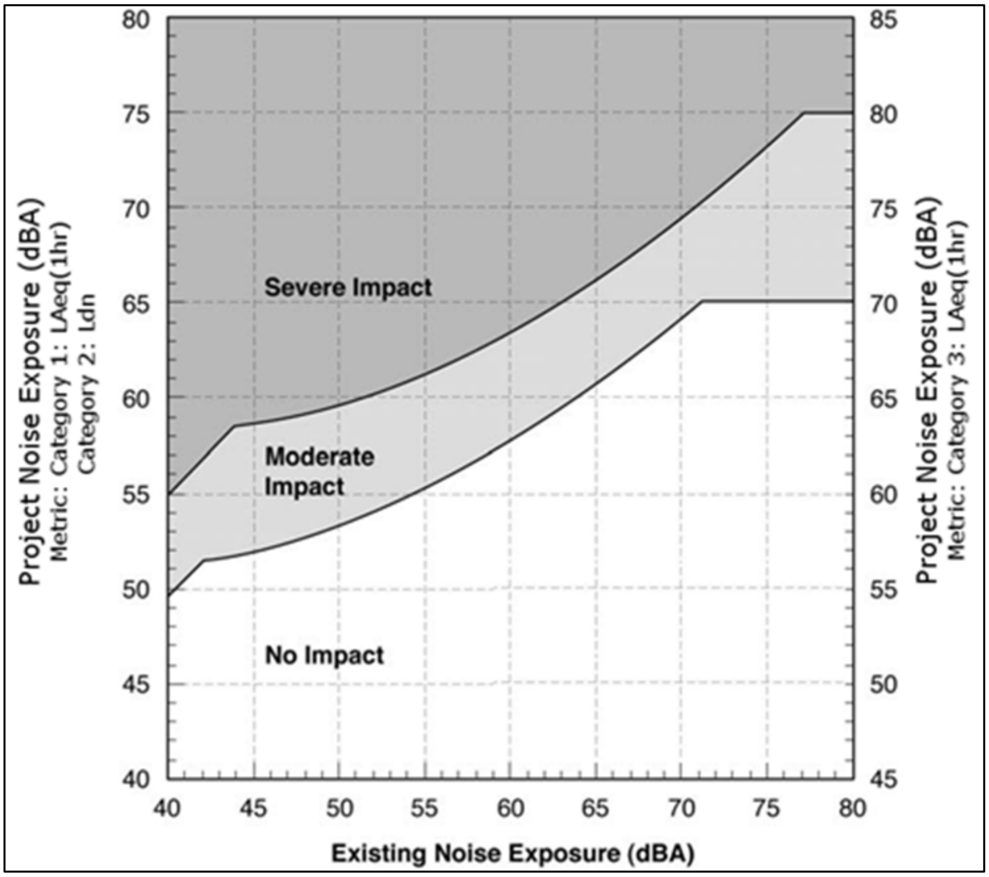
Source: FTA 2018

Note:

(1) Leq (1hr) for the loudest hour of project-related activity during hours of noise sensitivity.

The noise impact criteria are defined by the two curves in Figure G2.4-1, which allow increasing project noise as existing noise levels increase, up to a point at which impact is determined based on project noise alone. The FTA noise impact criteria include three levels of impact, as shown on Figure G2.4-1. The three levels of impact include:

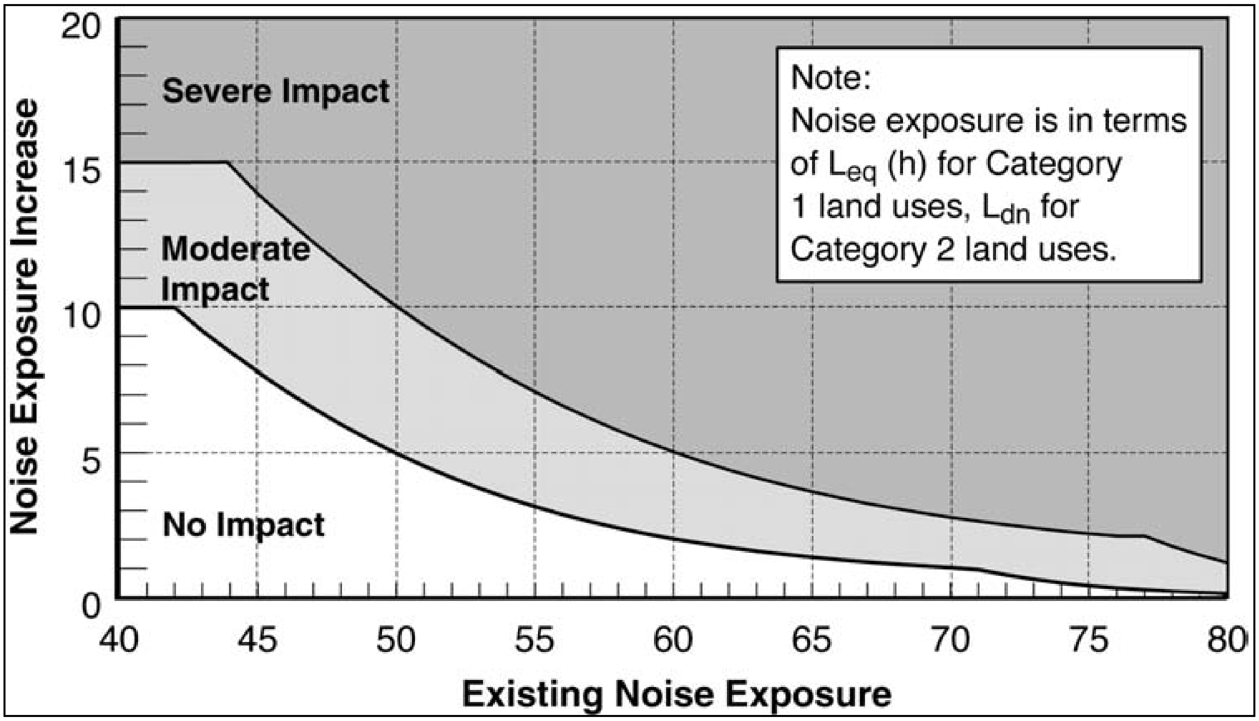
- **No Impact:** In this range, the project is considered to have no impact since, on average, the introduction of the project will result in an insignificant increase in the number of people highly annoyed by the new project noise.
- **Moderate Impact:** Project-generated noise in this range is considered to cause impact at the threshold of measurable annoyance. Moderate impacts serve as an alert to project planners for potential adverse impacts and complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties.
- **Severe Impact:** Project-generated noise in this range is likely to cause a high level of community annoyance. Noise mitigation should be applied for severe impacts where feasible.



Source: FTA 2018

Figure G2.4-1 FTA Noise Impact Criteria

Although the curves in Figure G2.4-1 are defined in terms of the project noise exposure and the existing noise exposure, the increase in the cumulative noise — when project-generated noise is added to existing noise levels — is the basis for the criteria. To illustrate this point, Figure G2.4-2 shows the noise impact criteria for Category 1 and Category 2 land uses in terms of the allowable increase in the cumulative noise exposure. Because Ldn and Leq are measures of total acoustic energy, any new noise source in a community will cause an increase, even if the new source level is lower than the existing level. In Figure G2.4-2, the criterion for a moderate impact allows a noise exposure increase of 10 dB if the existing noise exposure is 42 dBA or less, but only a 1 dB increase when the existing noise exposure is 70 dBA.



Note: Noise exposure is in terms of L_{eq} (h) for Category 1 land uses, L_{dn} for Category 2 land uses.

Source: FTA 2018

Figure G2.4-2 FTA Cumulative Noise Impact Criteria

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project noise exposure that is lower than the existing noise exposure can still cause an effect.

4.2 FTA Operational Vibration Impact Criteria

The operational vibration impact criteria used for the project are based on the information contained in Section 6 of the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The criteria for a general vibration assessment are based on land use and train frequency, as shown in Table G2.4-2. Some buildings, such as concert halls, recording studios, and theaters, can have a higher sensitivity to vibration (or ground-borne noise) but do not fit into the three vibration categories listed below in Table G2.4-2. Because of the sensitivity of these buildings, special attention is paid to these buildings during the environmental assessment of a project.

Table G2.4-2 Ground-Borne Vibration and Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels for Frequent Events [1,3]	Ground-Borne Vibration Impact Levels for Occasional Events [1,4]	Ground-Borne Vibration Impact Levels for Infrequent Events [1,5]	Ground-Borne Noise Impact Levels for Frequent Events [2,3]	Ground-Borne Noise Impact Levels for Occasional Events [2,4]	Ground-Borne Noise Impact Levels for Infrequent Events [2,5]
Category 1: Buildings where vibration would interfere with interior operations	65 [6]	65 [6]	65 [6]	N/A [7]	N/A [7]	N/A [7]
Category 2: Residences and buildings where people normally sleep	72	75	80	35	38	43
Category 3: Institutional land uses with primarily daytime use	75	78	83	40	43	48

Source: FTA 2018

Notes:

(1) Ground-borne vibration impact levels = VdB re 1 micro-inch/sec.

(2) Ground-borne noise impact levels = dBA re 20 micro Pascals.

(3) “Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

(4) “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

(5) “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

(6) This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

(7) Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

Table G2.4-3 shows the FTA criteria for acceptable levels of vibration for several types of special buildings.

Table G2.4-3 Ground-Borne Vibration and Noise Impact Criteria for Special Buildings

Land Use Category	Ground-Borne Vibration Impact Levels for Frequent Events [1,3]	Ground-Borne Vibration Impact Levels for Occasional or Infrequent Events [1,4]	Ground-Borne Noise Impact Levels for Frequent Events [2,3]	Ground-Borne Noise Impact Levels for Occasional or Infrequent Events [2,4]
Concert halls	65	65	25	25
TV studios	65	65	25	25
Recording studios	65	65	25	25
Auditoriums	72	80	30	38
Theaters	72	80	35	43

Source: FTA 2018

Notes:

(1) Ground-borne vibration impact levels = VdB re 1 micro-inch/sec.

(2) Ground-borne noise impact levels = dBA re 20 micro Pascals.

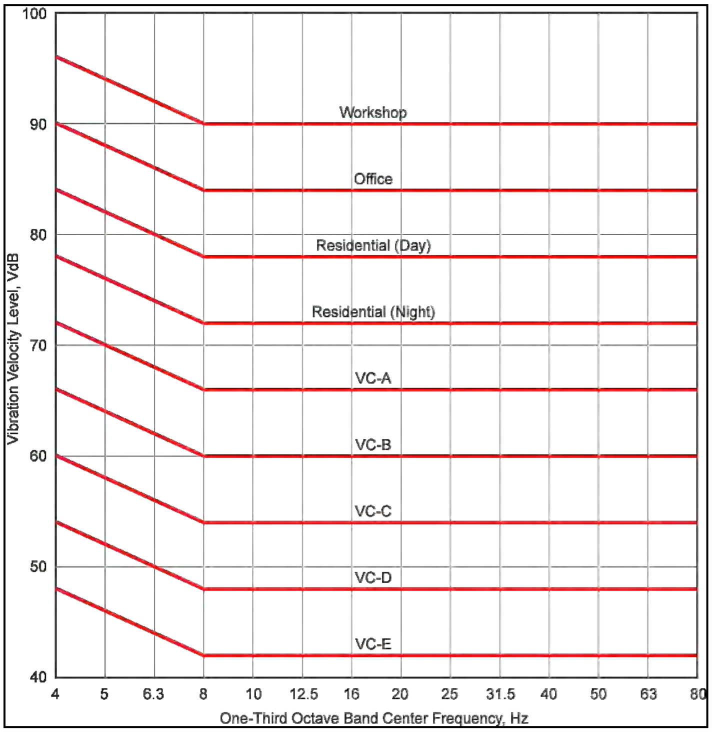
(3) “Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

(4) “Occasional or Infrequent Events” is defined as fewer than 70 vibration events per day. This category includes most commuter rail system. If the building will rarely be occupied when the trains are operating, there is no need to consider impact. As an example, consider locating a commuter rail line next to a concert hall. If no commuter trains would operate after 7 p.m., it should be rare that the trains interfere with the use of the hall.

Table G2.4-2 and Table G2.4-3 also include additional criteria for ground-borne noise, which is a low-frequency noise that is radiated from the motion of room surfaces, such as walls and ceilings, in buildings due to ground-borne vibration. Ground-borne noise is defined in terms of dBA, which emphasizes middle and high frequencies and is more audible to human ears. The criteria for ground-borne noise are much lower than for airborne noise to account for the low-frequency character of ground-borne noise; however, because airborne noise typically masks ground-borne noise for above ground (at-grade or elevated) transit systems, ground-borne noise is assessed only for operations in tunnels, where airborne noise is not a factor, or at locations such as recording studios, which are well insulated from airborne noise.

The criteria for a detailed vibration assessment are shown in Figure G2.4-3, and descriptions of the curves are shown in Table G2.4-4. The curves in Figure G2.4-3 are applied to the projected vibration spectrum for the project. If the vibration level at any one frequency exceeds the criteria, there is an impact. Conversely, if the entire proposed vibration spectrum of the project is below the curve, there will be no impact.

For the project, the detailed vibration assessment criteria will be used to assess operational ground-borne vibration, except at special buildings where the general vibration assessment criteria will be used.



Source: FTA 2018

Figure G2.4-3 FTA Detailed Vibration Criteria

Table G2.4-4 Interpretation of Vibration Criteria for Detailed Analysis

Criterion Curve (See Figure 3-3)	Max. Level (VdB) [1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and other areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night, Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity.
VC-A	66	Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment.
VC-B	60	Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths.
VC-C	54	Appropriate for most lithography and inspection equipment to 1-micron detail size.
VC-D	48	Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities.
VC-E	42	The most demanding criterion for extremely vibration-sensitive equipment.

Source: FTA 2018

Note:

(1) As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.

4.3 FTA Construction Noise Impact Criteria

FTA has developed methods for evaluating construction noise levels. These methods are not standardized criteria, but they include noise impact guidelines for sensitive land uses that describe levels having the potential to result in a negative community reaction. Table G2.4-5 shows the FTA noise assessment criteria for construction. The last column applies to construction activities that extend over 30 days near any given receiver. The Ldn is used to assess impacts in residential areas and 24-hour Leq is used in commercial and industrial areas. The 8-hour Leq and the 30-day average Ldn noise exposure from construction noise calculations use the noise emission levels of the construction equipment, their location, and operating hours. The construction noise limits are normally assessed at the noise-sensitive receiver property line.

Table G2.4-5 FTA Construction Noise Criteria

Land Use	8-Hour Leq, dBA Day	8-Hour Leq, dBA Night	Noise Exposure, dBA 30-Day Average
Residential	80	70	75
Commercial	85	85	80
Industrial	90	90	85

Source: FTA 2018

4.4 FTA Construction Vibration Impact Criteria

In addition to the vibration criteria for human annoyance and interference with equipment and spaces described above, there are also vibration criteria for building damage from construction activities. Typical transit operations do not have the potential for damage, so only certain construction activities are assessed for their potential to generate vibration that could cause building damage.

The thresholds for damage to structures are typically several orders of magnitude above the thresholds for human response to vibration. Table G2.4-6 shows the FTA criteria for vibration damage to structures. This is based on the structure and construction type (and not a designation as historic). Table G2.4-6 includes criteria in both VdB and PPV.

Table G2.4-6 FTA Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate Level [1] (VdB)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: FTA 2018

Note:

(1) RMS velocity in VdB re 1 micro-inch/second.

4.5 Traffic Noise Criteria

OMF South does not include any modifications to existing highways that would change the vertical or horizontal alignment or add new lanes. The Preferred Alternative would remove 21st Avenue S between S 336th Street and S 341st Place, extend 18th Avenue S between S 340th Street and S 336th Street, and extend 21st Avenue S south to S 344th Street. However, these new and extended roadways would not be located near sensitive receptors nor have the traffic volumes to increase noise levels to the extent that a noise study would be warranted. Vehicle traffic within the OMF sites was assessed using FTA noise impact criteria, along with other project components.

As required by the FTA, the criteria for determining traffic noise impacts associated with OMF South are taken from the FHWA Procedures for Abatement of Highway Traffic Noise and Construction Noise, Code of Federal Regulations Title 23, § 772 (2010). A traffic noise impact occurs if predicted traffic noise levels approach the criteria levels for specific FHWA land use activity categories or substantially exceed existing noise levels (e.g., a 10-dBA increase). These levels are defined as noise abatement criteria (NAC) and are based on hourly Leq noise levels during the peak traffic noise hour. The land use activity categories of greatest concern in the OMF South study areas are Types B and C, which include residences, playgrounds, active sports areas, parks, schools, churches, libraries, and hospitals. The noise abatement criterion used to determine impacts on this land use is to approach, or exceed, 67 dBA Leq outside of buildings. Under Washington State Department of Transportation (WSDOT) policy, a traffic noise impact occurs if predicted noise levels approach within 1 dB of the NAC. Therefore, an impact on Type B or C land uses would occur at 66 dBA Leq. Some commercial uses, including hotels and motels, have a criterion of 71 dBA under the WSDOT policy. Many other commercial uses, such as general offices and retail businesses, are not normally considered noise-sensitive.

4.6 Local Ordinances

The Washington Administrative Code (WAC) noise regulations (which have been adopted by the cities of Federal Way and Kent) are taken from Chapter 173-60, Maximum Environmental Noise Levels. The noise control ordinance provides three different Environmental Designations for Noise Abatement based on zoning, which are defined as residential, commercial, and industrial. The ordinance is then written to define the maximum allowable noise level from one designation to another. For example, the noise caused by an industrial use, like the proposed project, must be less than 60 dBA at the closest residential property line, 65 dBA at the closest commercial use, and 70 dBA at the closest industrial use. These noise levels apply to stationary land uses, like the OMF South, with noises originating from outside public roadways and rights-of-way. Table G2.4-7 provides the property line noise standards provided in the WAC.

Table G2.4-7 Washington State Noise Control Regulation

Source of Noise	Maximum Allowable Sound Level (Leq, dBA)[1] Residential Receiver	Maximum Allowable Sound Level (Leq, dBA)[1] Commercial Receiver	Maximum Allowable Sound Level (Leq, dBA)[1] Industrial Receiver
Residential	55	57	60
Commercial	57	60	65
Industrial	60	65	70

Note:

(1) Between 10 p.m. and 7 a.m., the levels given above are reduced by 10 dB for residential receiving property.

In addition to the property-line noise standards listed in Table G2.4-7, there are exemptions for short-term noise exceedance, including those outlined in Table G2.4-8, which are based on the minutes per hour that the noise limit is exceeded. Based on the operations of LRVs moving on the tracks within the facility, the 5 dB adjustment is applied to the levels shown in Table G2.4-7.

Table G2.4-8 Washington State Exemptions for Short-Term Noise Exceedances

Minutes per Hour	Ln Value	Adjustment to Maximum Sound Level
15	L_{25}	+5 dB
5	$L_{8.3}$	+10 dB
1.5	$L_{1.5}$	+15 dB

Construction noise is exempt from the WAC noise limits, except at residential land uses during nighttime hours (10 p.m. to 7 a.m.). If construction is performed during nighttime hours, the contractor must still meet the WAC noise level requirements presented in Table G2.4-7 or obtain a noise variance from the governing jurisdiction.

Maximum permissible sound levels for haul trucks on public roadways are limited to 86 dBA for speeds of 35 mph or less and 90 dBA for speeds over 35 mph when measured at 50 feet (WAC 173-62).

Sounds created by backup alarms are exempt, except between 10 p.m. and 7 a.m. when “beep-beep” backup alarms are essentially prohibited by the WAC in urban areas and would be replaced with smart backup alarms, which automatically adjust the alarm level based on the background level or would be switched off and replaced with spotters. This condition is included because, just like noise from construction activities, noise from backup beepers would exceed the WAC nighttime criteria, even with the allowable exceedance, at large distances from the construction site.

5 AFFECTED ENVIRONMENT

The affected noise and vibration environment in the vicinity of the OMF South build alternatives and mainline track options to the Federal Way Downtown Station was investigated based on a review of current project and land use information, geographic information system (GIS) data, a windshield survey, and measurements conducted during November 2019. Land use in the OMF South study area includes a combination of residential, institutional, commercial, and industrial zones. Noise-sensitive and vibration-sensitive land uses in the study area were identified based on alignment drawings, aerial photographs, visual surveys, and land use information. Sensitive receptors located near the proposed alternatives include single-family and multi-family residences, hotels, and places of worship.

A summary of noise- and vibration-sensitive land uses adjacent to the OMF South build alternatives and mainline track is provided below, followed by descriptions of the existing noise and vibration conditions in the study area. There are no special buildings, such as recording studios, or highly vibration-sensitive buildings with specialized equipment known to be near any of the OMF South alternatives or the mainline track.

5.1 Noise and Vibration Sensitive Land Use

5.1.1 Preferred Alternative Site

The study area around the Preferred Alternative OMF South site and lead tracks includes a mix of commercial and noise-sensitive residential land uses. To the north of the site is a noise-sensitive residential community with a mix of single- and multi-family residences and the Russian-Ukrainian Seventh-Day Adventist Church. To the south is a mix of commercial uses with a few scattered noise-sensitive residences and the Restoration Life Church. To the west are commercial uses on both sides of SR 99 along with the KAC Baptist Church. I-5 is to the east.

5.1.2 South 344th Street Alternative Site

The study area around the South 344th Street Alternative OMF South site and lead tracks includes a mix of commercial, institutional, and noise-sensitive residential land uses. To the north of the site is a noise-sensitive residential community with a mix of single- and multi-family residences, the Christian Faith Center and associated school, the Russian-Ukrainian Seventh-Day Adventist Church, and the KAC Baptist Church. To the south are commercial uses. To the west are commercial uses on both sides of SR 99, and I-5 is to the east.

5.1.3 Midway Landfill Alternative

The land use around the Midway Landfill Alternative includes primarily commercial land uses to the west on both sides of SR 99, along with three religious facilities that are noise sensitive: the Great Commission Presbyterian Church, the New Jerusalem Haitian Baptist Church, and the Seattle Full Gospel Church. Noise-sensitive uses also include a mobile home park to the north and hotels and a single-family residential community to the south. To the east of the site is I-5.

5.1.4 Mainline Track

The noise-sensitive land uses adjacent to the mainline track design options and the test track between the Federal Way Downtown Station and the Preferred and South 344th Street alternatives are a mix of single- and multi-family residences, including the residences within the Belmor Mobile Home Park (Belmor). The land use around the mainline tail track alignments is commercial, with no noise-sensitive land uses.

5.2 Existing Noise Conditions

Existing noise sources in the project area include traffic on I-5, local roadway traffic, aircraft overflights, and local community activities. The existing ambient sound levels vary by location, depending on the proximity to I-5, and are generally typical of a suburban environment near a busy interstate. Existing ambient noise levels were characterized through direct measurements at selected sites in the area near the OMF South alternatives and mainline track during November 2019.

5.2.1 Noise Measurement Results

5.2.1.1 Preferred Alternative Site

Table G2.5-1 summarizes the results of the existing noise measurement program, and Figure G2.5-1 shows the locations of the three measurements for the Preferred Alternative. The results of the existing noise measurements were used to characterize the existing noise levels at all noise-sensitive locations near the Preferred Alternative.

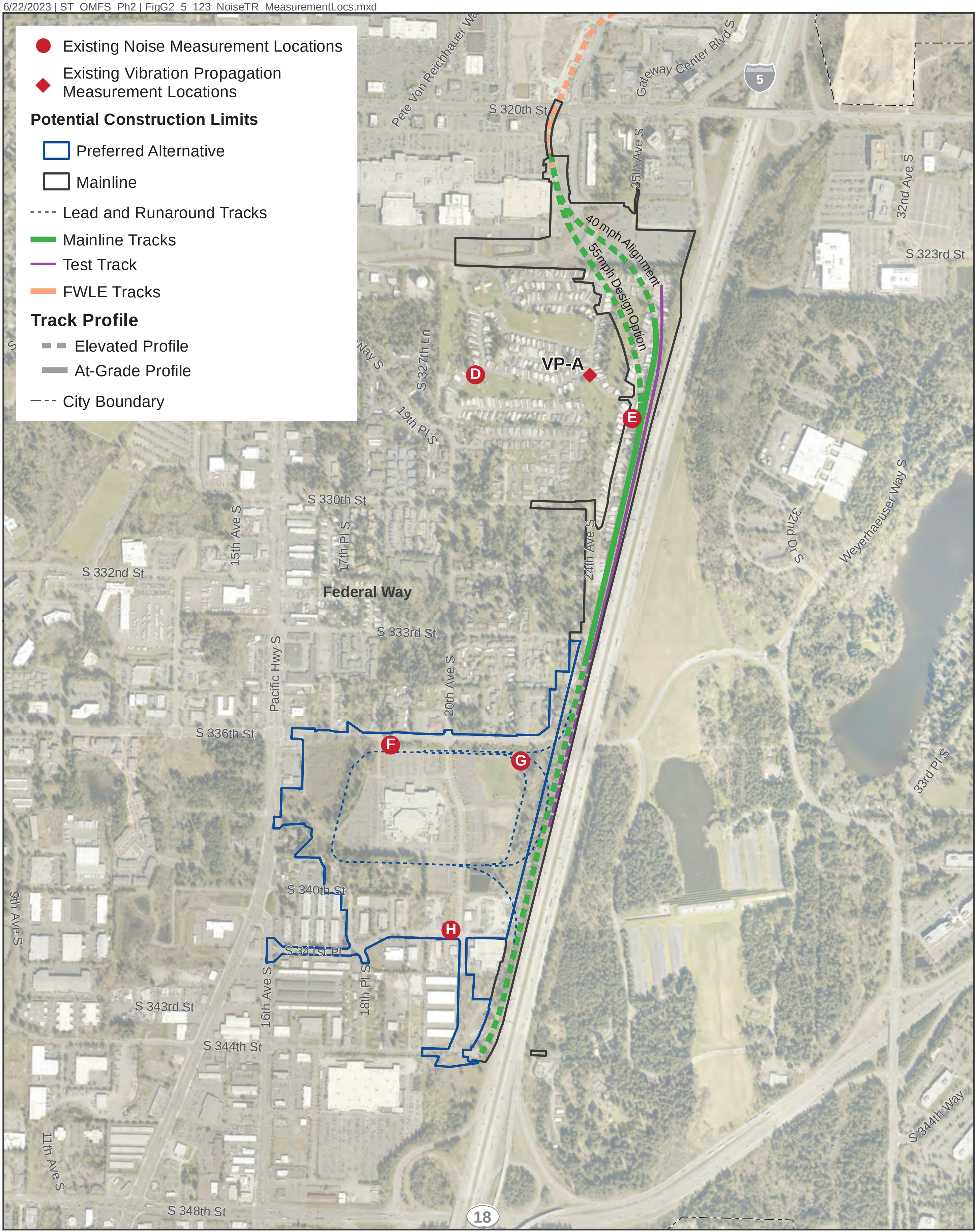
Site F: Christian Faith Center West. The Ldn measured at this location was 67 dBA, and the peak hour Leq was 62 dBA. This location is representative of the residences to the north of the Preferred Alternative away from I-5 and the KAC Baptist Church. The ambient noise levels were dominated by local traffic and traffic on I-5.

Site G: Christian Faith Center East. The Ldn measured at this location was 72 dBA, and the peak hour Leq was 66 dBA. This location is representative of the residences to the north of the Preferred Alternative near I-5. The ambient noise levels were dominated by traffic on I-5.

Site H: 20th Avenue S and S 31st Place. The Ldn measured at this location was 73 dBA, and the peak hour Leq was 67 dBA. This location is representative of the residences to the south of the Preferred Alternative. The ambient noise levels were dominated by traffic on I-5.

Table G2.5-1 Summary of Existing Ambient Noise Measurements Results for Preferred Alternative

Site No.	Measurement Location Description	Start Date	Start Time	Meas. Duration (hours)	Noise Exposure (dBA) Ldn	Noise Exposure (dBA) 1 Hour Leq
F	Christian Faith Center West	11/19/19	14:00	24	67	62
G	Christian Faith Center East	11/19/19	14:00	24	72	66
H	20th Avenue S and S 31st Place	11/19/19	14:00	24	73	67


● Existing Noise Measurement Locations
◆ Existing Vibration Propagation Measurement Locations
Potential Construction Limits
Preferred Alternative
Mainline
Lead and Runaround Tracks
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
D
E
F
G
H
VP-A
40 mph Alignment
55mph Design Option
Federal Way
5
18
Pete Von Reichbauer Way
Gateway Center Blvd S
S 320th St
25th Ave S
32nd Ave S
S 323rd St
S 327th Ln
19th Pl S
S 330th St
15th Ave S
17th Pl S
24th Ave S
32nd Dr S
Weyerhaeuser Way S
S 332nd St
S 333rd St
Pacific Hwy S
20th Ave S
S 336th St
33rd Pl S
S 340th St
S 341st Pl
9th Ave S
16th Ave S
18th Pl S
S 343rd St
S 344th St
S 344th Way
11th Ave S
S 348th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE G2.5-1
Measurement Locations for Existing Ambient Noise and Vibration: Preferred Alternative

OMF South

5.2.1.2 South 344th Street Alternative Site

Table G2.5-2 summarizes the results of the existing noise measurement program, and Figure G2.5-2 shows the locations of the two measurements for the South 344th Street Alternative. The results of the existing noise measurements were used to characterize the existing noise levels at all noise-sensitive locations near the South 344th Street Alternative.

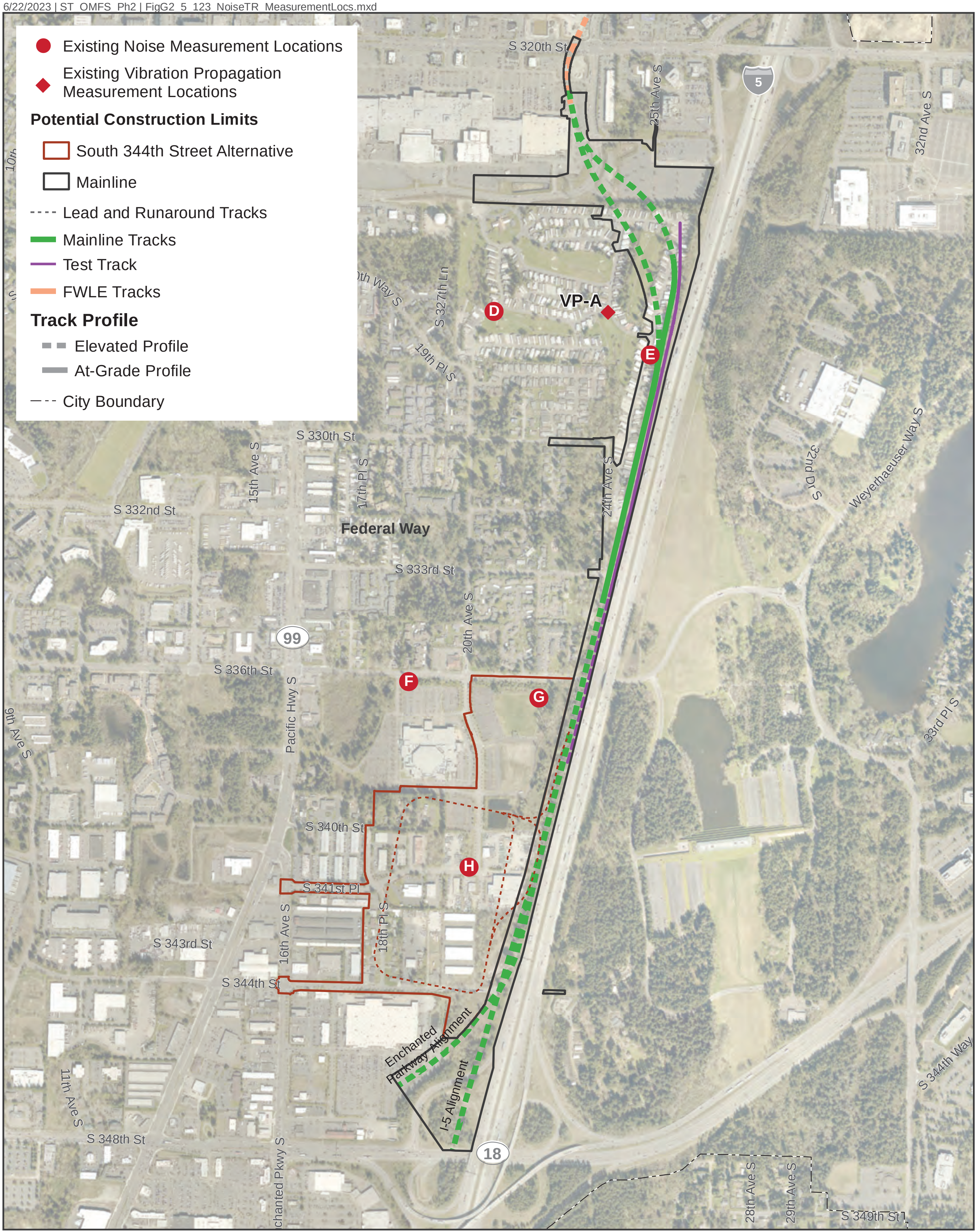
Site F: Christian Faith Center West. The Ldn measured at this location was 67 dBA, and the peak hour Leq was 62 dBA. This location is representative of the residences to the north of the Preferred Alternative away from I-5, the Christian Faith Center, and the KAC Baptist Church. The ambient noise levels were dominated by local traffic and traffic on I-5.

Site G: Christian Faith Center East. The Ldn measured at this location was 72 dBA, and the peak hour Leq was 66 dBA. This location is representative of the residences to the north of the Preferred Alternative near I-5. The ambient noise levels were dominated by traffic on I-5.

Table G2.5-2 Summary of Existing Ambient Noise Measurements Results for South 344th Street Alternative

Site No.	Measurement Location Description	Start Date	Start Time	Meas. Duration (hours)	Noise Exposure (dBA) Ldn	Noise Exposure (dBA) 1 Hour Leq
F	Christian Faith Center West	11/19/19	14:00	24	67	62
G	Christian Faith Center East	11/19/19	14:00	24	72	66

6/22/2023 | ST_OMFS_Ph2 | FigG2_5_123_NoiseTR_MeasurementLocs.mxd


● Existing Noise Measurement Locations
◆ Existing Vibration Propagation Measurement Locations
Potential Construction Limits
South 344th Street Alternative
Mainline
Lead and Runaround Tracks
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
S 320th St
25th Ave S
5
32nd Ave S
10th
VP-A
D
E
S 327th Ln
19th Pl S
S 330th St
15th Ave S
17th Pl S
24th Ave S
32nd Dr S
Weyerhaeuser Way S
S 332nd St
Federal Way
S 333rd St
99
20th Ave S
S 336th St
F
G
9th Ave S
Pacific Hwy S
33rd Pl S
S 340th St
H
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 344th Way
S 348th St
18
Enchanted Pkwy S
28th Ave S
29th Ave S
S 349th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
1,000
2,000 Feet

FIGURE G2.5-2

Measurement Locations for Existing Ambient Noise and Vibration: South 344th Street

OMF South

5.2.1.3 Midway Landfill Alternative

Table G2.5-3 summarizes the results of the existing noise measurement program, and Figure G2.5-3 shows the locations of the three measurements for the Midway Landfill Alternative. The results of the existing noise measurements were used to characterize the existing noise levels at all noise-sensitive locations near the Midway Landfill.

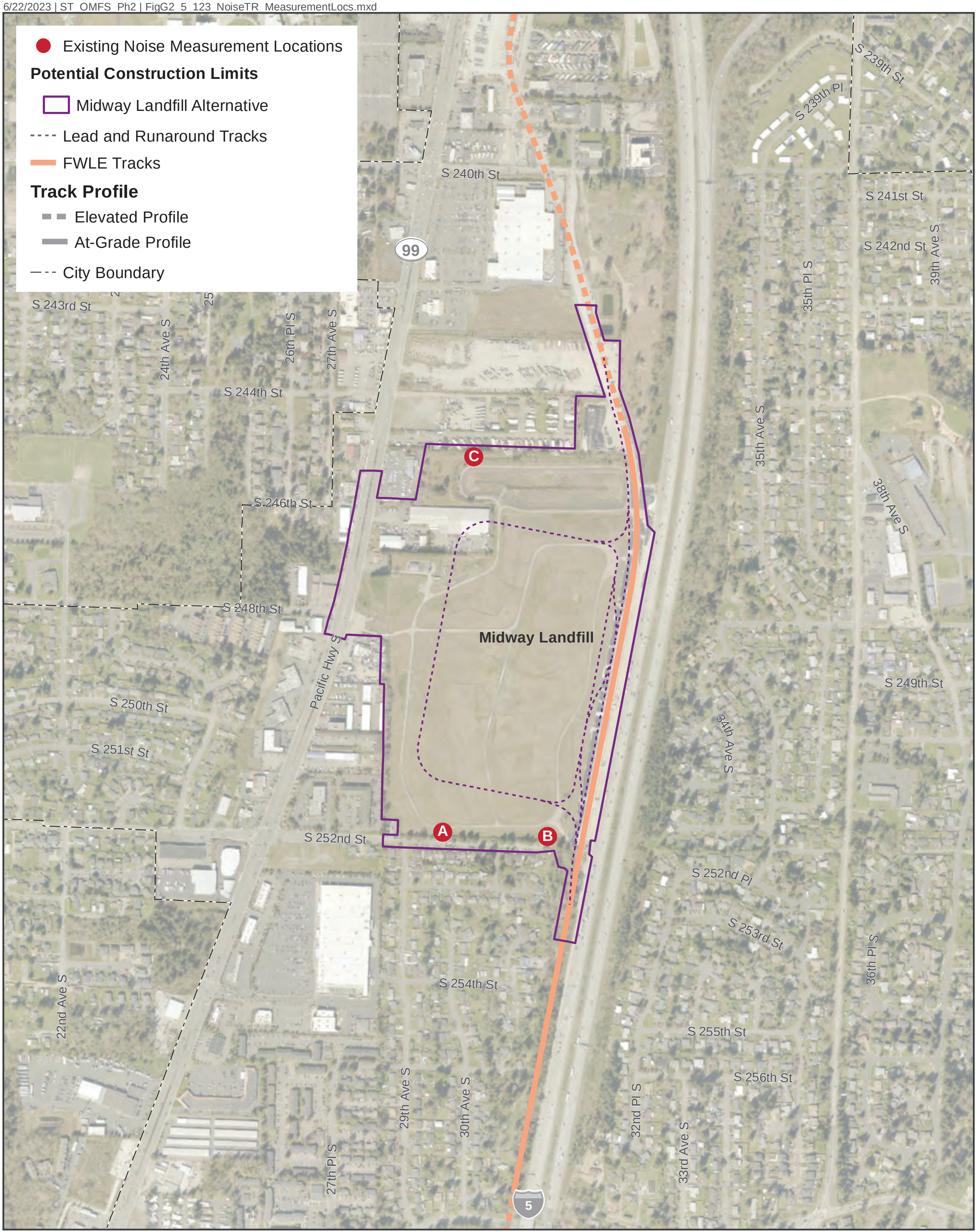
Site A: Midway Landfill Southwest Corner. The Ldn measured at this location was 65 dBA, and the measured peak hour Leq was 62 dBA. This location is representative of the hotels and the residences to the south of the Midway Landfill away from I-5. The ambient noise levels were dominated by local traffic and traffic on I-5.

Site B: Midway Landfill Southeast Corner. The Ldn measured at this location was 71 dBA, and the measured peak hour Leq was 66 dBA. This location is representative of the residences to the south of the Midway Landfill near I-5. The ambient noise levels were dominated by traffic on I-5.

Site C: Midway Landfill North Side. The Ldn measured at this location was 67 dBA, and the measured peak hour Leq was 62 dBA. This location is representative of the residences to the north of the Midway Landfill and the religious facilities on SR 99. The ambient noise levels were dominated by local traffic and traffic on I-5.

Table G2.5-3 Summary of Existing Ambient Noise Measurements Results for the Midway Landfill Alternative

Site No.	Measurement Location Description	Start Date	Start Time	Meas. Duration (hours)	Noise Exposure (dBA) Ldn	Noise Exposure (dBA) 1 Hour Leq
A	Midway Landfill Southwest Corner	11/18/19	13:00	24	65	62
B	Midway Landfill Southeast Corner	11/18/19	13:00	24	71	66
C	Midway Landfill North Side	11/18/19	13:00	24	67	62


● Existing Noise Measurement Locations
Potential Construction Limits
Midway Landfill Alternative
Lead and Runaround Tracks
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
S 239th St
S 239th Pl
S 240th St
S 241st St
S 242nd St
39th Ave S
35th Pl S
99
S 243rd St
24th Ave S
26th Pl S
27th Ave S
S 244th St
35th Ave S
C
38th Ave S
S 246th St
S 248th St
Midway Landfill
Pacific Hwy S
S 249th St
S 250th St
34th Ave S
S 251st St
S 252nd St
A
B
S 252nd Pl
S 253rd St
36th Pl S
22nd Ave S
S 254th St
S 255th St
S 256th St
29th Ave S
30th Ave S
32nd Pl S
33rd Ave S
27th Pl S
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

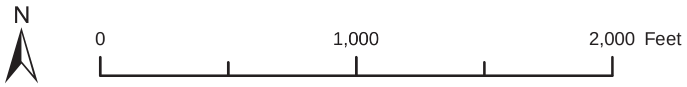

N
0
1,000
2,000 Feet

FIGURE G2.5-3
Measurement Locations for Existing Ambient Noise: Midway Landfill Alternative

5.2.1.4 Mainline Track Design Options

Table G2.5-4 summarizes the results of the existing noise measurement program, and Figures G2.5-1 and G2.5-2 show the locations of the two measurements for the mainline track design options. The results of the existing noise measurements were used to characterize the existing noise levels at all noise-sensitive locations near each option.

Site D: 11 The Dunes Court, Belmor. The Ldn measured at this location was 65 dBA, and the peak hour Leq was 59 dBA. This location is representative of the residences farther from I-5 near the mainline track design options. The ambient noise levels were dominated by local traffic and traffic on I-5.

Site E: 326 Oakland Hills Boulevard, Belmor. The Ldn measured at this location was 70 dBA, and the peak hour Leq was 65 dBA. This location is representative of the residences closer to I-5 near the mainline track design options. The ambient noise levels were dominated by traffic on I-5.

Table G2.5-4 Summary of Existing Ambient Noise Measurements Results for Mainline Track Options

Site No.	Measurement Location Description	Start Date	Start Time	Meas. Duration (hours)	Noise Exposure (dBA) Ldn	Noise Exposure (dBA) 1 Hour Leq
D	11 The Dunes Court, Belmor	11/19/19	12:00	24	65	59
E	326 Oakland Hills Boulevard, Belmor	11/19/19	12:00	24	70	65

5.3 Existing Vibration Conditions

Vibration-sensitive land uses for the project alternatives are the same as the noise-sensitive land uses described above. Existing vibration sources along the project alignments include auto, bus, and truck traffic on local streets. However, vibrations from street traffic are not generally perceptible at receivers in the study area unless streets have substantial bumps, potholes, or other uneven surfaces. Furthermore, the FTA vibration impact criteria are not ambient based; that is, future project vibrations are not compared with existing vibrations to assess impact. Therefore, the vibration measurements for the project focused on characterizing the soil conditions along the mainline track rather than on characterizing the existing vibration levels as described below.

One vibration propagation test site was selected for the 2019 measurements. The location of the site is shown on Figures G2.5-1 and G2.5-2, a site photograph is included in Attachment G2-1, and detailed propagation information is included in Attachment G2-3.

Site VP-A: Belmor. The vibration propagation measurement at this location was conducted in the vicinity of the mainline track design options in Belmor.

6 IMPACT ASSESSMENT

6.1 No-Build Alternative

Under the No-Build Alternative, noise impacts from the construction or operation of OMF South would not occur. However, for the purposes of this Final EIS the No-Build Alternative assumes that by the design year 2042, all planned Sound Transit 3 projects, including FWLE and TDLE, are built, along with the other public and private projects planned within the study area.

The noise and vibration effects of FWLE on sensitive receptors near the Midway Landfill Alternative have been addressed in the Federal Way Link Extension Final Environmental Impact Statement. FWLE constructed noise walls adjacent to the residential areas near the Midway Landfill to mitigate the anticipated noise impacts from that project. No vibration impacts from FWLE are anticipated in the area. The proposed alignment for the TDLE mainline track overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these alternatives would be built later in time. The noise and vibration effects of TDLE and Federal Way's City Center Access Project on sensitive receptors within the study area for the Preferred and South 344th Street alternatives are discussed in Section 7, Cumulative Impacts. Noise and vibration impacts from TDLE will be further detailed in the TDLE Draft EIS, expected to be published in mid-2024.

In addition, there would likely be increases in highway and local roadway noise due to increased traffic volumes as a result of anticipated population and job growth in the study areas.

6.2 Build Alternatives

Detailed noise and vibration impact assessments were performed based on the criteria discussed in Section 4 and the prediction methodology described in Section 3. The assessment results are presented in this section. The FTA guidance manual is the primary source for the noise methodology. During final design, all impacts would be reevaluated to verify impact levels and inform the mitigation design.

The noise and vibration assessments included the following steps:

- Noise- and vibration-sensitive land uses were identified using aerial photography, GIS data, and field surveys. See Section 5.1.
- Existing noise levels along the corridor were measured at sensitive receptors. See Section 5.2.
- Vibration-propagation characteristics of the soil along the corridor were measured at a representative sensitive receptor. See Section 5.3.
- Project noise and vibration levels from transit operations were predicted using project drawings and information on speeds, headways, track type, vehicle type, crossover locations, and facility operations.
- The noise impact from transit operations, facility operations, and test track operations was assessed by comparing the project noise with the existing noise (not the No-Build Alternative noise) using the FTA noise impact criteria. See Figure G2.4-1.
- The vibration impact from transit operations was assessed by comparing the project vibration levels with the FTA vibration impact criteria in Figure G2.4-3.

- Project noise levels were also compared with the WAC noise criteria for exceedances.
- Mitigation was recommended at locations where project noise or vibration levels exceed the impact criteria.
- Wheel squeal for tight radius curves is not included in the noise model because Sound Transit has committed to reducing any potential wheel squeal by installing wayside lubricators on all curves in noise-sensitive areas with a radius of less than 600 feet and by preparing all curves for wayside lubricators that have a radius of between 600 and 1,000 feet, including those in the OMF. There are numerous tight radius curves within the sites for all three OMF build alternatives that would also be prepared for wayside lubricators.

6.2.1 Preferred Alternative Site

Comparisons of the existing and future noise levels are presented in Table G2.6-1 and Table G2.6-2 for the Preferred Alternative site. Table G2.6-3 includes the results for FTA Category 2 (residential) receptors with both daytime and nighttime sensitivity to noise, and Table G2.6-4 includes the results for FTA Category 3 (institutional) receptors with daytime and evening use. There were no FTA Category 1 (high sensitivity) receptors in the study area for this alternative. In addition to the distances to the nearest track, the tables include the existing noise levels, the projected noise levels from facility operations, and the FTA noise impact criteria. Based on a comparison of the predicted project noise levels with the impact criteria, the tables also include an inventory of the moderate and severe noise impacts for the Preferred Alternative site.

Table G2.6-1 Summary of FTA Category 2 Noise Impacts for the Preferred Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 336th Street	North	176	67	48	62	68	0	0
18th Place S	South	933	73	36	65	71	0	0
Total:							**0**	**0**

Table G2.6-2 Summary of FTA Category 3 Noise Impacts for the Preferred Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
Russian-Ukrainian Seventh-Day Adventist Church	North	180	62	<20	64	70	0	0
KAC Baptist Church	West	295	62	<20	64	70	0	0
Restoration Life Church	South	857	67	<20	67	72	0	0
Total:							**0**	**0**

Table G2.6-3 shows a comparison of the maximum noise levels from facility operations with the WAC thresholds for residential land uses at night. Because the majority of the activity at the facility would occur at night, and commercial and industrial uses typically do not have activity at night, only the residential night threshold is assessed.

Table G2.6-3 Summary of WAC Nighttime Noise Exceedances for the Preferred Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Project Noise Level (Leq, dBA)	Noise Level for Impact	# of Exceedances
S 336th Street	North	180	42	55	0
18th Place S	South	933	30	55	0
Total:					**0**

There are no FTA noise impacts or WAC exceedances for the Preferred Alternative site.

6.2.2 South 344th Street Alternative Site

Comparisons of the existing and future noise levels are presented in Table G2.6-4 and Table G2.6-5 for the South 344th Street Alternative site. Table G2.6-4 includes the results for FTA Category 2 (residential) receptors with both daytime and nighttime sensitivity to noise, and Table G2.6-5 includes the results for FTA Category 3 (institutional) receptors with daytime and evening use. There were no FTA Category 1 (high sensitivity) receptors in the study area for this alternative. In addition to the distances to the nearest track, the tables include the existing noise levels, the projected noise levels from facility operations, and the FTA noise impact criteria. Based on a comparison of the predicted project noise levels with the impact criteria, the tables also include an inventory of the moderate and severe noise impacts for the South 344th Street Alternative site.

Table G2.6-4 Summary of FTA Category 2 Noise Impacts for the South 344th Street Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 336th Street	North	1210	67	40	62	68	0	0
S 340th Street	West	510	67	44	62	68	0	0
Total:							**0**	**0**

Table G2.6-5 Summary of FTA Category 3 Noise Impacts for the South 344th Street Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
Russian-Ukrainian Seventh-Day Adventist Church	North	1130	62	<20	64	70	0	0
KAC Baptist Church	West	970	62	<20	64	70	0	0
Christian Faith Center	West	240	62	<20	64	70	0	0
Restoration Life Church	West	1060	67	<20	67	73	0	0
Total:							**0**	**0**

Table G2.6-6 shows a comparison of the maximum noise levels from facility operations with the WAC thresholds for residential land uses at night. Because the majority of the activity at the facility would occur at night, and commercial and industrial uses typically do not have activity at night, only the residential night threshold is assessed.

Table G2.6-6 Summary of WAC Nighttime Noise Exceedances for the South 344th Street Alternative Site

Location	Side of OMF	Distance to Nearest Proposed Track (feet)	Project Noise Level (Leq, dBA)	Noise Level for Impact	# of Exceedances
S 336th Street	North	1210	34	55	0
S 340th Street	West	510	41	55	0
Total:					**0**

There are no FTA noise impacts or WAC exceedances for the South 344th Street Alternative site.

6.2.3 Midway Landfill Alternative

Comparisons of the existing and future noise levels with the Midway Landfill Alternative are presented in Table G2.6-7 and Table G2.6-8. Table G2.6-7 includes the results for FTA Category 2 (residential) receptors with both daytime and nighttime sensitivity to noise, and Table G2.6-8 includes the results for FTA Category 3 (institutional) receptors with daytime and evening use. There were no FTA Category 1 (high sensitivity) receptors in the study area for this alternative. In addition to the distances to the nearest track, the tables include the existing noise levels, the projected noise levels from facility operations, and the FTA noise impact criteria. Based on a comparison of the predicted project noise levels with the impact criteria, the tables also include an inventory of the moderate and severe noise impacts for the Midway Landfill Alternative.

Table G2.6-7 Summary of FTA Category 2 Noise Impacts for the Midway Landfill Alternative

Location	Side of OMF	Distance to Nearest Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
Midway Mobile Mansions	North	490	67	45	62	67	0	0
SR 99 Motels	West	230	65	40	61	66	0	0
S 252nd Street	South	270	71	40	65	70	0	0
Total:							**0**	**0**

Table G2.6-8 Summary of FTA Category 3 Noise Impacts for the Midway Landfill Alternative

Location	Side of OMF	Distance to Nearest Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
New Jerusalem Haitian Baptist Church	West	640	62	<20	64	69	0	0
Seattle Full Gospel Church	West	860	62	<20	64	69	0	0
Great Commission Presbyterian Church	West	780	62	<20	64	69	0	0
Total:							**0**	**0**

Table G2.6-9 shows a comparison of the maximum noise levels from facility operations with the WAC thresholds for residential land uses at night. Because the majority of the activity at the facility would occur at night, and commercial and industrial uses typically do not have activity at night, only the residential night threshold is assessed.

Table G2.6-9 Summary of WAC Nighttime Noise Exceedances for the Midway Landfill Alternative

Location	Side of OMF	Distance to Nearest Track (feet)	Project Noise Level (Leq, dBA)	Noise Level for Impact	# of Exceedances
Midway Mobile Mansions	North	490	41	55	0
SR 99 Motels	West	230	41	55	0
S 252nd Street	South	270	40	55	0
Total:					**0**

There are no FTA noise impacts or WAC exceedances for the Midway Landfill Alternative.

6.3 Preferred and South 344th Street Alternatives Mainline and Test Track Noise

For the Preferred and South 344th Street alternatives mainline track design options and the test track, comparisons of the existing and future noise levels are presented in Table G2.6-10 and Table G2.6-11. Table G2.6-10 includes the results for FTA Category 2 (residential) receptors with both daytime and nighttime sensitivity to noise for the 40 mph Alignment, and Table G2.6-11 includes the results for FTA Category 2 receptors for the 55 mph Design Option. There are no FTA Category 1 (high sensitivity) or Category 3 (industrial) land uses near the mainline track design options.

In addition to the distances to the nearest track, Table G2.6-10 and Table G2.6-11 include the existing noise levels, the projected noise levels from LRV operations, and the FTA noise impact criteria. Based on a comparison of the predicted project noise levels with the impact criteria, the table also includes an inventory of the moderate and severe noise impacts for the mainline tracks.

There would be no FTA noise impacts for the 40 mph Alignment and four FTA moderate impacts for the 55 mph Design Option. The noise impacts are at single-family residences and are due to the proximity to the proposed tracks. The noise impact locations are shown in Figure G2.6-1 for the 55 mph Design Option, and the projected noise impacts are described below.

Table G2.6-10 Summary of FTA Category 2 Noise Impacts for the 40 mph Alignment Mainline Track

Location	Side of Track	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 324th Street to Burning Tree Boulevard	SB[1]	80	70	62	64	69	0	0
Burning Tree Boulevard to S 330th Street	SB	111	70	56	64	69	0	0
S 330th Street to S 333rd Street	SB	81	72	58	65	71	0	0
S 333rd Street to S 336th Street	SB	197	72	64(58)[2]	65	71	0 (0)[2]	0 (0)[2]
Total:							**0 (0)[2]**	**0 (0)[2]**

Note:

(1) SB = southbound.

(2) The Preferred Alternative is shown first, followed by the South 344th Street Alternative in parenthesis. The lead tracks and crossovers from the OMF would be further south for the South 344th Street Alternative in comparison to the Preferred Alternative.

Table G2.6-11 Summary of FTA Category 2 Noise Impacts: 55 mph Design Option Mainline Track

Location	Side of Track	Distance to Nearest Proposed Track (feet)	Existing Noise Level (Ldn, dBA)	Project Noise Level (Ldn, dBA)	Moderate Noise Criteria	Severe Noise Criteria	# of Moderate Impacts	# of Severe Impacts
S 324th Street to Burning Tree Boulevard	NB[1]	76	65	61	64	69	2	0
S 324th Street to Burning Tree Boulevard	SB[1]	57	65	64	61	66	2	0
Burning Tree Boulevard to S 330th Street	SB	85	70	57	64	69	0	0
S 330th Street to S 333rd Street	SB	81	72	58	65	71	0	0
S 333rd Street to S 336th Street	SB	197	72	64 (58)[2]	65	71	0 (0)[2]	0 (0)[2]
Total:							**4 (4)[2]**	**0 (0)[2]**

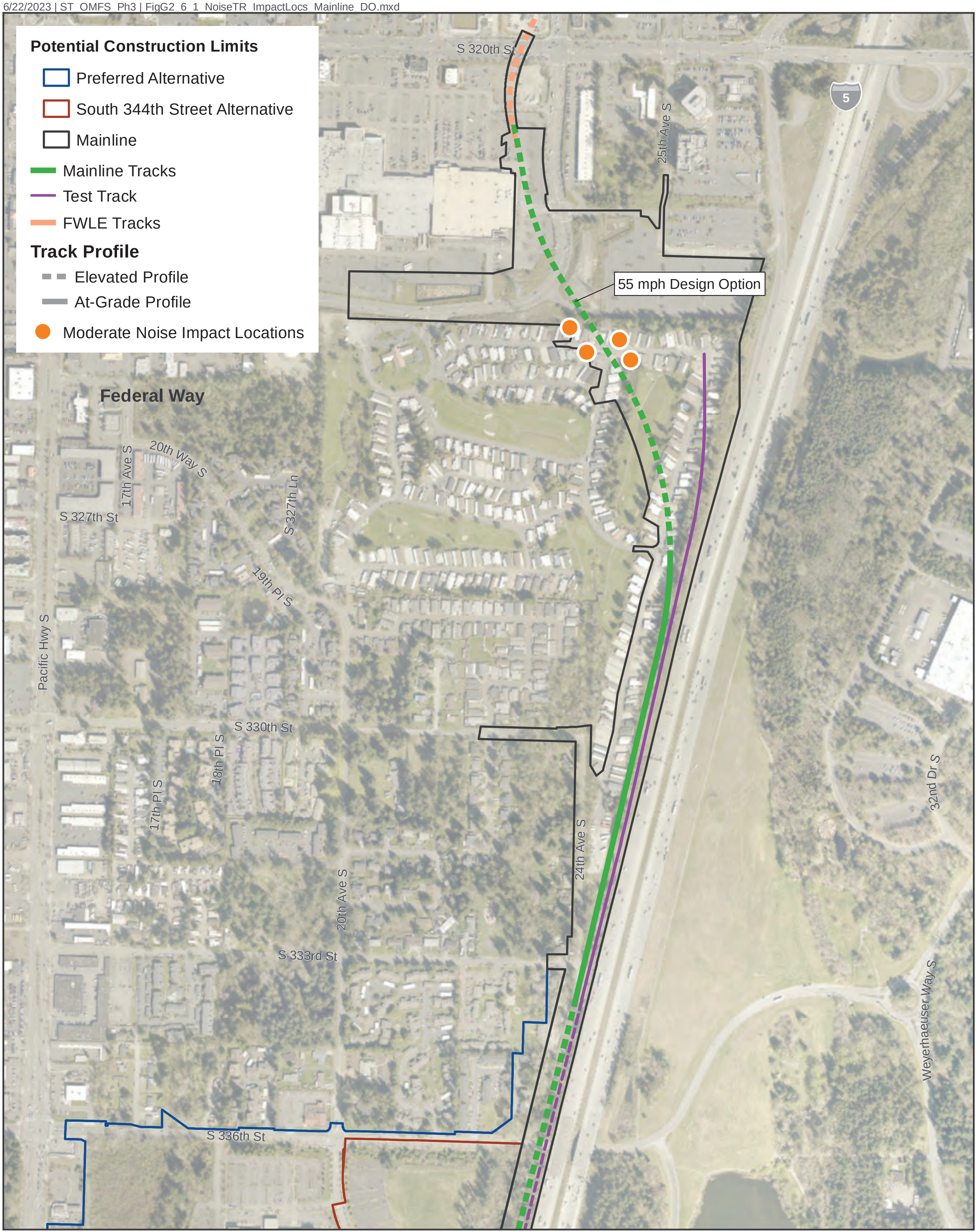
Note:

(1) NB = northbound, SB = southbound.

(2) The Preferred Alternative is shown first, followed by the South 344th Street Alternative in parenthesis. The lead tracks and crossovers from the OMF would be further south for the South 344th Street Alternative in comparison to the Preferred Alternative.

S 324th Street to Burning Tree Boulevard (NB): Two single-family residences between S 324th Street and Burning Tree Boulevard on the northbound side of the mainline track are projected to have moderate noise impacts. These impacts are due to the proximity of the tracks.

S 324th Street to Burning Tree Boulevard (SB): Two single-family residences between S 324th Street and Burning Tree Boulevard on the southbound side of the mainline track are projected to have moderate noise impacts. These impacts are due to the proximity of the tracks.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Moderate Noise Impact Locations
55 mph Design Option
Federal Way
S 320th St
25th Ave S
5
20th Way S
17th Ave S
S 327th Ln
S 327th St
19th Pl S
Pacific Hwy S
S 330th St
18th Pl S
17th Pl S
24th Ave S
20th Ave S
32nd Dr S
S 333rd St
Weyerhaeuser Way S
S 336th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

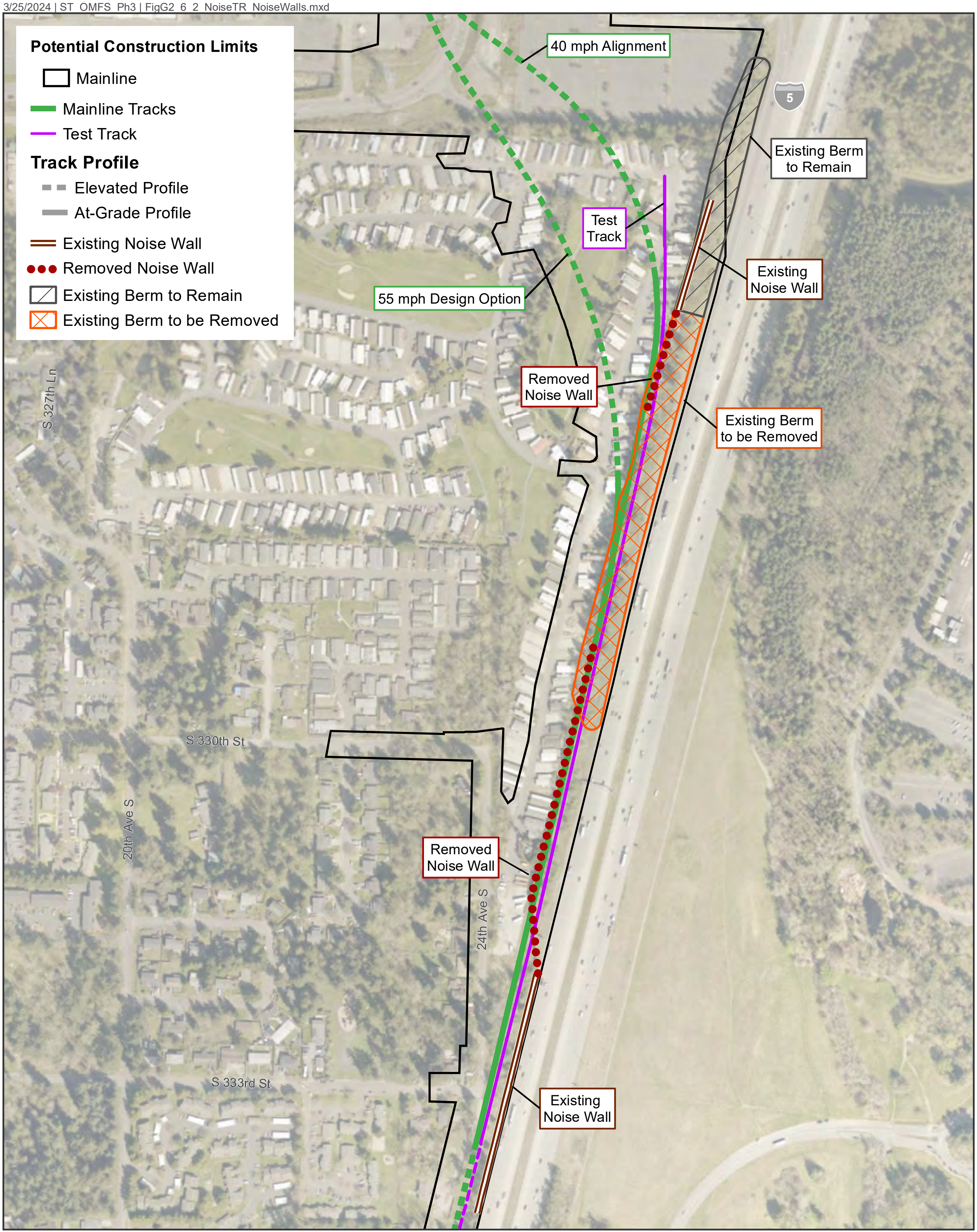
FIGURE G2.6-1
Noise Impact Locations
55 mph Design Option
OMF South

6.3.1 Traffic Noise

Construction of either mainline alignment would modify a portion of an existing berm and remove noise walls adjacent to I-5 that screen residences from traffic noise between S 320th Street and S 336th Street. The berm and noise walls were anticipated to be removed by the City of Federal Way's City Center Access Project, which would construct a new interchange with roundabouts and a new bridge over I-5 at S 324th Street. However, the City Center Access Project is now anticipated to be constructed after OMF South. As a result, Sound Transit would modify the existing berm and remove approximately 1,390 linear feet of noise walls as part of the OMF South project.

While the retained fill structure to support the mainline would serve as a barrier to traffic noise from I-5, the modification of the existing berm and noise walls is anticipated to result in traffic noise impacts for about one to three residences (Sound Transit 2023a). In final design, Sound Transit would conduct additional noise analysis in coordination with Federal Way and WSDOT to verify the findings of the noise analysis, determine whether replacement of noise walls would be necessary, and ensure that the location of any new noise walls would be consistent with the plans for the City Center Access Project.

Figure G2.6-2, Proposed Modifications to Highway Noise Walls, shows the location of the existing noise wall and berm and the areas that would be modified to accommodate the construction of the mainline tracks for OMF South under the Preferred or South 344th Street alternatives.


Potential Construction Limits
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Existing Noise Wall
Removed Noise Wall
Existing Berm to Remain
Existing Berm to be Removed
40 mph Alignment
5
Existing Berm to Remain
Test Track
Existing Noise Wall
55 mph Design Option
Removed Noise Wall
Existing Berm to be Removed
S 327th Ln
S 330th St
20th Ave S
Removed Noise Wall
24th Ave S
S 333rd St
Existing Noise Wall

Data Sources: King County; City of Federal Way.

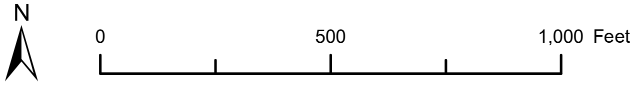

N
0
500
1,000 Feet

FIGURE G2.6-2
Proposed Modifications to
Highway Noise Walls
OMF South

6.4 Vibration

Because there are no highly vibration-sensitive land uses located near the OMF South alternatives, and due to the very low train speeds within the facility, vibration levels would be well below the impact thresholds for sensitive receptors near the three site alternatives and have not been assessed. However, vibration has been assessed for the LRV operations on the mainline and test tracks between the Preferred and the South 344th Street alternatives and the Federal Way Downtown Station.

This section describes the vibration impacts for the LRV operations on the mainline track design options. Table G2.6-12 includes the results for FTA Category 2 (residential) receptors with both daytime and nighttime sensitivity to vibration for the 40 mph Alignment, and Table G2.6-13 includes the results for FTA Category 2 receptors for the 55 mph Design Option. There are no FTA Category 1 (high sensitivity) or Category 3 (industrial) land uses near the mainline track design options.

The results include a tabulation of location information for each sensitive receptor group, the projections of future vibration levels, the impact criteria, and whether there will be vibration impacts. The tables also show the total number of vibration impacts for each location. There are no vibration impacts projected for either mainline track design option.

Table G2.6-12 Summary of FTA Category 2 Vibration Impacts for the 40 mph Alignment Mainline Track

Location	Side of Track	Dist to Near Track (feet)	Project Vibration Level (VdB)	FTA Criterion (VdB)	# of Impacts
S 324th Street to Burning Tree Boulevard	SB	80	48	72	0
Burning Tree Boulevard to S 330th Street	SB	111	46	72	0
S 330th Street to S 333rd Street	SB	81	47	72	0
S 333rd Street to S 336th Street	SB	197	46	72	0
Total:					**0**

Note: SB = southbound.

Table G2.6-13 Summary of FTA Category 2 Vibration Impacts for the 55 mph Design Option Mainline Track

Location	Side of Track	Dist to Near Track (feet)	Project Vibration Level (VdB)	FTA Criterion (VdB)	# of Impacts
S 324th Street to Burning Tree Boulevard	NB	76	48	72	0
S 324th Street to Burning Tree Boulevard	SB	57	48	72	0
Burning Tree Boulevard to S 330th Street	SB	85	46	72	0
S 330th Street to S 333rd Street	SB	81	44	72	0
S 333rd Street to S 336th Street	SB	197	43	72	0
Total:					**0**

Note: NB = northbound, SB = southbound.

6.5 Construction Noise

Elevated noise levels from construction activities are, to a degree, unavoidable for this type of project. For most construction equipment, diesel engines are typically the dominant noise source. For other activities, such as impact pile driving and jackhammering, noise generated by the actual process dominates. Short-term noise during construction of the project can be intrusive to residents near the construction sites. Most of the construction will consist of site preparation and laying new tracks and would primarily occur during daytime hours within local noise ordinance requirements for a waiver. At some locations, more extensive work will occur, such as pile driving for elevated structures and retaining walls.

Table G2.3-1 in Section 3 lists noise levels of typical construction equipment from the FTA guidance manual in terms of the maximum levels at 50 feet. Construction noise predictions at noise-sensitive locations depend on the amount of noise during each construction phase, the duration of the noise, and the distance from the construction activities to the sensitive receptor. Table G2.6-14 provides an example of a construction noise projection for typical at-grade track construction. Construction for other project features, such as buildings, would have similar results. Using these assumptions, an 8-hour Leq of 88 dBA would be projected at a distance of 50 feet from the construction site.

Using the criteria in Section 4.3 and the example for at-grade construction in Table G2.6-14, screening distances for at-grade track construction noise impact can be determined. For residential land use, the potential for short-term at-grade track construction noise impact could extend to approximately 120 feet from the corridor or OMF South site; however, if nighttime construction is conducted (when sensitivity to noise is higher and the criteria for impact are lower), the potential for short-term noise impact from at-grade construction could extend to approximately 380 feet from the corridor. For elevated structure construction, the distance for noise impact during the daytime could be up to 250 feet for impact pile driving, assuming a usage factor of 20 percent during the day. If alternative methods of piling are used, the distance to impact could be less. When a specific piling method has been determined, a screening distance could be calculated.

Based on the distances above, there would be sensitive receptors within the screening distances for all three OMF South alternatives, including the mainline track design options. Noise impacts perceived by residents and other sensitive receptors would vary depending on the proximity of the construction activity, the type of equipment being used, the time of day, and the overall duration of construction. While the noise levels would be similar for construction of any of the build alternatives, the Hybrid and Full Excavation design options for the Midway Landfill Alternative would have a greater impact due to the extended period of time needed for site preparation work.

Table G2.6-14 Typical Construction Scenario, At-Grade Track

Equipment Type	Typical Noise Level at 50 Feet (dBA)	Equipment Utilization Factor (%)	Leq (dBA)
Grader	85	50	82
Backhoe	80	40	76
Compactor	82	20	75
Loader	85	20	78
Roller	74	20	67
Truck	88	40	84
Crane, mobile	83	20	76
Total 8-hour workday Leq at 50 feet:			**88**

6.6 Construction Vibration

Unlike typical LRV operations, there is the potential for damage to nearby structures at close distances due to construction vibration from activities, such as pile driving, hoe rams, vibratory compaction, and loaded trucks. Most limits on construction vibration are based on reducing the potential for damage to nearby structures. Although construction vibrations are only temporary, it is still reasonable to assess the potential for human annoyance and damage.

As a conservative approach, the nonengineered timber and masonry construction category (Category III) has been used to assess the potential for construction vibration impacts. A vibration criterion of 94 VdB has been used to assess potential damage impact, and 72 VdB has been used to assess potential vibration annoyance from construction activities. Vibration source levels at 25 feet and the distances to potential residential annoyance and potential damage are shown in Table G2.6-15. With the exception of impact pile driving, the potential for damage is limited to within 25 feet of construction activities. For impact pile driving, the distance for the potential for damage is up to 55 feet. There are no sensitive receptors within 25 feet of the OMF South site alternatives, but there are several within 55 feet of the mainline track design options in Belmor. However, any potential for impacts would depend on the piling method chosen.

Because the exact location of construction equipment is important in projecting vibration levels, a more detailed assessment of potential vibration damage will be performed during final design when more accurate equipment locations are known.

Table G2.6-15 Summary of Potential Construction Vibration Impacts

Equipment Type	Typical Vibration Level at 25 Feet (VdB)	Distance for Potential Damage (feet)	Distance for Potential Annoyance (feet)
Impact pile driving	104	55	290
Push piling	84	25	125
Hoe ram	87	15	80
Caisson drilling	87	15	80
Loaded trucks	86	15	75
Clam shovel	94	25	135
Vibratory roller	94	25	135

7 CUMULATIVE IMPACTS

Cumulative impacts for the OMF South project would be associated with TDLE and Federal Way's proposed City Center Access Project for the Preferred and South 344th Street alternatives. Please see Figure G2.7-1, Cumulative Transit and Traffic Noise Impacts. There would be no cumulative noise impacts associated with the Midway Landfill Alternative.

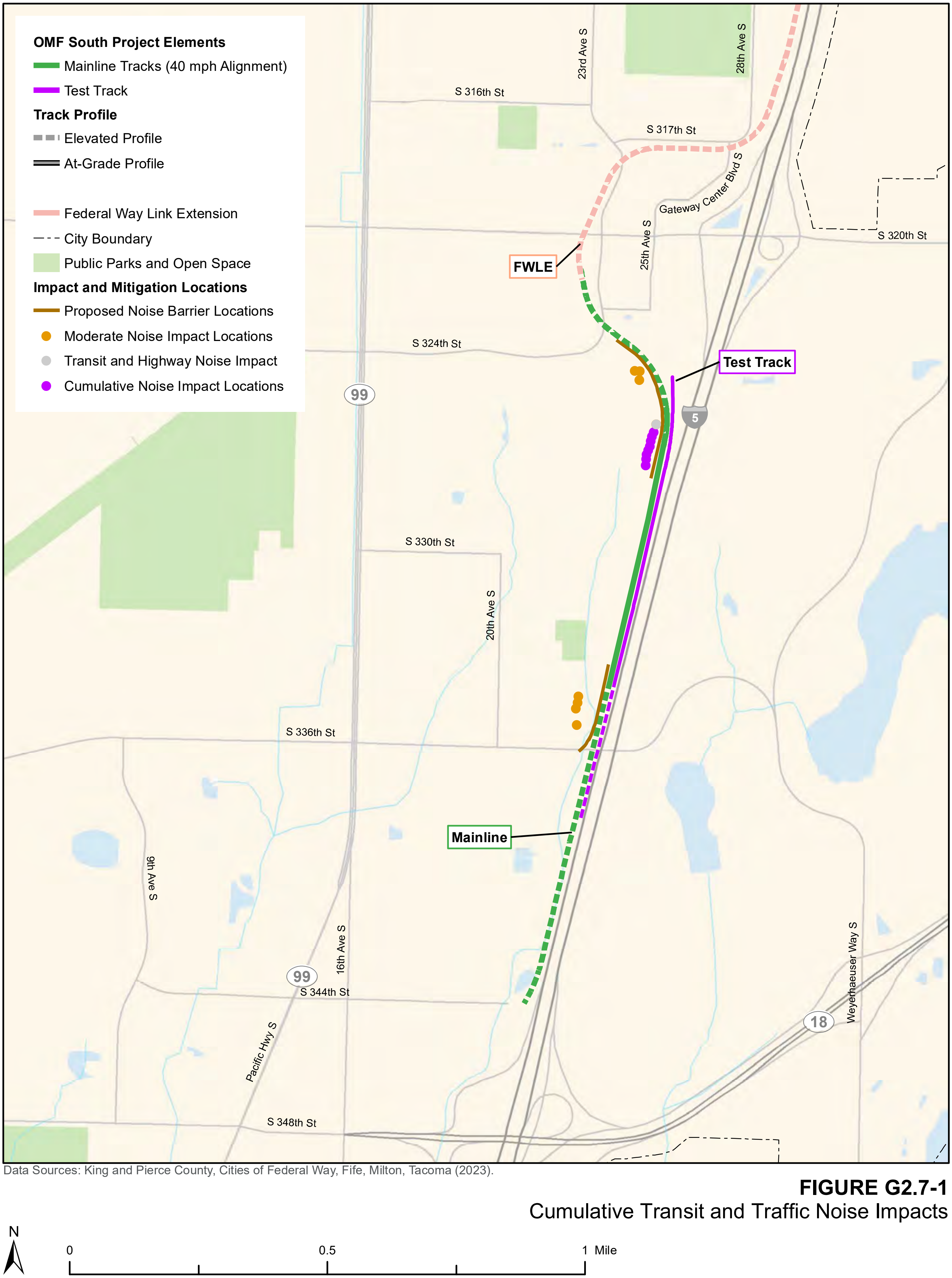
If TDLE is constructed, approximately 144 LRVs would be needed and stored at OMF South. With the additional vehicles, there would be additional operations within the facility, including additional LRV movements into and out of the facility in the morning and evening, respectively. Additionally, for the Preferred and South 344th Street alternatives, the LRVs leaving and entering would be split between the northern and southern tracks leading to the mainline tracks. The additional LRVs from TDLE operating from within the OMF South alternative sites would increase some noise levels, but they would not be loud enough to cause FTA noise impacts or WAC exceedances.

As described previously, the mainline tracks connecting the Preferred and South 344th Street alternatives would become the operational track for TDLE. With TDLE, additional trains would use the mainline tracks, and they would operate at higher speeds. As a result, the operation of TDLE is anticipated to cause additional noise impacts to residences along the mainline tracks in Belmor from either the 40 mph Alignment or the 55 mph Design Option. Impacts would also occur where the mainline curves south of S 324th Street and near the mainline north of S 336th Street. There would be no cumulative noise impacts from TDLE for the Midway Landfill Alternative because the mainline tracks adjacent to the site would already be built as part of FWLE and operating as revenue-generating tracks.

There would be no vibration impacts associated with OMF South. With the inclusion of the TDLE project, there would be an increase in vibration levels due to the higher speed of the trains, but no cumulative vibration impacts are anticipated. With the Midway Landfill Alternative, there would be no cumulative vibration impacts from the FWLE project.

Further details regarding TDLE noise and vibration impacts and mitigation will be included in the TDLE Draft EIS, which is expected to be published in mid-2024. The Draft EIS will include recommended mitigation measures, such as noise barriers, for any noise impacts on sensitive receptors near the mainline tracks, which would address the cumulative effects of TDLE for the Preferred or South 344th Street alternatives. To improve efficiency and eliminate the impacts of two construction activities in the same location, the OMF South project is anticipated to construct noise mitigation required for TDLE if the Preferred Alternative or South 344th Street Alternative is selected as the project to be built.

The City Center Access Project, together with OMF South and TDLE, could result in cumulative noise impacts to a small number of receptors south of S 324th Street. The City Center Access Project proposes to extend S 324th Street across I-5 to the east, which may increase motor vehicle traffic noise that would require mitigation.


OMF South Project Elements
Mainline Tracks (40 mph Alignment)
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Federal Way Link Extension
City Boundary
Public Parks and Open Space
Impact and Mitigation Locations
Proposed Noise Barrier Locations
Moderate Noise Impact Locations
Transit and Highway Noise Impact
Cumulative Noise Impact Locations
23rd Ave S
28th Ave S
S 316th St
S 317th St
Gateway Center Blvd S
25th Ave S
S 320th St
FWLE
S 324th St
Test Track
99
5
S 330th St
20th Ave S
S 336th St
Mainline
9th Ave S
16th Ave S
99
S 344th St
Pacific Hwy S
18
Weyerhaeuser Way S
S 348th St
N
0
0.5
1 Mile

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2023).

FIGURE G2.7-1
Cumulative Transit and Traffic Noise Impacts

8 MITIGATION

8.1 Operational Noise

The Sound Transit Link Light Rail Noise and Vibration Policy (Sound Transit 2023b) sets source mitigation as the preferred method of mitigation, followed by path mitigation, such as noise barriers, and then receiver mitigation last, which would include sound insulation of properties. There are several methods of noise mitigation available, including:

- **Noise Barriers:** Installation of noise barriers beside the tracks is commonly used to reduce noise from surface transportation sources. Depending on the height and location relative to the tracks, noise barriers can achieve between 5 and 15 dB of noise reduction. The primary requirements for an effective noise barrier are that (1) the barrier must be high enough and long enough to break the line of sight between the sound source and the receiver, (2) the barrier must be of an impervious material with a minimum surface density of 4 pounds per square foot, and (3) the barrier must not have any gaps or holes between the panels or at the bottom. Because many materials meet these requirements, the selection of materials for noise barriers is usually dictated by aesthetics, durability, cost, and maintenance considerations. Noise barriers for transit projects typically range from 8 to 12 feet in height along at-grade track and can be as low 4 feet in height on elevated structures.
- **Building Sound Insulation:** Although typically used as a last resort, sound insulation may be necessary when noise barriers are not feasible or desirable and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to the windows, by sealing holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened.

For the Preferred and South 344th Street alternatives, the mainline 40 mph Alignment curves north of S 324th Street and from S 324th Street to Oakland Hills Boulevard would have a radius between 600 and 1,000 feet and would be prepared for wayside lubricators.

Noise barriers are proposed for mitigation along the elevated 55 mph Design Option mainline track for the Preferred and South 344th Street alternatives. The approximate locations and lengths of the noise barriers are shown in Table G2.8-1 and shown in Figure G2.8-1. The final height and length of the barriers would be determined based on additional analysis of potential noise impacts during final design. However, typical noise barriers are 4 feet in height on elevated structures. Assuming 4-foot barriers on the elevated structure at the locations described below, the barriers would provide approximately 8 dB of noise reduction (with 1 and 3 dB of reduction required to eliminate impacts, respectively), and there would be no residual impacts after mitigation. No mitigation would be necessary for the Midway Landfill Alternative.

The noise mitigation for the cumulative effects of TDLE on sensitive receptors near the mainline and the Preferred or South 344th Street alternatives could include one or more of a combination of the methods described above. This will be further detailed in the TDLE Draft EIS, which is expected to be published in mid-2024.

Table G2.8-1 Summary of Potential Noise Barrier Locations

Project Alternative	Approximate Location	Noise Barrier Length (feet)
55 mph Design Option	Northbound side from south of park-and-ride to south of Burning Tree Boulevard	360
55 mph Design Option	Southbound side from south of park-and-ride to south of Burning Tree Boulevard	325

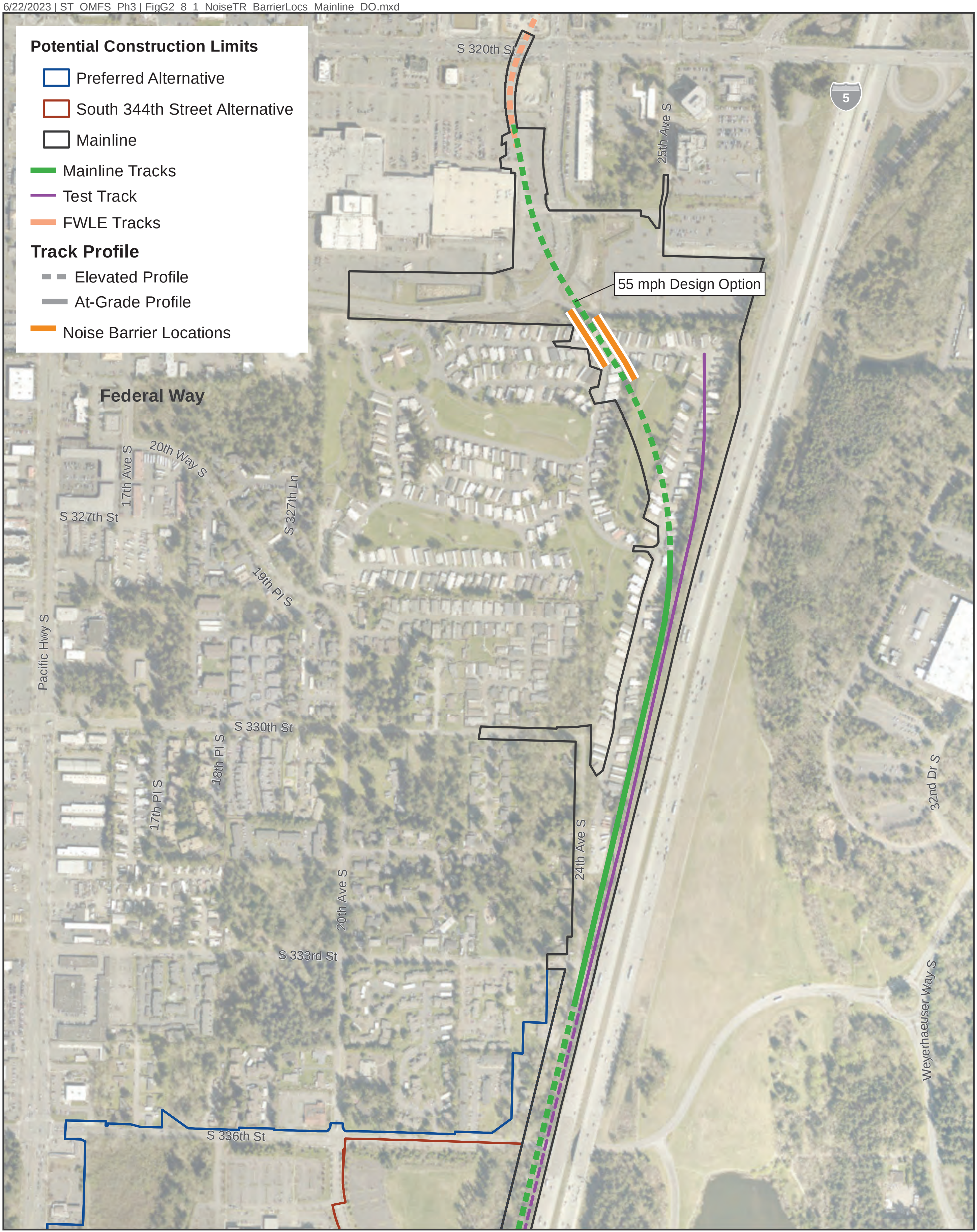
8.1.1 Traffic Noise

Mitigation for traffic noise impacts caused by a project is designed to ensure that, whenever possible, there would be no residences in the study area with project-related traffic noise levels at or above the WSDOT NAC of 66 dBA. In circumstances where existing WSDOT noise barriers (such as walls or berms constructed for the purpose of traffic noise abatement) would be removed or altered by a project, mitigation would be designed to ensure that, whenever possible, there would be no residences with traffic noise levels above the predicted 2042 No-Build levels.

For the Preferred and South 344th Street alternatives, Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing WSDOT berm and noise wall. Mitigation would be designed to maintain 2042 No-Build noise levels and could include replacement of noise walls and berms. Sound Transit would conduct additional noise analysis during final design in coordination with WSDOT to confirm whether noise mitigation is needed.

8.2 Operational Vibration

No operational vibration impacts are projected to occur; therefore, no vibration mitigation is required.


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Noise Barrier Locations
55 mph Design Option
S 320th St
25th Ave S
5
Federal Way
20th Way S
17th Ave S
S 327th Ln
S 327th St
19th Pl S
Pacific Hwy S
S 330th St
18th Pl S
17th Pl S
24th Ave S
20th Ave S
32nd Dr S
S 333rd St
Weyerhaeuser Way S
S 336th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G2.8-1
Noise Barrier Locations
55 mph Design Option
OMF South

8.3 Construction

Construction activities would be carried out in compliance with Sound Transit specifications and applicable local noise regulations. Construction noise is exempt from the WAC noise limits, except at residential land uses during nighttime hours (10 p.m. to 7 a.m.). If construction is performed during nighttime hours, the contractor must meet the WAC noise level requirements or obtain a noise variance from the governing jurisdiction. Specific construction noise and vibration mitigation measures would be developed during the final design phase of the project when more detailed construction information is available. The following measures could be applied as needed to minimize temporary construction noise and vibration impacts:

- Avoiding nighttime construction in residential neighborhoods when possible
- Locating stationary construction equipment as far as possible from noise-sensitive sites
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers
- Routing construction-related truck traffic to roadways that will cause the least disturbance to residents
- Using alternative construction methods to minimize the use of impact and vibratory equipment (e.g., pile drivers and compactors). If pile driving is necessary, it would be limited to daytime hours

The primary means of mitigating noise and vibration from construction activities is to require the contractors to prepare a detailed Noise and Vibration Control Plan. A noise control engineer or acoustician would work with the contractor to prepare a Noise and Vibration Control Plan in conjunction with the contractor’s specific equipment and methods of construction. Key elements of a plan could include the following:

- Contractor’s specific equipment types
- Schedule (dates and times of day) and methods of construction
- Maximum noise limits for each piece of equipment with certification testing
- Prohibitions on certain types of equipment and processes during the night or day time hours per local agency coordination and approved variances
- Identification of specific sensitive sites where near construction sites
- Methods for projecting construction noise levels
- Implementation of noise and vibration control measures where appropriate
- Methods for responding to community complaints in compliance with Sound Transit Outreach requirements

9 REFERENCES

FHWA (Federal Highway Administration). 2006. FHWA Construction Noise Handbook. Final Report FHWA-HEP-06-015. Available at: https://www.fhwa.dot.gov/Environment/noise/construction_noise/handbook/. Accessed 2020.

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Federal Transit Administration, John A. Volpe National Transportation System Center and Cross-Spectrum Acoustics Inc. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed 2020.

Sound Transit. 2015. Link Light Rail Operations and Maintenance Satellite Facility Noise and Vibration Technical Report. Michael Minor & Associates, Inc.

Sound Transit. 2019. 2019 Reference Noise and Vibration Levels for Link Light Rail Projects.

Sound Transit. 2023a. OMF South Highway Traffic Noise Study Technical Memorandum. Cross-Spectrum Acoustics Inc.

Sound Transit. 2023b. Sound Transit Board Resolution No. R2023-15. Link Light Rail Noise and Vibration Policy*.* Available at: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2023/Resolution%20R2023-15.pdf. Accessed 2023.

Operations and Maintenance Facility South

ATTACHMENT G2-1

Measurement Site Photographs

Federal Transit Administration

SOUNDTRANSIT

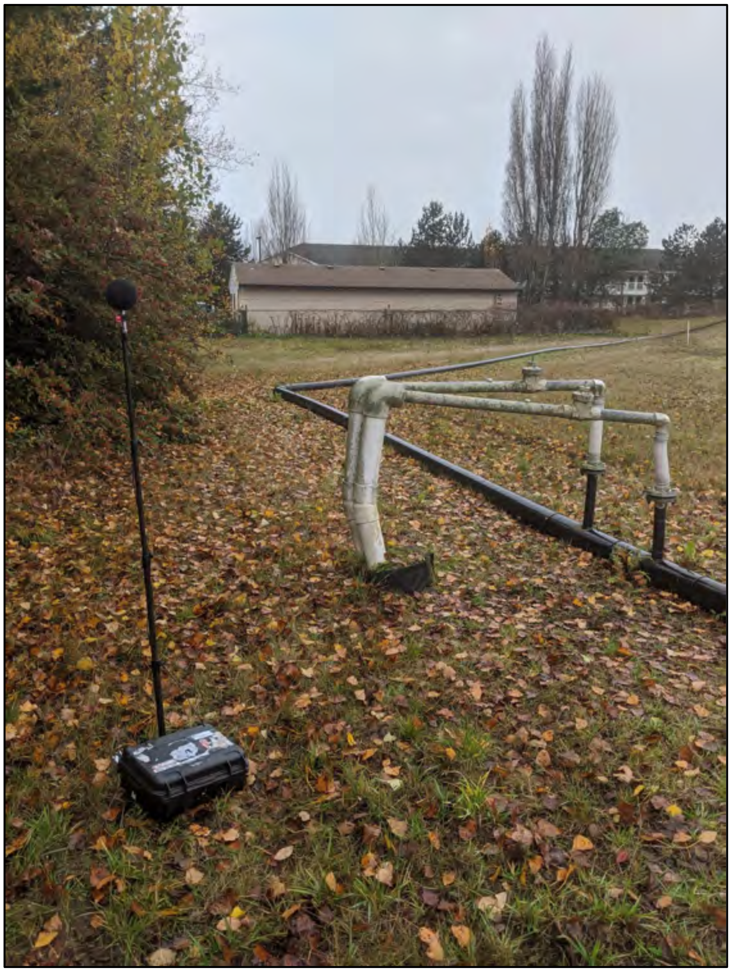


Figure G2-1.1 Site A Long-Term Noise Measurement: Midway Landfill Alternative

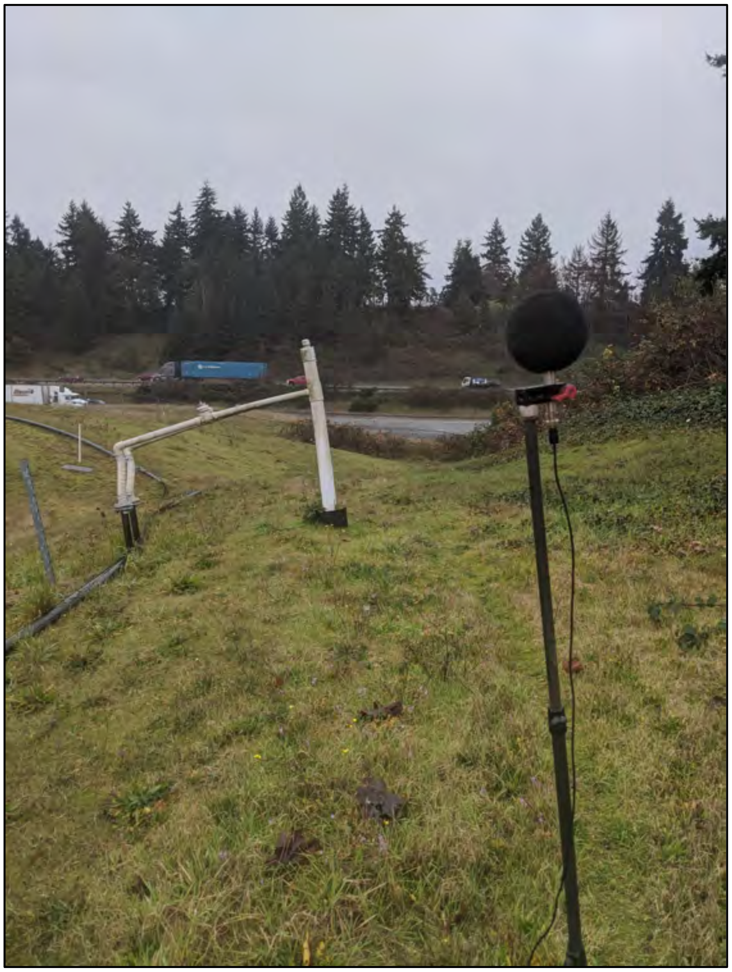


Figure G2-1.2 Site B Long-Term Noise Measurement: Midway Landfill Alternative

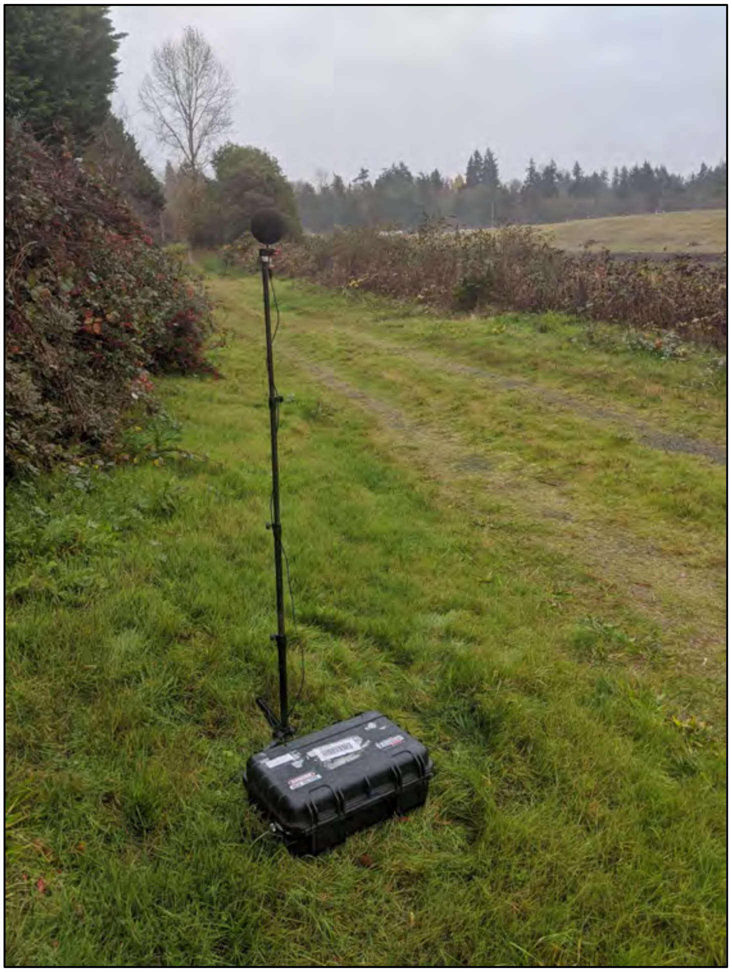


Figure G2-1.3 Site C Long-Term Noise Measurement : Midway Landfill Alternative

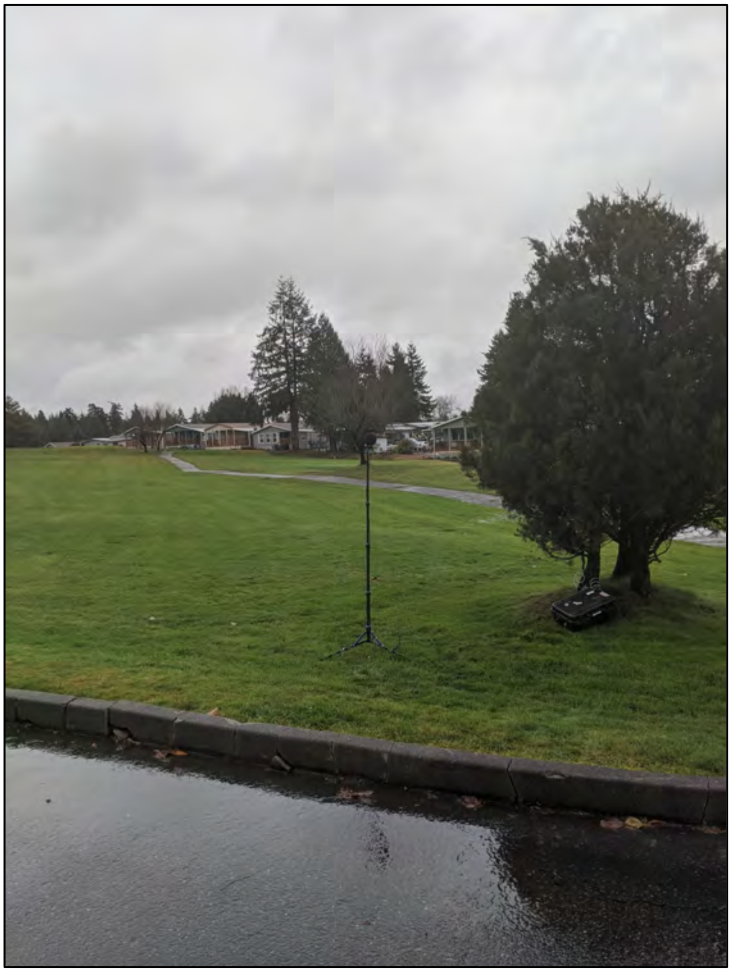


Figure G2-1.4 Site D Long-Term Noise Measurement: Mainline Track Options to Federal Way Transit Center

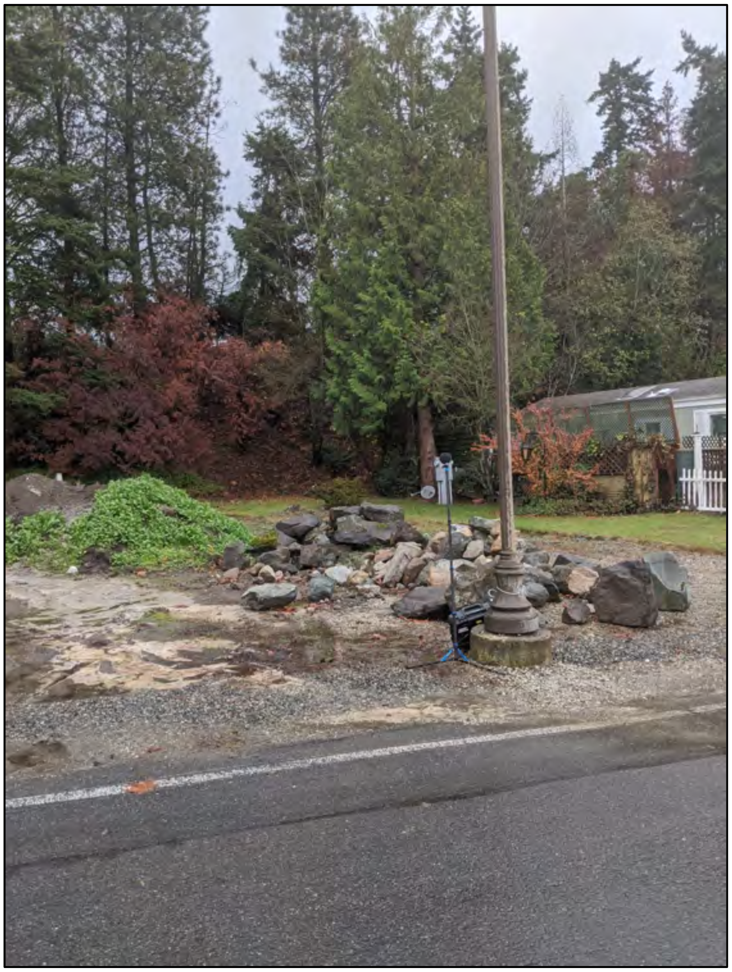


Figure G2-1.5 Site E Long-Term Noise Measurement – Mainline Track Options to Federal Way Transit Center

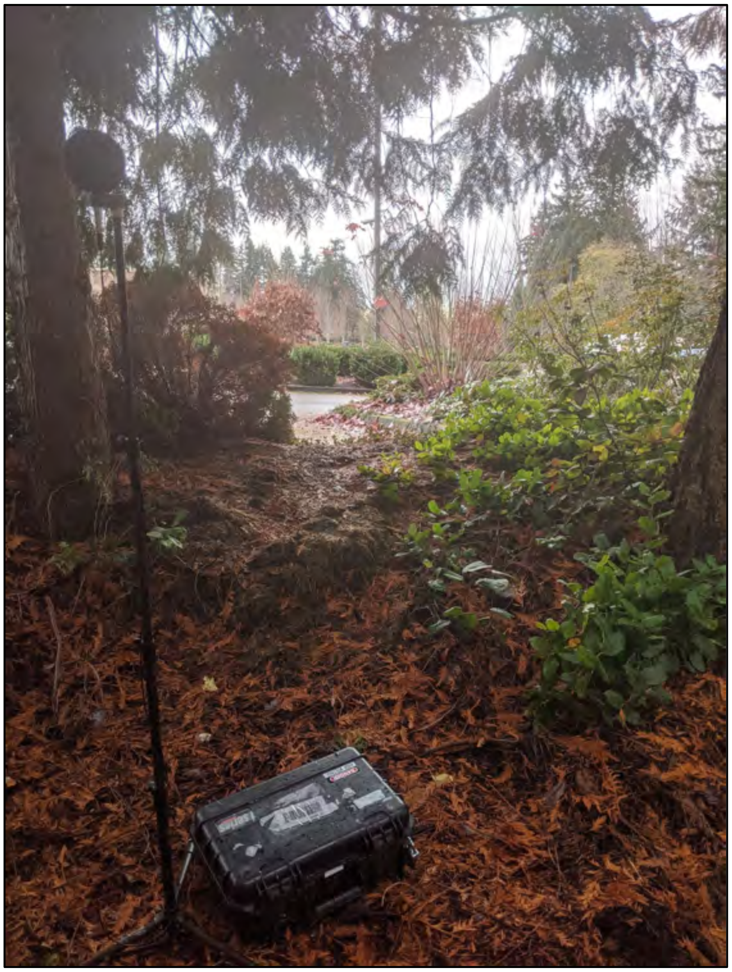


Figure G2-1.6 Site F Long-Term Noise Measurement: South 336th Street and South 344th Street Alternatives

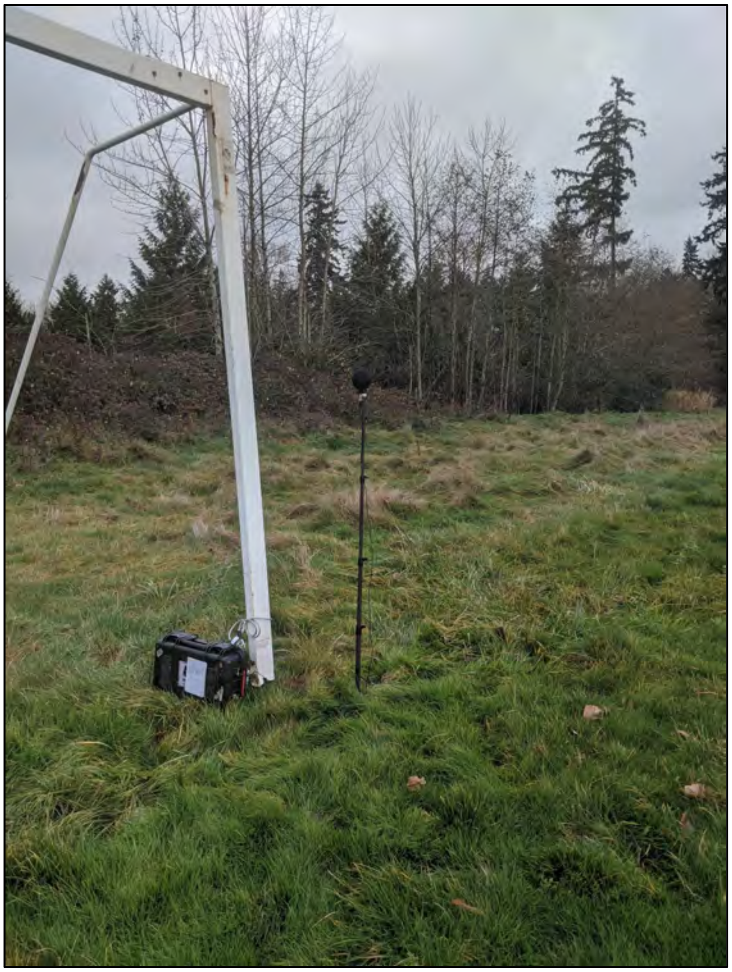


Figure G2-1.7 Site G Long-Term Noise Measurement: South 336th Street/ South 344th Street Alternatives

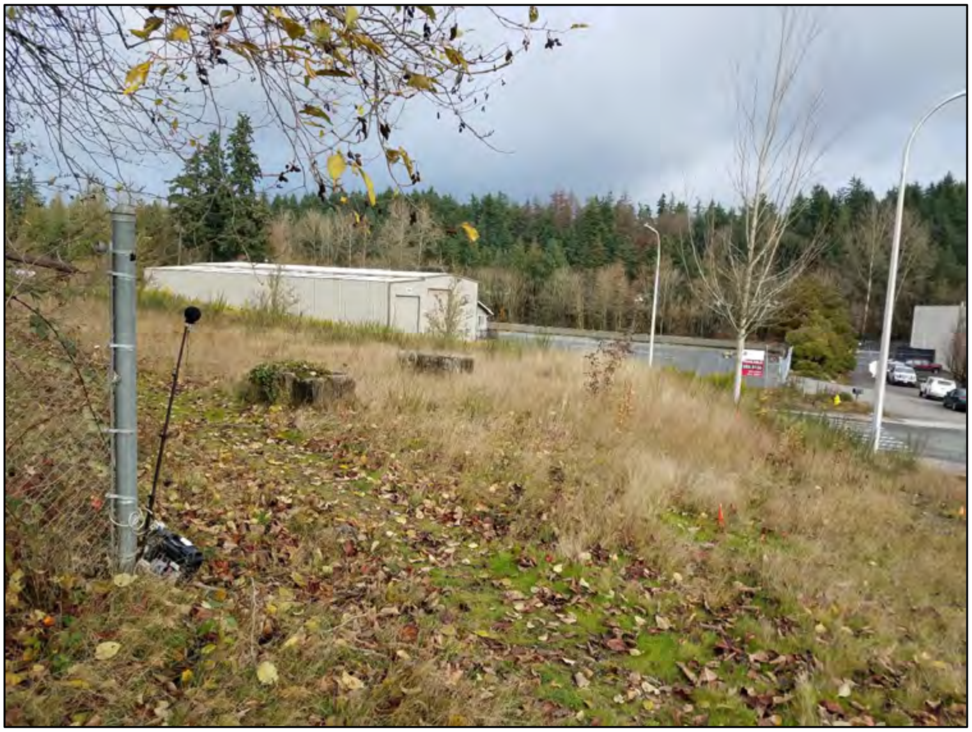


Figure G2-1.8 Site H Long-Term Noise Measurement: South 336th Street and South 344th Street Alternatives

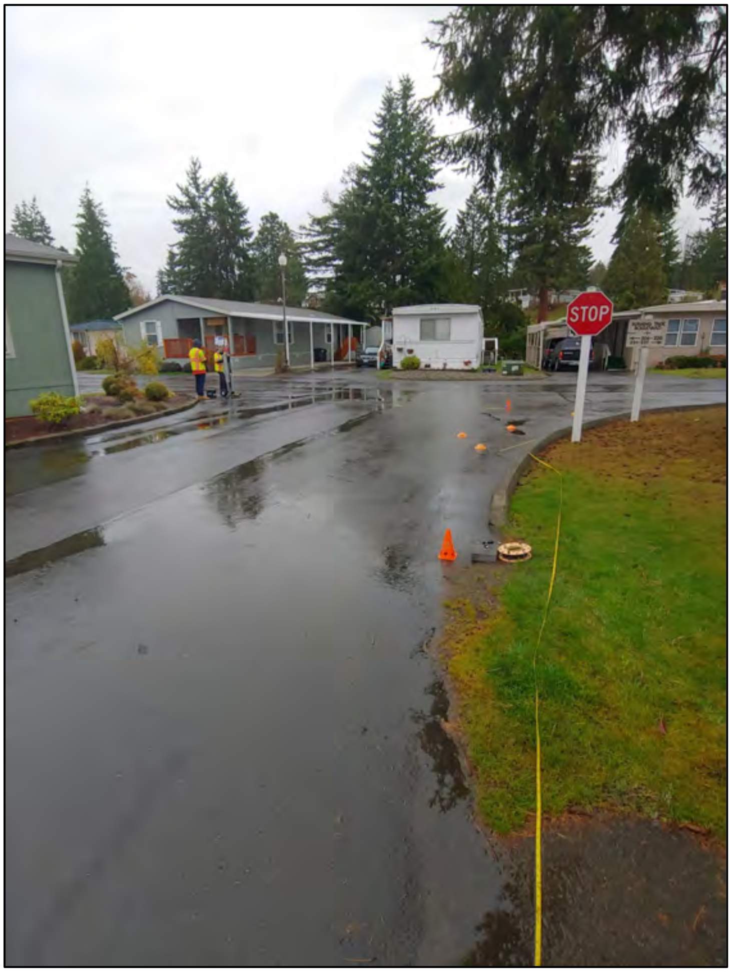


Figure G2-1.9 Vibration Propagation Measurement: Belmor Mobile Home Park

Operations and Maintenance Facility South

ATTACHMENT G2-2

Noise Measurement Data

Federal Transit Administration

SOUNDTRANSIT

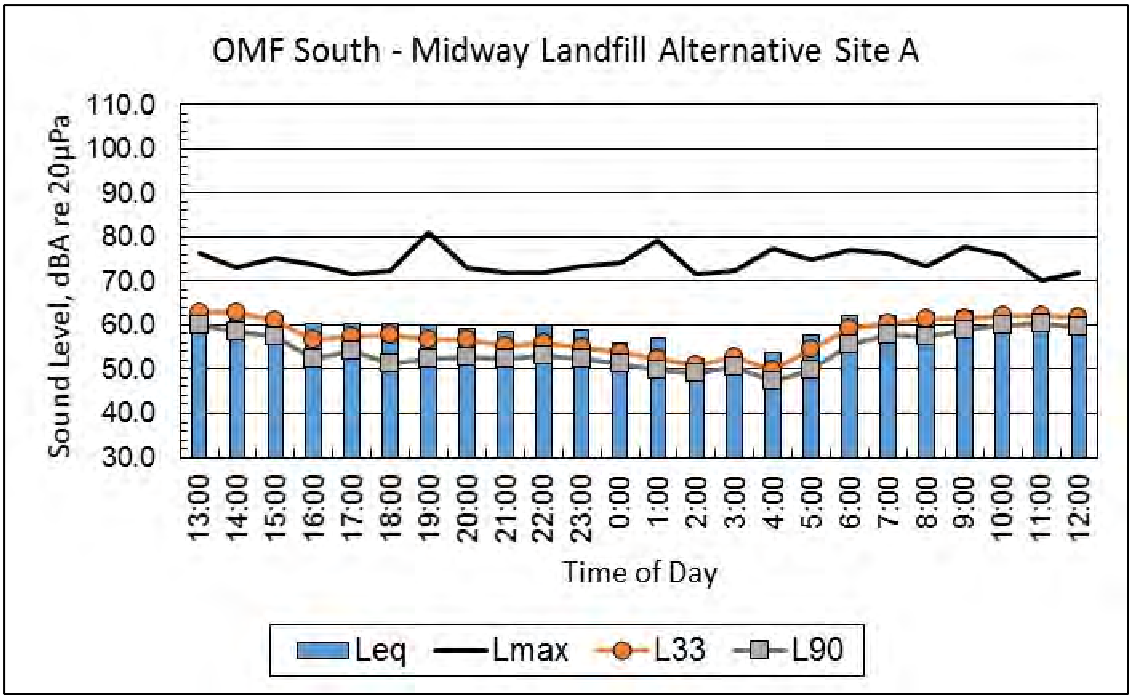


Figure G2-2.1 Site A Long-Term Noise Measurement Data: Midway Landfill Alternative

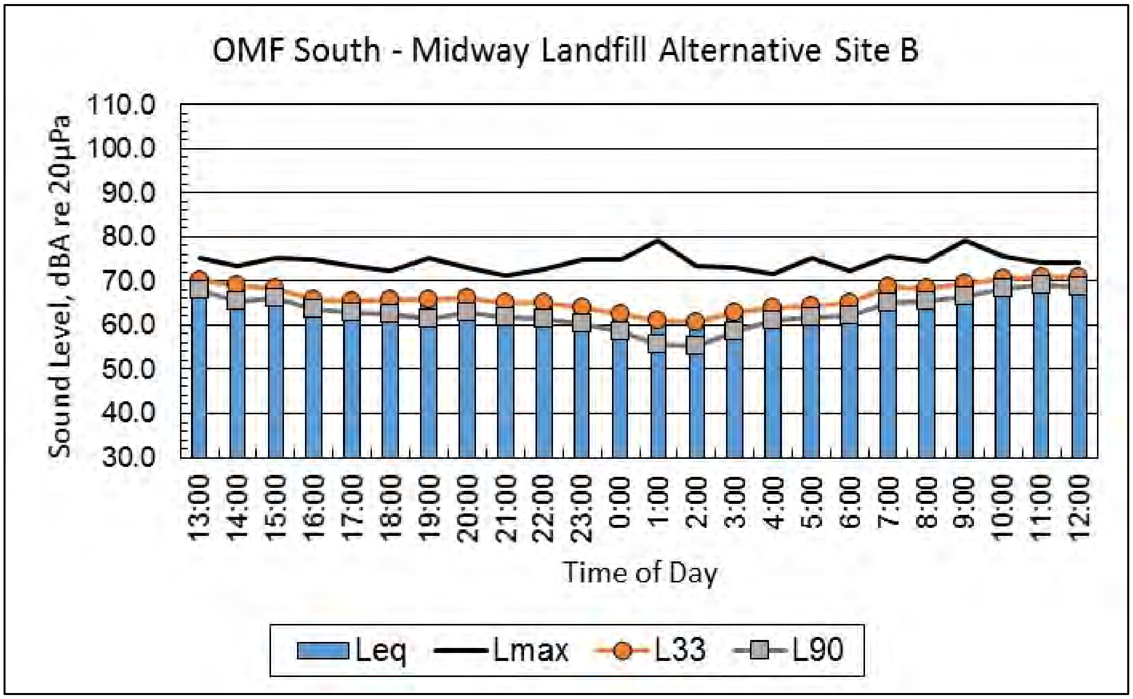


Figure G2-2.2 Site B Long-Term Noise Measurement Data: Midway Landfill Alternative

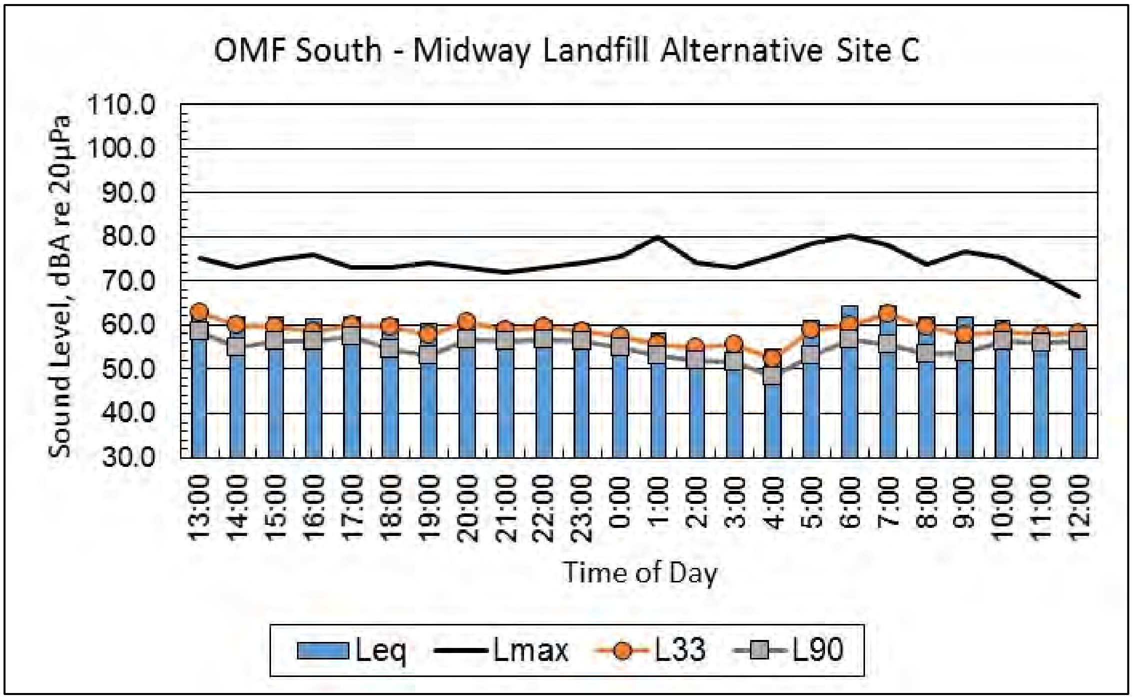


Figure G2-2.3 Site C Long-Term Noise Measurement Data: Midway Landfill Alternative

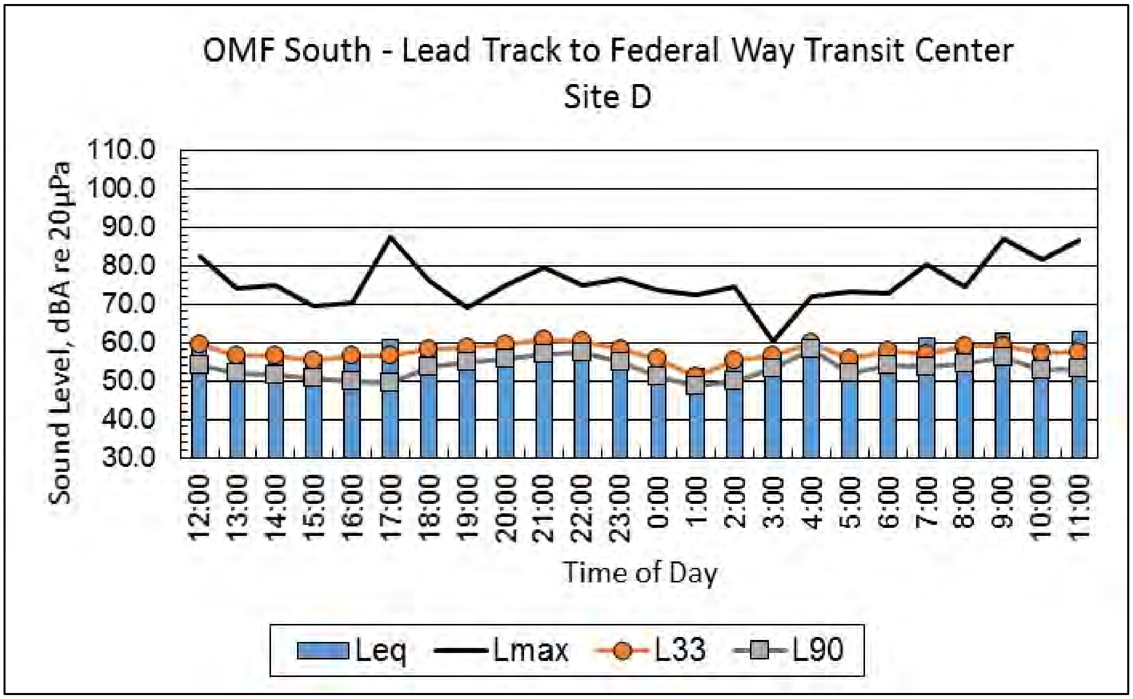


Figure G2-2.4 Site D Long-Term Noise Measurement Data; Mainline Track Options to Federal Way Transit Center

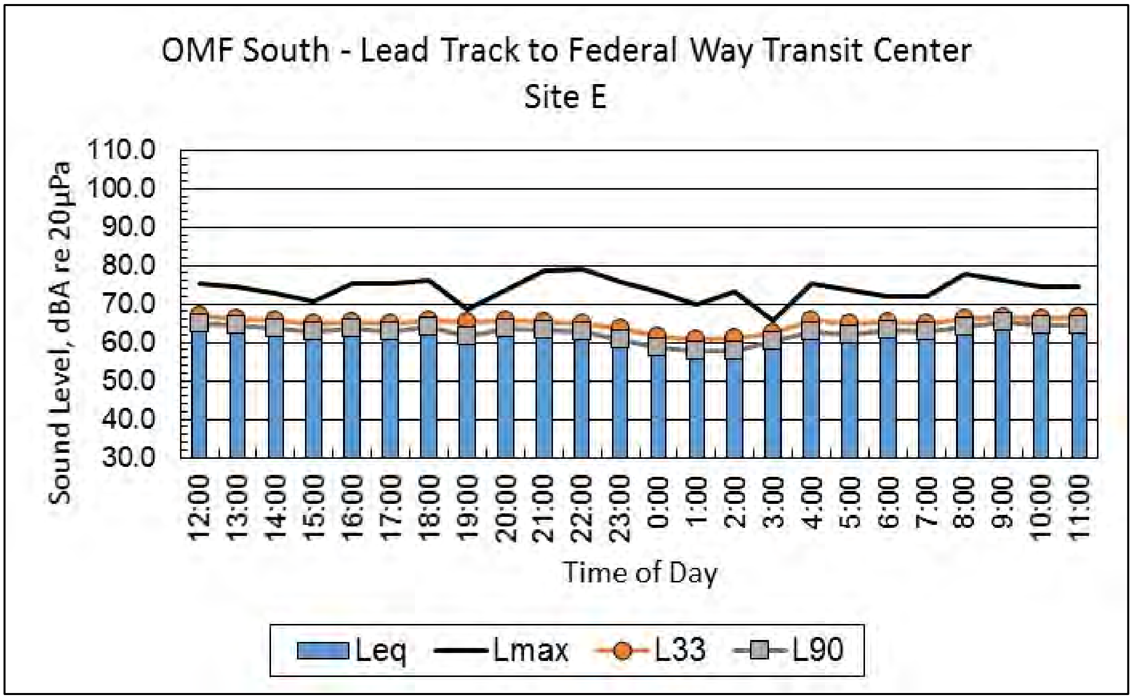


Figure G2-2.5 Site E Long-Term Noise Measurement Data: MainlineTrack Options to Federal Way Transit Center

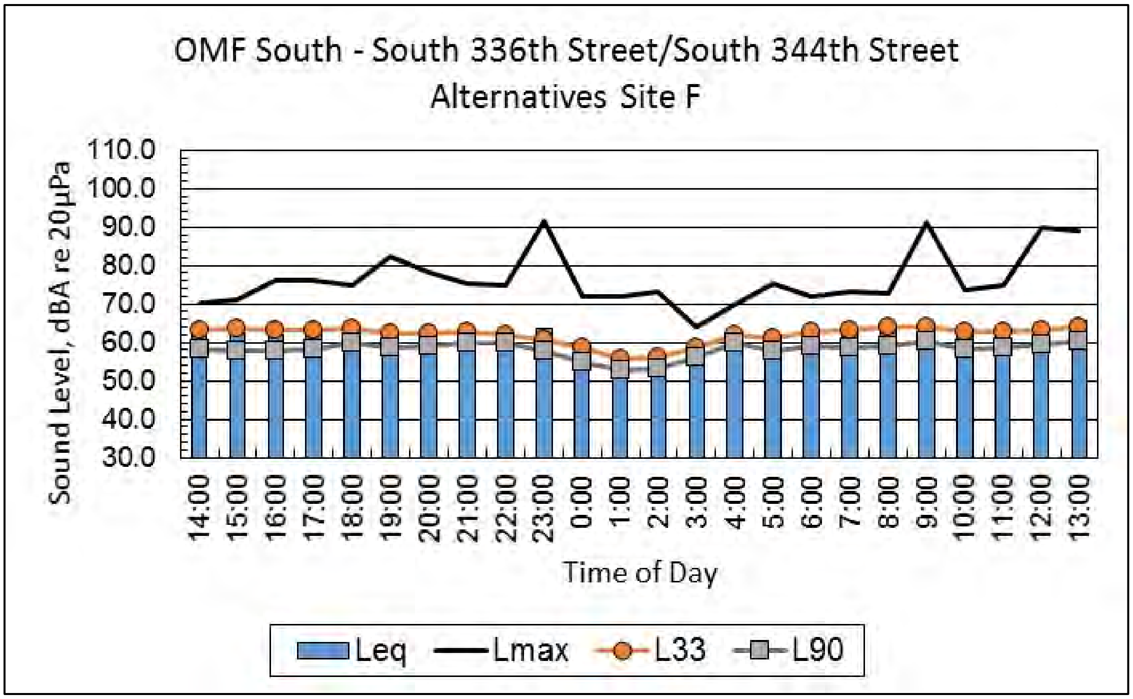


Figure G2-2.6 Site F Long-Term Noise Measurement Data: South 336th Street and South 344th Street Alternatives

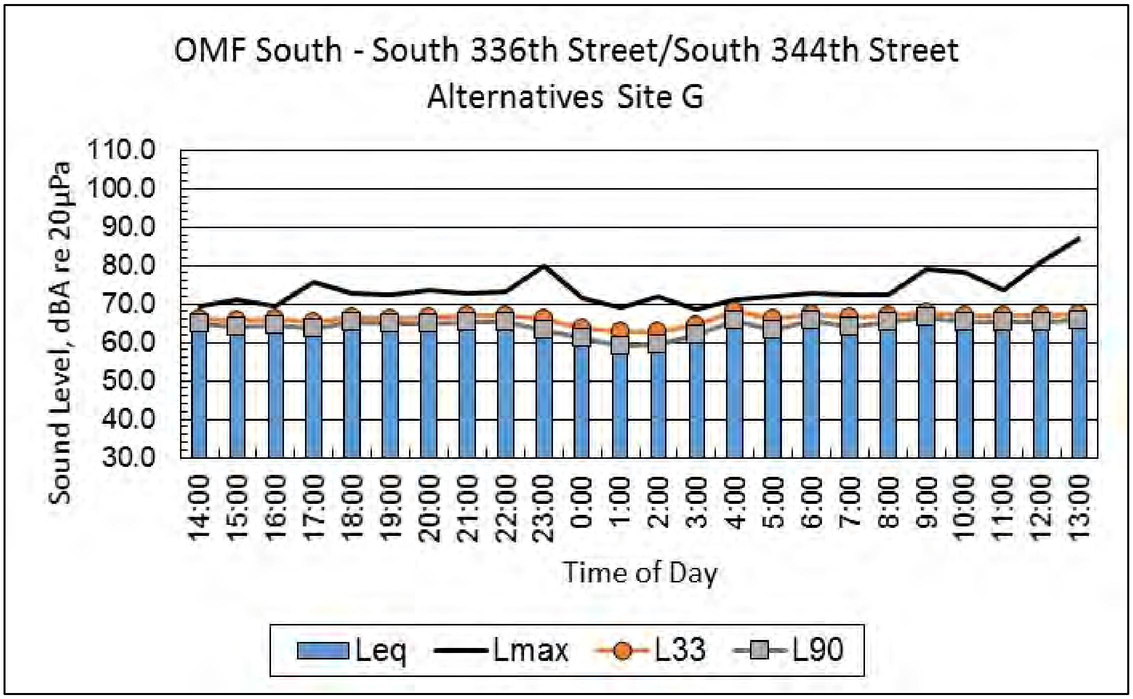


Figure G2-2.7 Site G Long-Term Noise Measurement Data: South 336th Street and South 344th Street Alternatives

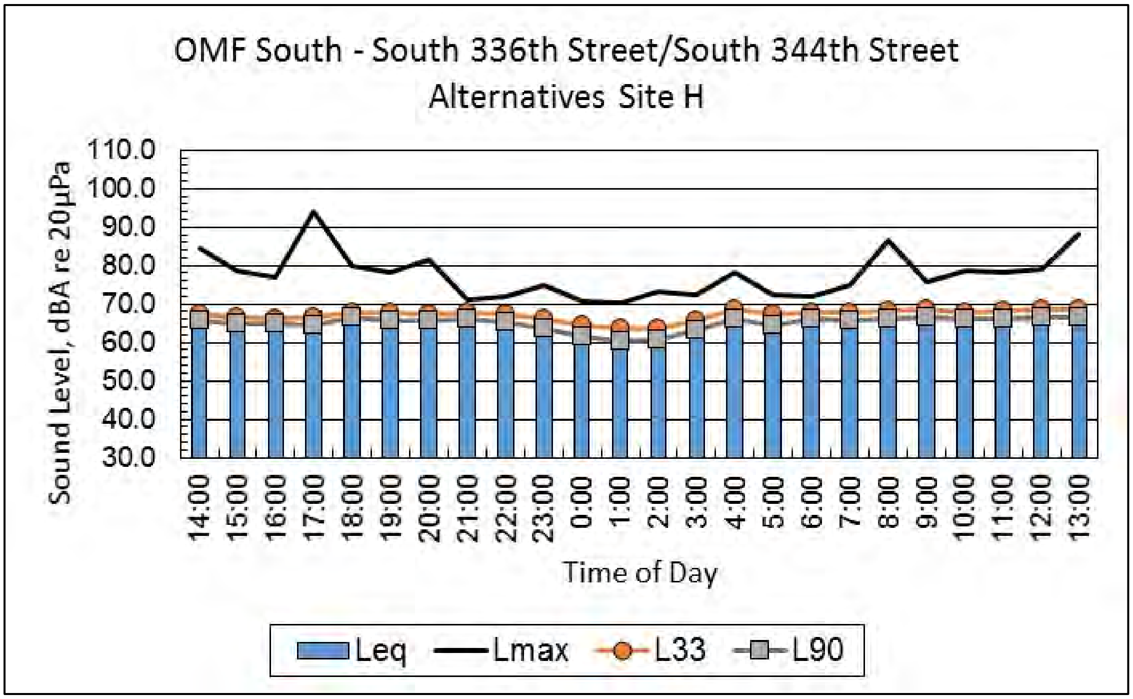


Figure G2-2.8 Site H Long-Term Noise Measurement Data: South 336th Street and South 344th Street Alternatives

Operations and Maintenance Facility South

ATTACHMENT G2-3

Vibration Measurement Data

Federal Transit Administration

SOUNDTRANSIT

Table G2-3.1 Site VP-A Belmor Mobile Home Park 1/3-Octave Band Transfer Mobility Coefficients

Coefficients	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz
A	24.0	30.8	28.2	32.2	42.6	54.2	59.2	71.7	83.0	100.5	101.8	110.5	126.9	151.2	-91.1	-164.6
B	-5.9	-9.1	-7.0	-6.3	-11.3	-16.1	-17.2	-23.9	-31.1	-41.1	-42.8	-49.4	-60.7	-76.3	195.9	282.0
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-76.4	-101.6

TM=A+B*log(dist)+C*log(dist)^2

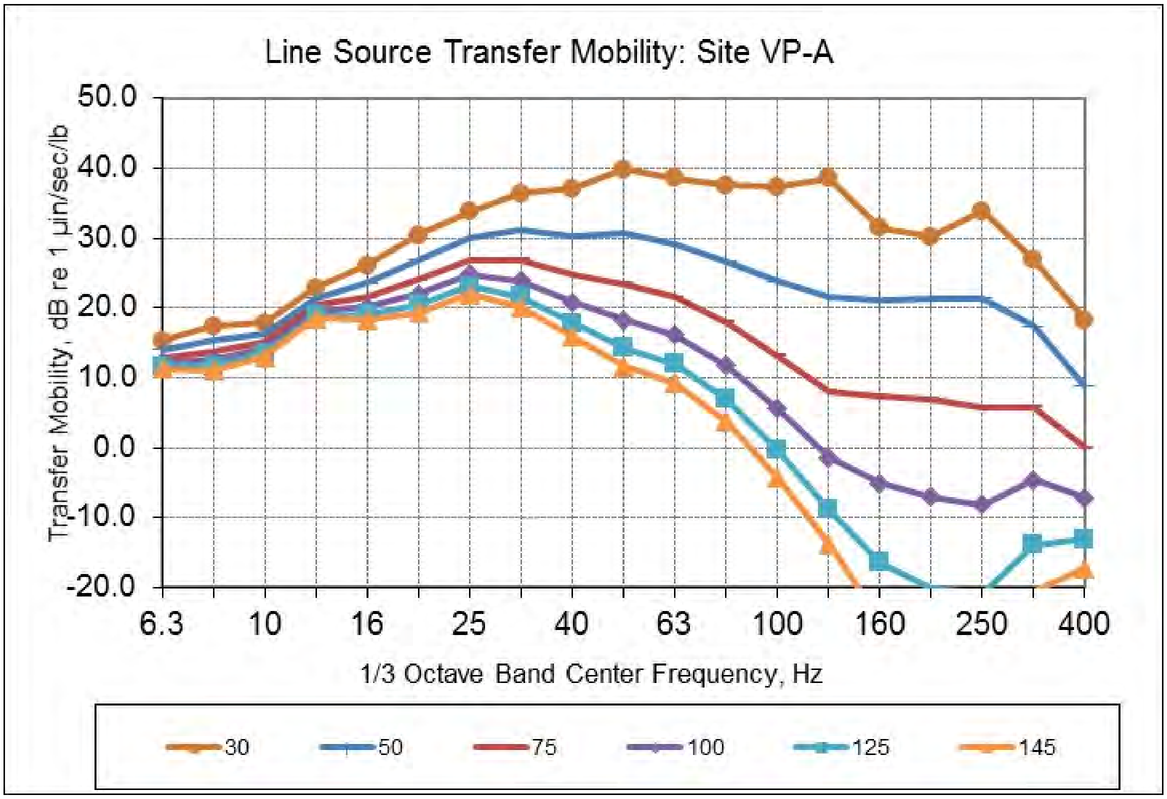


Figure G2-3.1 Line Source Transfer Mobility Site VP-A Belmor Mobile Home Park

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix G3: Ecosystem Resources Technical Report

SOUND TRANSIT
140A
154B
Link

Federal Transit Administration

SOUNDTRANSIT

June 2024

Summary

This technical report addresses ecosystem components that may be affected by the Sound Transit Operations and Maintenance Facility South (OMF South) Project. The ecosystem components addressed in this report are aquatic species and habitat, vegetation, wildlife and wildlife habitat, and wetlands. The report describes the affected environment and the expected temporary construction impacts and permanent long-term operational impacts of the proposed alternatives, including the No-Build Alternative, on these resources. It also identifies measures intended to avoid and minimize impacts and potential compensatory mitigation for unavoidable impacts.

This technical report was prepared to meet the requirements of the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA) to support the OMF South NEPA/SEPA Final Environmental Impact Statement (Final EIS). The technical report provides information that would typically be addressed in a biological assessment or other document that demonstrates compliance with the requirements of Section 7(c) of the Endangered Species Act (ESA). Further, this report addresses potential effects on Essential Fish Habitat, consistent with the requirements for federal action agencies under the Magnuson-Stevens Fishery Conservation and Management Act.

Under any of the build alternatives, direct long-term impacts on ecosystem resources would occur where permanent features such as project facilities overlap features such as streams, stream buffers, native or structurally complex vegetation, wetlands, or wetland buffers. Temporary, construction-related impacts would occur where such features are affected by clearing and ground disturbing work but are revegetated following construction.

Aquatic Species and Habitats

The study area includes two streams: East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C (referred to as East Fork Hylebos Tributary and West Fork Hylebos Tributary, respectively, in this Final EIS). Both are tributaries to Hylebos Creek, an independent tributary that discharges to the Hylebos Waterway along the eastern shore of Puget Sound's Commencement Bay in Tacoma. A third stream (North Fork McSorley Creek) would receive treated stormwater runoff from the Midway Landfill Alternative but would otherwise not be directly affected by project construction or operation. All three streams are classified as Type F streams, meaning they have the potential to support fish.

Three ESA-listed fish species could potentially occur in the study area. These are Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout, all of which are federally listed as threatened. Numerous barriers to fish passage, combined with small stream sizes and intermittent flow regimes, prevent any of these species from entering stream reaches in the study area. None of the streams in the study area include any proposed or designated critical habitat for ESA-listed species.

Direct long-term impacts on aquatic resources would occur where permanent features such as project facilities permanently alter in-stream habitat (including habitat accessibility) or riparian functions. Additional impacts may occur where surface waters receive stormwater runoff from impervious surfaces created or replaced by project construction. Potential construction-related impacts include temporary disturbance of riparian vegetation and an elevated risk of delivering sediment or contaminants, such as fuel and hydraulic fluids to streams during construction.

Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. However, two to three culverts may need to be replaced as part of the Preferred Alternative, and these replaced culverts, which may be longer, would be made fish passable. If any culverts on potentially fish-bearing streams are replaced, the replacement structures would be designed and installed in accordance with WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). In the interim design, the replacement structure for West Fork Hylebos Tributary would have a substantially larger hydraulic opening than the existing culverts at that site. The installation of an appropriately sized structure would help restore hydrological capacity, allowing flood flows, sediment and organic debris to pass through and (if access is restored in the future) providing unhindered fish passage beneath the roadway.

Under the Preferred Alternative (referred to as the South 336th Street Alternative in the 2021 Draft EIS) or the South 344th Street Alternative, construction of the OMF facility and associated elevated mainline tracks would necessitate the realignment of the stream channel for East Fork Hylebos Tributary. The interim design includes meanders and other features that would increase the length of the stream channel by approximately 130 linear feet, enhancing the availability and diversity of aquatic habitats. Large woody debris would be placed in and near the stream channel to provide additional habitat complexity. The relocated channel would be designed to maintain flows and water quality conditions.

Along an approximately 380-foot-long segment of the relocated stream channel, the width of the area available to support riparian functions would be expanded under these alternatives. Under current conditions, the vegetated riparian zone in that area is confined to an approximately 80-foot-wide strip. Upon project completion, the width of the area between the OMF site and the mainline tracks would be approximately 200 feet.

Although relocating and realigning the stream channel would have some beneficial effects, changing the physical characteristics of the stream could affect its hydrology and downstream sediment regimes. In addition, the presence of the OMF site to the west and the mainline tracks to the east would further reduce the width of the already limited area available to support riparian functions. In general, other than the 380 feet of expanded riparian buffer along the relocated channel, both the Preferred and the South 344th Street alternatives would have a net reduction in riparian habitat width. Also, the presence of support columns for the elevated mainline tracks may constrain options for natural or human-created modifications to channel configuration in the future. Approximately 1,650 linear feet of East Fork Hylebos Tributary would be reconfigured under the Preferred Alternative, compared to approximately 1,500 linear feet under the South 344th Street Alternative.

Under the Preferred Alternative, East Fork Hylebos Tributary at the downstream end of the study area would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long culvert. Under the South 344th Street Alternative, this culvert would be replaced with an approximately equal daylighted length of surface-flowing stream. Daylighting would allow increased interaction between the stream and associated riparian vegetation, resulting in beneficial effects associated with restoring natural processes such as organic input and flow attenuation.

Emergency vehicle access to the mainline tracks would be needed near the location of the stream segment that would be daylighted under the South 344th Street Alternative. One of the options under consideration may require approximately 60 feet of channel that is currently culverted (and that would otherwise be daylighted, as described above) to be placed in a new culvert. It may be possible to eliminate the need for a culvert through detailed design of the access and of the stream meanders. The design of the emergency vehicle access would need to be coordinated and approved by Sound Transit, WSDOT, and the city of Federal Way.

Construction and operation of the Preferred Alternative would affect aquatic and riparian habitats associated with West Fork Hylebos Tributary where it flows through a wetland and associated in-line stormwater detention facility south of S 336th Street. The stream lacks a defined bed and bank in the wetland. Potential project-related impacts could include reduced riparian function and alterations to peak flows.

The Midway Landfill Alternative would not be expected to affect aquatic resources because it would not include any construction activities within 200 feet of a surface-flowing stream.

Vegetation, Wildlife, and Wildlife Habitat

Much of the study area is dominated by urban development, including industrial, institutional, commercial, and residential areas. These areas support plant and animal species adapted to disturbed urban areas. However, patches of less-developed habitats occur along the Hylebos Creek tributaries in Federal Way and at the Midway Landfill in Kent.

Analysts identified and delineated 10 vegetation cover types in the study area and evaluated their relative habitat value. Relative habitat value is based on habitat structure, scarcity in the study area, disturbance types and frequency, and time required for ecosystem functions to recover following clearing and post-construction revegetation.

No plant or wildlife species that are listed or proposed for listing under the ESA are known or expected to use habitats in the study area. Patches of mature forest, a state priority habitat, are found in riparian areas along East Fork Hylebos Tributary within the study area.

Impacts on terrestrial resources would occur where project construction converts vegetation or other wildlife habitat features to project facilities. Clearing for project construction would also increase the risk of contributing to the spread of noxious or invasive weed species. Noise, light, and human activity associated with construction and operation of OMF South may also have short- and long-term impacts on wildlife.

The extent of the Preferred Alternative’s effects on native and complex habitats would be greater than any of the other alternatives. Compared to the other project alternatives, the Midway Landfill Alternative would have minimal effects on existing native or complex habitats and a lower risk of contributing to the establishment and spread of noxious weeds and invasive plants.

Wetlands

Sound Transit identified a total of 23 wetlands in the study area. Biologists performed formal delineations of wetland boundaries in legally accessible areas associated with the Hylebos Creek tributaries, which included most wetlands in the study area. Agencies, Tribes, and the public expressed a high level of concern about potential impacts on ecosystem resources in these areas. While formal delineations are not typically required at this stage of the environmental review process, Sound Transit determined that detailed information collected early in the process would help the design team avoid or minimize impacts on wetlands. Other wetlands were mapped and characterized during site reconnaissance visits.

The Preferred Alternative would have the greatest degree of permanent impacts on wetlands and wetland buffers and of temporary (construction-related) impacts on wetlands, while the South 344th Street Alternative would have the greatest degree of temporary (construction-related) impacts on wetland buffers. Among the build alternatives, the Midway Landfill

Alternative would have the least wetland impact because there are no regulated wetlands or wetland buffers within its project footprint.

The 55 mph Design Option for the curve at the northern end of the mainline tracks would affect one wetland that would otherwise be avoided by the 40 mph Alignment. Under each of the alternatives, the extent of temporary construction-related impacts on wetlands and wetland buffers would be substantially less than long-term permanent impacts.

Potential Mitigation

The proposed project would mitigate impacts on ecosystem resources in accordance with the mitigation sequencing requirements established by NEPA, SEPA, the Clean Water Act (CWA), and local critical areas ordinances. In this context, mitigation sequencing is defined as first avoiding and minimizing, then rectifying, reducing, compensating, and monitoring environmental impacts (Washington Administrative Code [WAC] 197-11-768). As described below, the project alternatives would first avoid or minimize potential impacts on ecosystems resources to the greatest degree feasible, and Sound Transit is committed to providing compensatory mitigation when avoidance is not practicable.

The avoidance and minimization of impacts was a guiding principle in the preliminary design of the project alternatives. The build alternatives for the proposed project would avoid or minimize potential impacts on ecosystems resources whenever practicable. Sound Transit would comply with applicable federal, state, and local mitigation requirements during design, construction, and post construction activities. Sound Transit would meet all regulatory requirements and implement proactive avoidance and minimization measures with best management practices in adherence with federal, state, and local regulations.

The design for OMF South was influenced by the presence and location of streams, wetlands, and potential fish habitat. The project footprint was adjusted to avoid and minimize impacts on wetlands (Wetland WFW-02 in particular), streams, riparian areas, and areas of native forest (along East Fork Hylebos Tributary in particular). Sound Transit is exploring options for reducing impacts on West Fork Hylebos Tributary without compromising the operability of the Preferred Alternative. Examples of additional strategies include minimizing vegetation clearing during construction and restoring temporarily affected areas. On-site restoration would include restoring in-stream habitat with large woody debris and planting temporarily disturbed wetlands and riparian buffers with native species.

For unavoidable long-term impacts on wetlands, streams, and their buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase, in accordance with applicable federal, state, and local requirements and guidelines. These include the federal Final Compensatory Mitigation Rule (40 Code of Federal Regulations [CFR] Part 230); interagency guidance (Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance; Ecology et al. 2021, or as updated); and the applicable local critical areas ordinances. Use of the King County In-Lieu Fee Program (Mitigation Reserves Program) or an approved mitigation bank would be considered as options for compensatory mitigation. Permittee-responsible wetland mitigation, including both on- and off-site mitigation, would also be included in the compensatory mitigation approach. Off-site mitigation areas could involve use of City-owned parcels or acquisition of properties to be restored or enhanced. Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis.

Table of Contents

1 INTRODUCTION....G3-1

1.1 Project Description....G3-1

1.2 Data Gathered....G3-8

1.2.1 Tribal....G3-8

1.2.2 Federal....G3-8

1.2.3 State....G3-8

1.2.4 Local....G3-8

1.3 Related Laws, Regulations, and Guidelines....G3-9

1.3.1 Federal....G3-9

1.3.2 State....G3-10

1.3.3 Regional and Local....G3-10

1.4 Study Areas....G3-10

1.4.1 Aquatic Species and Habitat....G3-11

1.4.2 Vegetation, Wildlife, and Wildlife Habitat....G3-11

1.4.3 Wetlands....G3-11

2 STUDY OBJECTIVES AND METHODS....G3-15

2.1 Aquatic Species and Habitat....G3-15

2.1.1 Study Objectives....G3-15

2.1.2 Methods....G3-15

2.2 Vegetation, Wildlife, and Wildlife Habitat....G3-17

2.2.1 Study Objectives....G3-17

2.2.2 Methods....G3-17

2.3 Wetlands....G3-19

2.3.1 Study Objectives....G3-19

2.3.2 Methods....G3-19

2.4 Impact Assessment Methods and Assumptions....G3-20

2.4.1 Direct Impacts....G3-20

2.4.2 Indirect Impacts....G3-21

2.4.3 Cumulative Impacts....G3-21

2.4.4 Analysis Assumptions....G3-21

3 AFFECTED ENVIRONMENT....G3-24

3.1 Aquatic Species and Habitat....G3-24

3.1.1 Streams in the Study Area....G3-25

3.1.2 Aquatic Species of Concern....G3-39

3.2 Vegetation, Wildlife, and Wildlife Habitat....G3-40

3.2.1 Vegetation....G3-40

3.2.2 Terrestrial Wildlife....G3-48
3.2.3 Species and Habitats of Concern....G3-49

3.3 Wetlands....G3-53
3.3.1 Wetland Descriptions....G3-56

4 ENVIRONMENTAL IMPACTS....G3-67

4.1 Aquatic Species and Habitat....G3-67
4.1.1 No-Build Alternative....G3-68
4.1.2 Long-Term Impacts....G3-68
4.1.3 Construction Impacts....G3-84

4.2 Vegetation, Wildlife, and Wildlife Habitat....G3-87
4.2.1 No-Build Alternative....G3-87
4.2.2 Long-Term Impacts....G3-88
4.2.3 Construction Impacts....G3-98

4.3 Wetlands....G3-101
4.3.1 No-Build Alternative....G3-101
4.3.2 Long-Term Impacts....G3-101
4.3.3 Construction Impacts....G3-105

4.4 Indirect Impacts....G3-109

4.5 Cumulative Impacts....G3-110

5 MITIGATION MEASURES....G3-111

5.1 Avoidance and Minimization....G3-111
5.1.1 Avoidance and Minimization During Design Development....G3-111
5.1.2 Construction Best Management Practices....G3-113
5.1.3 Design and Operation Best Management Practices....G3-114

5.2 Rectifying and Reducing Impacts over Time....G3-115

5.3 Compensatory Mitigation....G3-115
5.3.1 Approved Mitigation Bank....G3-116
5.3.2 County In-Lieu Fee Programs (Mitigation Reserves Program)....G3-116
5.3.3 Project-Specific Mitigation Developed by Sound Transit....G3-116

6 REFERENCES....G3-118

Figures

Figure G3.1-1 Project Vicinity: OMF South Alternatives G3-2
Figure G3.1-2 Conceptual Layout: Preferred Alternative G3-4
Figure G3.1-3 Conceptual Layout: South 344th Street Alternative G3-5
Figure G3.1-4 Conceptual Layout: Midway Landfill Alternative G3-6
Figure G3.1-5 Mainline Track Options....G3-7
Figure G3.1-6 Ecosystem Resources Study Area: Mainline Track Options G3-12
Figure G3.1-7 Ecosystem Resources Study Area: Preferred and South 344th Street Alternatives....G3-13
Figure G3.1-8 Ecosystem Resources Study Area: Midway Landfill Alternative G3-14
Figure G3.3-1 Wetland and Stream Existing Conditions: Mainline Track Options G3-27
Figure G3.3-2 Wetland and Stream Existing Conditions: Preferred and South 344th Street Alternatives....G3-28
Figure G3.3-3 Wetland and Stream Existing Conditions: Midway Landfill Alternative....G3-29
Figure G3.3-4 Vegetation Cover Existing Conditions: Mainline Track Options G3-42
Figure G3.3-5 Vegetation Cover Existing Conditions: Preferred and South 344th Street Alternatives....G3-43
Figure G3.3-6 Vegetation Cover Existing Conditions: Midway Landfill Alternative....G3-44
Figure G3.4-1 Impacts to Wetlands and Streams: Mainline Track, 40 mph Alignment....G3-71
Figure G3.4-2 Impacts to Wetlands and Streams: Mainline Track, 55 mph Design Option G3-72
Figure G3.4-3 Impacts to Wetlands and Streams: Preferred Alternative G3-73
Figure G3.4-4 Impacts to Wetlands and Streams: South 344th Street Alternative, Enchanted Parkway Alignment....G3-74
Figure G3.4-5 Impacts to Wetlands and Streams: South 344th Street Alternative, I-5 Alignment....G3-75
Figure G3.4-6 Impacts to Wetlands and Streams: Midway Landfill Alternative....G3-76
Figure G3.4-7 Impacts to Vegetation Cover: Mainline Track, 40 mph Alignment....G3-90
Figure G3.4-8 Impacts to Vegetation Cover: Mainline Track, 55 mph Design Option G3-91
Figure G3.4-9 Impacts to Vegetation Cover: Preferred Alternative....G3-92
Figure G3.4-10 Impacts to Vegetation Cover: South 344th Street Alternative, Enchanted Parkway Alignment....G3-93
Figure G3.4-11 Impacts to Vegetation Cover: South 344th Street Alternative, I-5 Alignment....G3-94
Figure G3.4-12 Impacts to Vegetation Cover: Midway Landfill Alternative G3-95

Tables

Table G3.3-1 Summary of Streams in the Study Area G3-25
Table G3.3-2 Characteristics of Physical In-Stream Habitat for East Fork Hylebos Tributary in the Study Area G3-31
Table G3.3-3 Fish Passage Barrier Assessment for East Fork Hylebos Tributary Within and Downstream of the Study Area G3-33
Table G3.3-4 Fish Passage Barrier Assessment for West Fork Hylebos Tributary Within and Downstream of the Study Area G3-36
Table G3.3-5 Fish Passage Barrier Assessment for North Fork McSorley Creek.........G3-38
Table G3.3-6 Vegetation and Wildlife Habitats in the OMF South Study Area.............G3-41
Table G3.3-7 Wildlife Species of Concern Potentially Occurring within the Study Area G3-50
Table G3.3-8 Wetlands in the Study Area..G3-54
Table G3.4-1 Potential Long-Term Impacts on Aquatic Resources.............................G3-70
Table G3.4-2 Potential Temporary (Construction-Related) Impacts on Aquatic Resources G3-86
Table G3.4-3 Potential Long-Term Impacts on Vegetation..G3-89
Table G3.4-4 Potential Temporary (Construction-Related) Impacts on Vegetation G3-99
Table G3.4-5 Potential Long-Term Wetland Impacts (acres) G3-102
Table G3.4-6 Potential Long-Term Wetland Buffer Impacts G3-103
Table G3.4-7 Potential Long-Term Impacts of the Preferred Alternative on Wetlands (acres)...G3-104
Table G3.4-8 Potential Long-Term Impacts of the South 344th Street Alternative on Wetlands (acres) G3-105
Table G3.4-9 Potential Temporary (Construction-Related) Impacts on Wetlands G3-106
Table G3.4-10 Potential Temporary (Construction-Related) Impacts on Wetland Buffers...G3-106
Table G3.4-11 Potential Temporary (Construction-Related) Impacts of the Preferred Alternative on Wetlands..G3-107
Table G3.4-12 Potential Temporary (Construction-Related) Impacts of the South 344th Street Alternative on Wetlands G3-108

Attachments

Attachment G3-1	Wetland Delineation Methodology
Attachment G3-2	Sound Transit's Stream Assessment Guidelines
Attachment G3-3	Wetland and Stream Background Information
Attachment G3-4	Wetland Data Determination Forms
Attachment G3-5	Ecology Wetland Rating Forms
Attachment G3-6	Wetland, Stream, and Habitat Photographs
Attachment G3-7	Common and Scientific Names of Plant and Animal Species
Attachment G3-8	Preliminary Potential Off-Site Mitigation Areas

Acronyms and Abbreviations

Belmor	Belmor Mobile Home Park
BMP	best management practice
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FWHCA	fish and wildlife habitat conservation area
FWLE	Federal Way Link Extension
GIS	geographic information system
HPA	Hydraulic Project Approval
I-5	Interstate 5
LRV	light rail vehicle
LWD	large woody debris
MOW	Maintenance of Way
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWL	ordinary high water line
OMF	Operations and Maintenance Facility
OMF South	Operations and Maintenance Facility South
PEM	palustrine emergent
PFO	palustrine forested
PGIS	pollution-generating impervious surface
PHS	Priority Habitats and Species
PSS	palustrine scrub-shrub
RCW	Revised Code of Washington
SASSI	Salmon and Steelhead Stock Inventory

SEPA	State Environmental Policy Act
Sound Transit	Central Puget Sound Regional Transit Authority
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
TDLE	Tacoma Dome Link Extension
TESC	Temporary Erosion and Sediment Control
UGA	Urban Growth Area
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WWTT	Western Washington Treaty Indian Tribes

1 INTRODUCTION

This technical report addresses ecosystem components that may be affected by the Sound Transit Operations and Maintenance Facility South (OMF South) Project. The ecosystem components addressed in this report are aquatic species and habitats; vegetation, wildlife, and wildlife habitat; and wetlands. For brevity, aquatic species and habitats, and vegetation, wildlife, and wildlife habitat are sometimes identified as aquatic resources and terrestrial resources, respectively. Discussions in this document also address threatened and endangered species. The report describes the affected environment and the expected temporary construction impacts and long-term operational impacts of the proposed alternatives, including the No-Build Alternative, on these resources. It also identifies measures intended to avoid and minimize impacts and potential compensatory mitigation for unavoidable impacts.

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility in its South Corridor (OMF South) to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy approximately 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way (MOW) building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire light rail system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

Three site alternatives for the proposed project are evaluated in the Draft Environmental Impact Statement (EIS): two in Federal Way and one in Kent (Figure G3.1-1). These alternatives are named the Preferred Alternative (referred to as the South 336th Street Alternative in the 2021 SEPA Draft EIS), the South 344th Street Alternative, and the Midway Landfill Alternative, respectively.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which in southern King County is the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by alternative. The Preferred Alternative would require the construction of approximately 1.4 miles of mainline tracks and the South 344th Street Alternative would require approximately 1.8 miles of mainline tracks. The Midway Landfill Alternative is adjacent to FWLE and would connect by lead tracks directly to the FWLE mainline tracks. The Preferred and South 344th Street alternative mainlines include tail tracks that extend approximately 1,000 feet past the site to allow trains to turnaround and access the site from the south if the northern lead tracks were out of service.

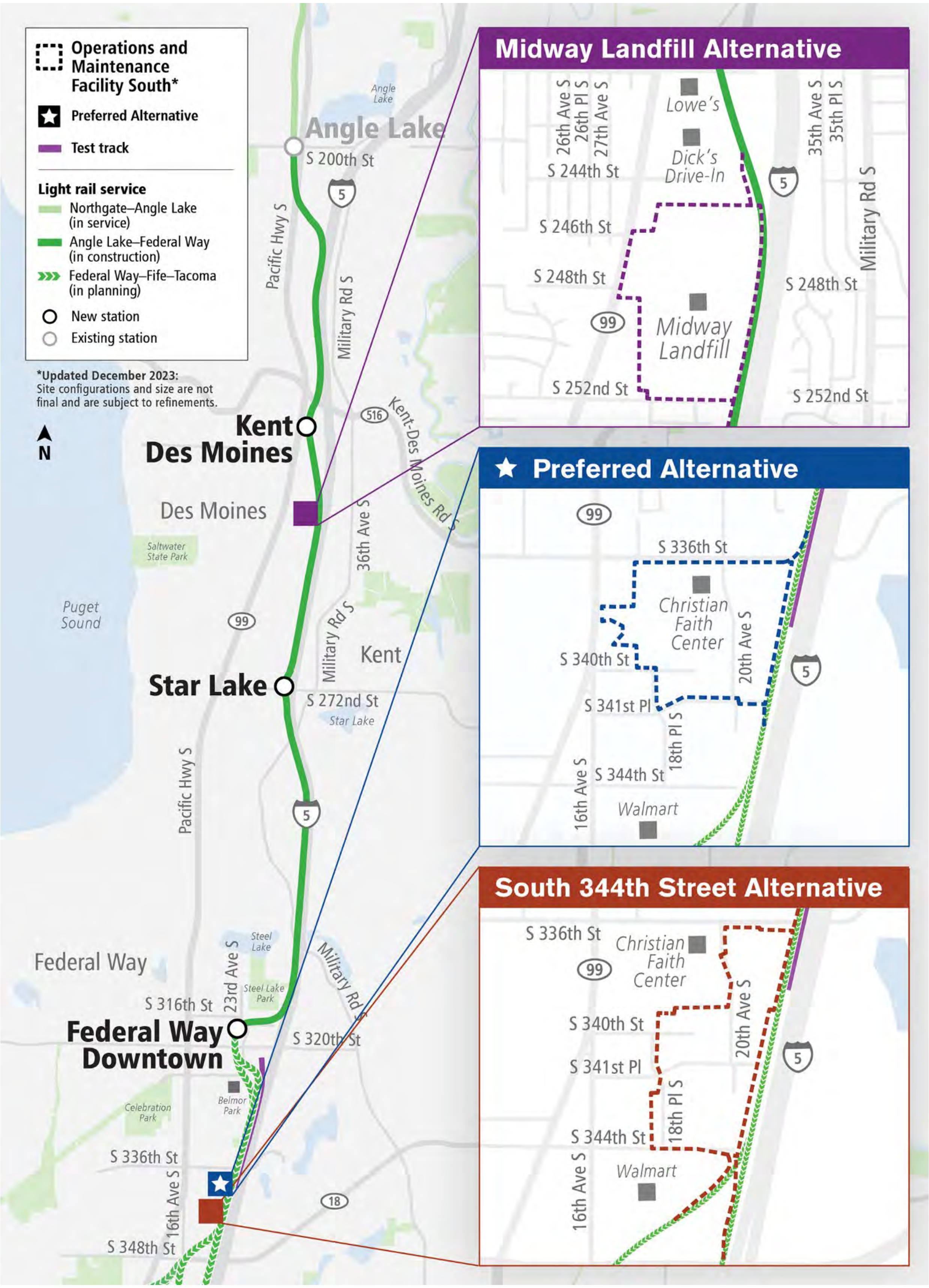

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
S 200th St
Pacific Hwy S
Military Rd S
Kent Des Moines
Des Moines
Saltwater State Park
Puget Sound
Kent-Des Moines Rd S
36th Ave S
Kent
Star Lake
S 272nd St
Federal Way
Steel Lake
Steel Lake Park
23rd Ave S
S 316th St
Federal Way Downtown
S 320th St
Celebration Park
Belmor Park
S 336th St
16th Ave S
S 348th St
Midway Landfill Alternative
26th Ave S
26th Pl S
27th Ave S
Lowe's
Dick's Drive-In
S 244th St
35th Ave S
35th Pl S
Military Rd S
S 246th St
S 248th St
Midway Landfill
S 252nd St
Preferred Alternative
S 336th St
Christian Faith Center
S 340th St
20th Ave S
S 341st Pl
18th Pl S
S 344th St
16th Ave S
Walmart
South 344th Street Alternative
S 336th St
Christian Faith Center
S 340th St
20th Ave S
S 341st Pl
18th Pl S
S 344th St
16th Ave S
Walmart

Figure G3.1-1 Project Vicinity: OMF South Alternatives

The Preferred and South 344th Street alternative would also include a test track to prepare new vehicles for service. The test track would run east of and parallel to the mainline connecting the sites to FWLE (Figures G3.1-2 and G3.1-4). Figure G3.1-5 shows the mainline track options. The Midway Landfill Alternative would not include a test track because the varying grades of the existing mainline tracks make it infeasible. Due to this, this analysis assumes that LRV testing would occur on the mainline tracks.

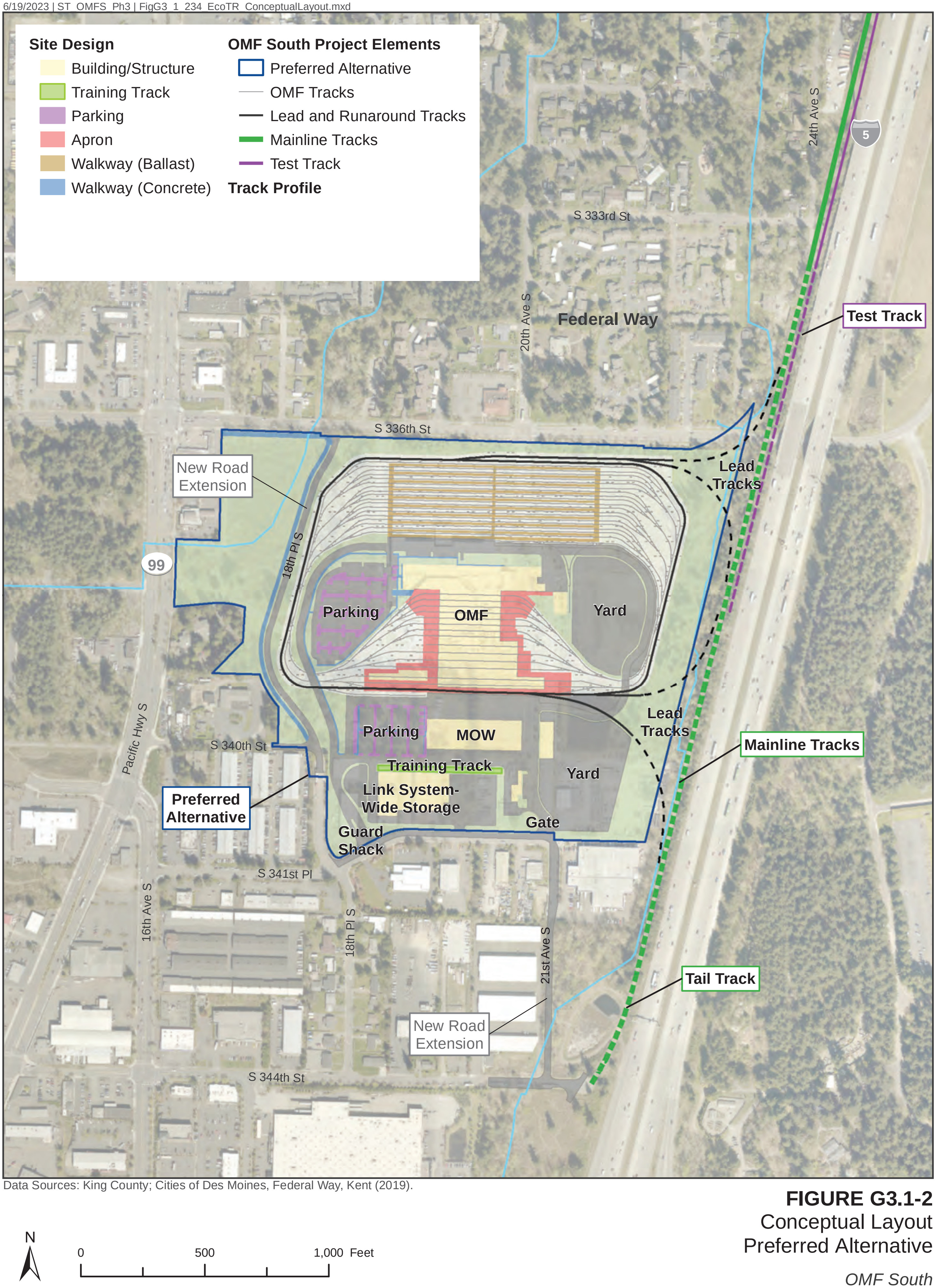
In addition to the features identified above, the Preferred Alternative includes the extension of 18th Place S between S 340th Street and S 336th Street to replace the functions of 20th Avenue S, which would be vacated, and the extension of 21st Ave S south to S 344th Street to meet Federal Way code requirements.

This technical report was prepared to support the OMF South NEPA Draft/SEPA Supplemental Draft EIS. As such, analyses in this report meet the requirements of the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA). The technical report provides information that would typically be addressed in a biological assessment or other document that demonstrates compliance with the requirements of Section 7(c) of the Endangered Species Act (ESA). Further, this report addresses potential effects on Essential Fish Habitat, consistent with the requirements for federal action agencies under the Magnuson-Stevens Fishery Conservation and Management Act.

Ecosystem resources are protected by federal, state, and local regulations that govern planning, land use, and management activities affecting wetlands, streams, and fish and wildlife species and their habitats. In addition, local Indian Tribes place a high value on maintaining and restoring watershed processes and ecological conditions that will sustain salmon productivity in all watersheds of Puget Sound in perpetuity (NWIFC 2023). The regulations, along with applicable guidance from agencies and in consultation with local Indian Tribes, prescribe procedures and substantive requirements that would apply during EIS preparation and throughout construction and operation of the project. Sound Transit, therefore, considered these applicable regulations and guidance as part of this analysis.

The report attachments provide additional information on fieldwork methodologies and information that supports the ecosystems resources evaluation. Attachment G3-1 describes the wetland delineation methodology. Attachment G3-2 describes Sound Transit’s Stream Habitat Assessment Guidelines. Attachment G3-3 contains background and research information related to the wetland and stream assessments. Attachments G3-4 and G3-5 provide wetland determination data forms and Washington State Department of Ecology (Ecology) wetland rating forms. Attachment G3-6 presents photographs of the wetlands, streams, and habitat types discussed, and Attachment G3-7 includes a list of common and scientific names of plant and animal species discussed in this report.

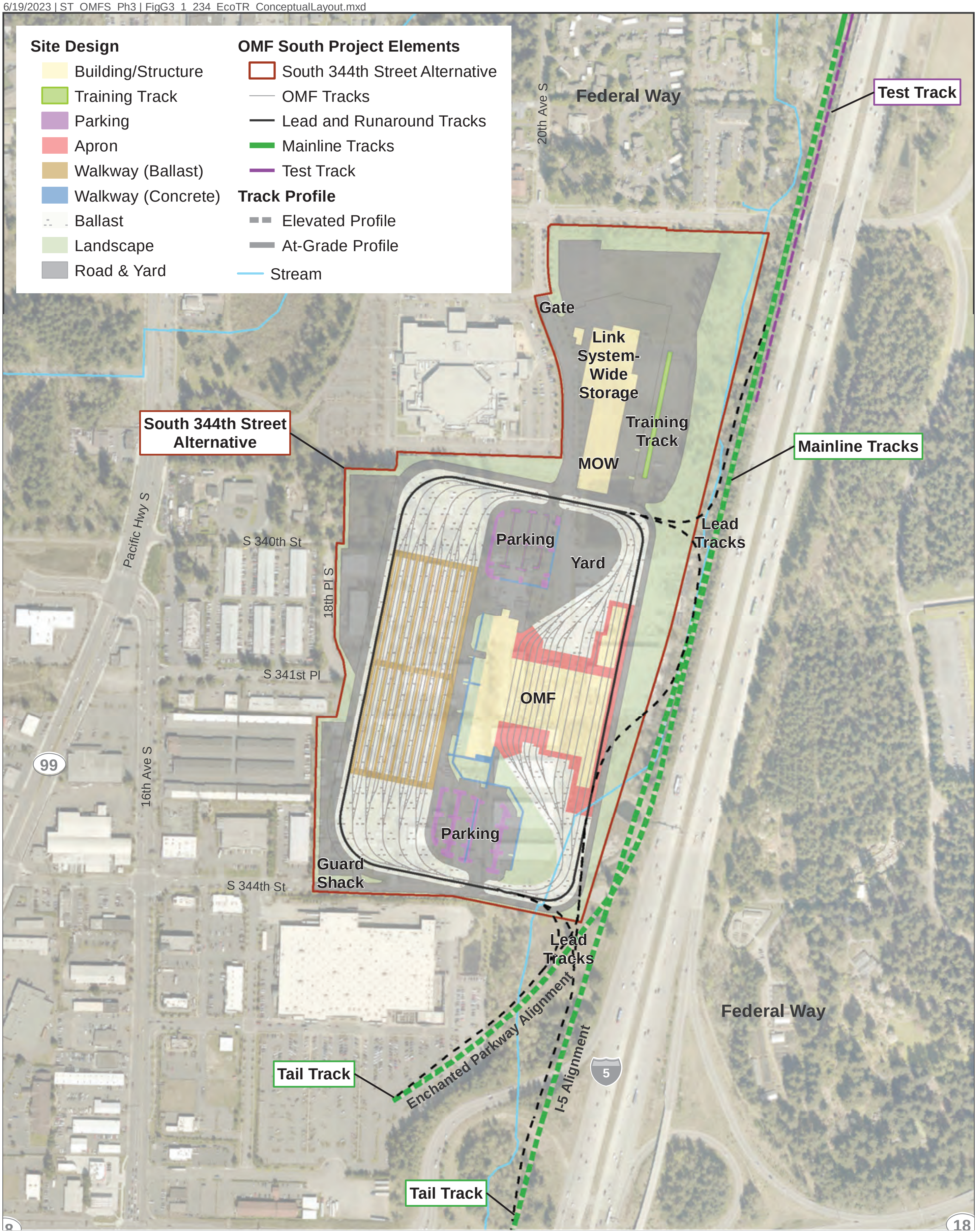
6/19/2023 | ST_OMFS_Ph3 | FigG3_1_234_EcoTR_ConceptualLayout.mxd


Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
S 333rd St
24th Ave S
5
Federal Way
20th Ave S
Test Track
S 336th St
New Road Extension
Lead Tracks
18th Pl S
99
Parking
OMF
Yard
Pacific Hwy S
S 340th St
Parking
MOW
Lead Tracks
Mainline Tracks
Training Track
Yard
Link System-Wide Storage
Preferred Alternative
Guard Shack
Gate
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G3.1-2
Conceptual Layout
Preferred Alternative

OMF South


Site Design
🟨 Building/Structure
🟩 Training Track
🟪 Parking
🟥 Apron
🟫 Walkway (Ballast)
🟦 Walkway (Concrete)
Ballast
Landscape
⬜ Road & Yard
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
Federal Way
20th Ave S
Test Track
Gate
Link System-Wide Storage
Training Track
MOW
South 344th Street Alternative
Mainline Tracks
Lead Tracks
Parking
Yard
Pacific Hwy S
S 340th St
18th Pl S
S 341st Pl
OMF
99
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
Enchanted Parkway Alignment
I-5 Alignment
5
Federal Way
Tail Track
Tail Track
18

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

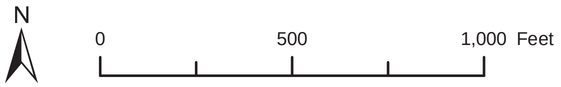
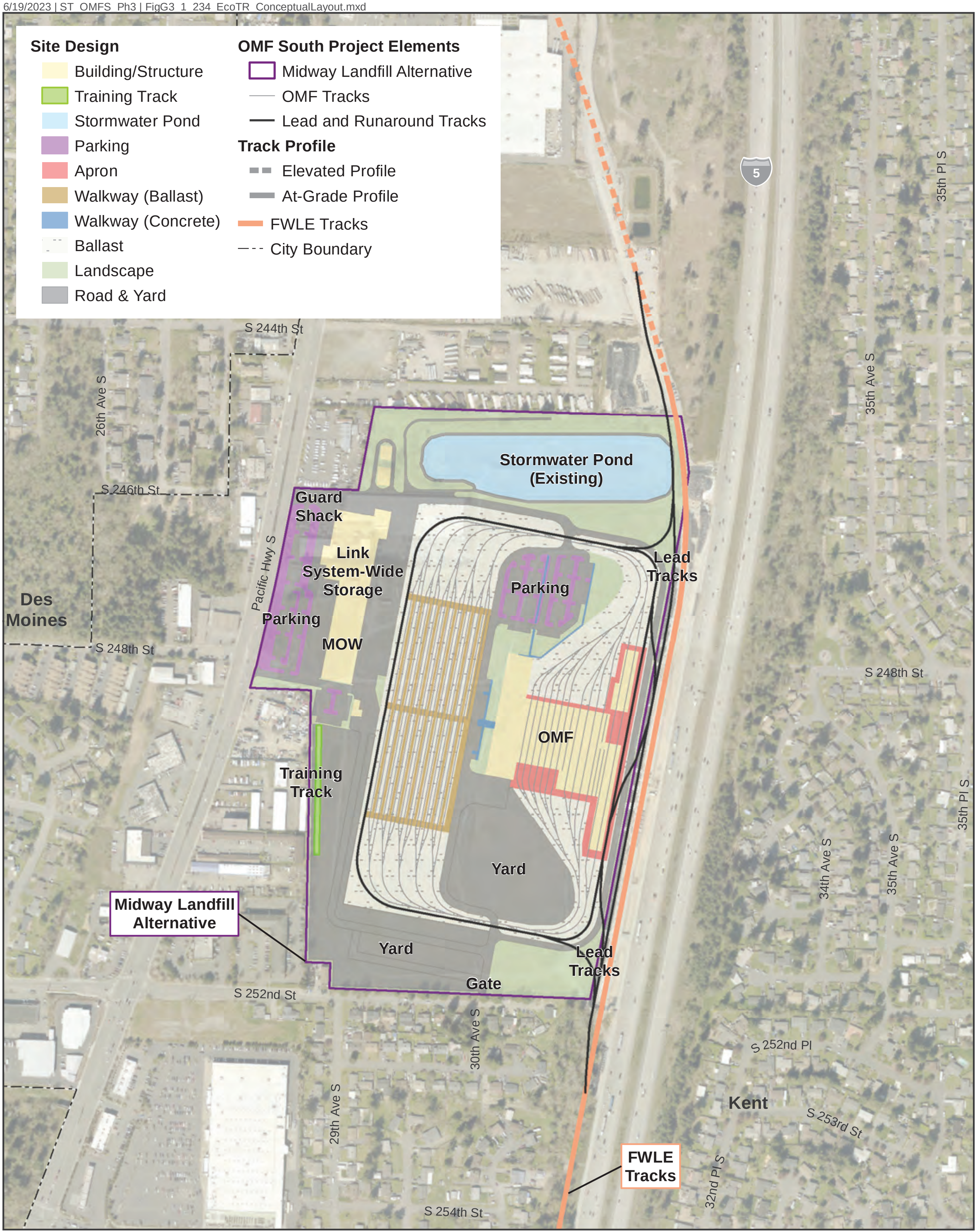

N
0
500
1,000 Feet

FIGURE G3.1-3
Conceptual Layout
South 344th Street Alternative

OMF South

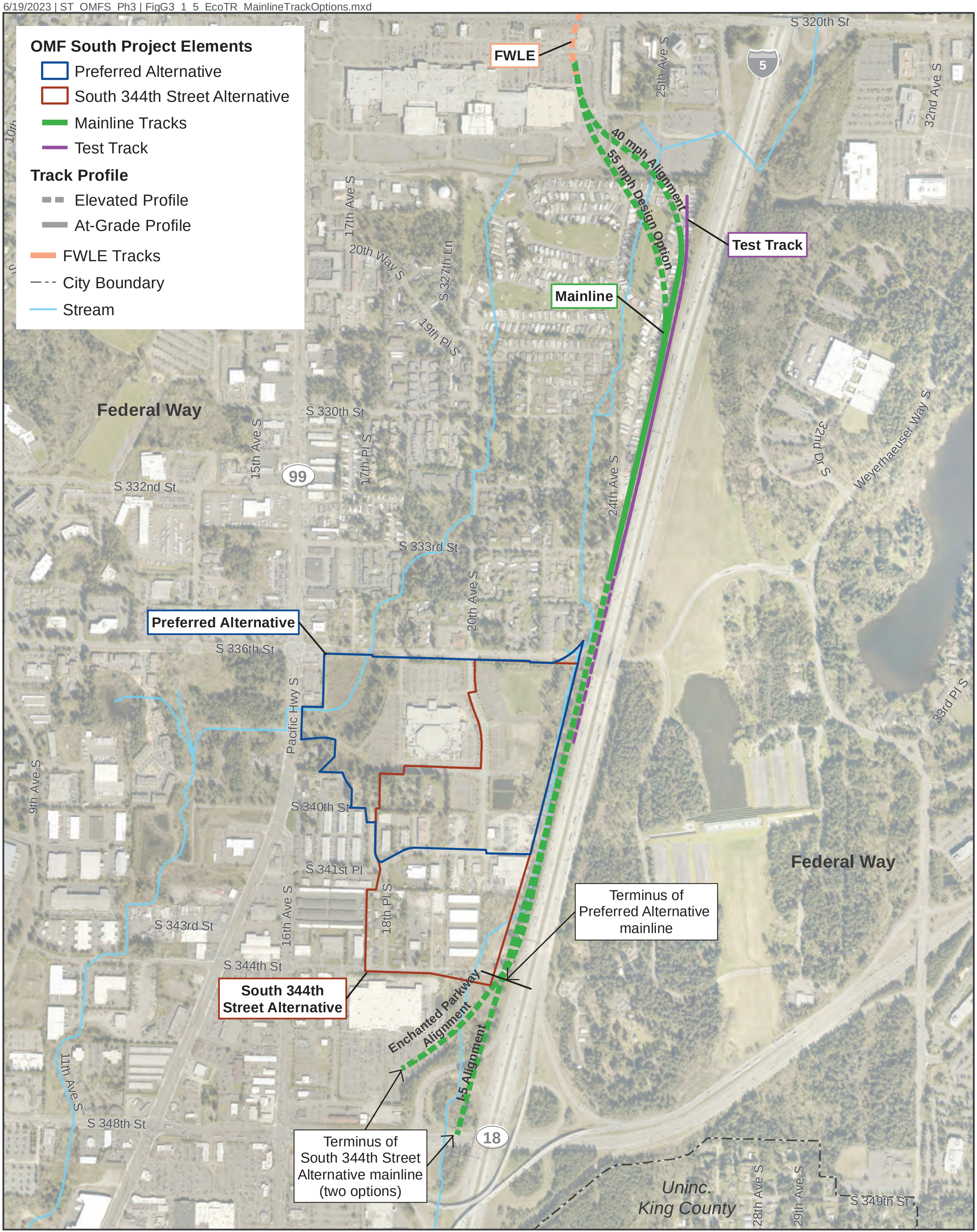
6/19/2023 | ST_OMFS_Ph3 | FigG3_1_234_EcoTR_ConceptualLayout.mxd


Site Design
🟨 Building/Structure
🟩 Training Track
🟦 Stormwater Pond
🟪 Parking
🟥 Apron
🟫 Walkway (Ballast)
🟦 Walkway (Concrete)
▨ Ballast
🟩 Landscape
⬜ Road & Yard
OMF South Project Elements
☐ Midway Landfill Alternative
— OMF Tracks
— Lead and Runaround Tracks
Track Profile
- - Elevated Profile
— At-Grade Profile
— FWLE Tracks
- - - City Boundary
5
S 244th St
26th Ave S
S 246th St
Des Moines
S 248th St
Pacific Hwy S
Guard Shack
Link System-Wide Storage
Parking
MOW
Stormwater Pond (Existing)
Lead Tracks
Parking
OMF
Training Track
Yard
Midway Landfill Alternative
Yard
Gate
Lead Tracks
S 252nd St
30th Ave S
29th Ave S
S 254th St
FWLE Tracks
35th Pl S
35th Ave S
S 248th St
35th Pl S
34th Ave S
35th Ave S
S 252nd Pl
Kent
S 253rd St
32nd Pl S
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G3.1-4
Conceptual Layout
Midway Landfill Alternative

OMF South


OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
S 320th St
5
25th Ave S
32nd Ave S
10th
40 mph Alignment
55 mph Design Option
17th Ave S
20th Way S
S 327th Ln
Test Track
Mainline
19th Pl S
Federal Way
S 330th St
15th Ave S
17th Pl S
99
S 332nd St
32nd Dr S
Weyerhaeuser Way S
24th Ave S
S 333rd St
20th Ave S
Preferred Alternative
S 336th St
Pacific Hwy S
33rd Pl S
9th Ave S
S 340th St
S 341st Pl
Federal Way
Terminus of Preferred Alternative mainline
S 343rd St
16th Ave S
18th Pl S
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
I-5 Alignment
11th Ave S
S 348th St
18
Terminus of South 344th Street Alternative mainline (two options)
Uninc. King County
28th Ave S
29th Ave S
S 349th St
N
0
1,000
2,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G3.1-5
Mainline Track Options
Preferred and South 344th Street Alternatives

1.2 Data Gathered

The following documents and data sources were reviewed to identify ecosystem features in the project vicinity, including the alternative footprints and potential mitigation sites:

1.2.1 Tribal

- Puyallup Tribal Fisheries annual reports for salmon, steelhead and bull trout in the Puyallup/White River Watershed (Marks et al. 2018, 2019, 2020, 2021)

1.2.2 Federal

- U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey maps (NRCS 2022)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) website (USFWS 2022a)
- USFWS list of ESA-listed species and critical habitats (obtained via the online Information for Planning and Consultation planning tool) (USFWS 2022b)
- National Marine Fisheries Service (NMFS) ESA species lists (NMFS 2021)
- U.S. Geological Survey (USGS) Topographic Maps (USGS 2020)

1.2.3 State

- Washington State Department of Natural Resources (WDNR) Forest Practice Applications Review System online water typing map (WDNR 2020)
- WDNR Washington Natural Heritage Program rare plants and high-quality ecosystems datasets (WDNR 2019)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) data (WDFW 2022)
- The Northwest Indian Fisheries Commission (NWIFC) Statewide Integrated Fish Distribution (SWIFD) web map (NWIFC 2023)
- StreamNet (2021) fish distribution data
- Fish passage barrier maps from WDFW and the Washington State Department of Transportation (WSDOT) (WSDOT 2020; WDFW 2023)
- Washington Department of Fisheries catalog of Washington streams and salmon utilization (Williams et al. 1975)
- Ecology 303(d)-listed waters information

1.2.4 Local

- King County iMap interactive mapping tool (King County 2018)
- King County aerial imagery (King County 2019)
- City of Federal Way wetland inventory report (Fischer 1999)
- City of Federal Way Hylebos Creek fish use and habitat technical memorandum (HDR 2014)

- City of Federal Way Critical Areas Map (City of Federal Way 2016)
- Other studies and environmental reviews that have been conducted in or near the study area (also see studies and sources cited in resource-specific discussions):
  - Federal Way Link Extension Final Environmental Impact Statement Appendix G2: Ecosystems Technical Report (Sound Transit 2016a)
  - OMF South Scoping Summary Report (Sound Transit 2019a)
  - OMF South Alternatives Development Technical Memorandum (Sound Transit 2019b)
  - Tacoma Dome Link Extension Pre-Screening and Level 1 Alternatives Evaluation Report (Sound Transit 2019c)
  - Tacoma Dome Link Extension Level 2 Alternatives Evaluation Report (Sound Transit 2019d)
  - Tacoma Dome Link Extension Scoping Summary Report (Sound Transit 2019e)
  - Hylebos Watershed Plan (EarthCorps 2016)
  - Executive Proposed Basin Plan for the Hylebos Creek and Lower Puget Sound basins (King County 1991)

1.3 Related Laws, Regulations, and Guidelines

Project activities that may affect wetlands, aquatic species, and habitat; vegetation, wildlife species, and habitat; or threatened and endangered species in the project area are subject to the following regulations, plans, and policies:

1.3.1 Federal

- The National Environmental Policy Act, ESA Section 7, and the Magnuson Stevens Fishery Conservation and Management Act (for projects that receive funding, permits, or other authorization from a federal agency)
- Sections 404, 402, and 401 of the Clean Water Act
- Protection of Wetlands, Presidential Executive Order 11990
- Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (73 Federal Register 19594, April 10, 2008)
- U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual (Environmental Laboratory 1987)
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (Corps 2010)
- Bald and Golden Eagle Protection Act
- Migratory Bird Treaty Act
- Treaty of Point Elliott of 1855

1.3.2 State

- SEPA (Chapter 43.21C Revised Code of Washington [RCW]) and implementing rules (Chapter 197-11 Washington Administrative Code [WAC])
- Washington State Growth Management Act (Chapter 36.70A RCW)
- Hydraulic code (Chapter 220-110 WAC)
- Protection of Wetlands, Governor's Executive Order 89-10
- Protection of Wetlands, Governor's Executive Order 90-04
- Water Pollution Control Act, Chapter 90.48 RCW
- Wetland Mitigation in Washington State (Ecology et al. 2006)

1.3.3 Regional and Local

- Sound Transit SEPA rules (Board Resolution No. R2018-17) and Sound Transit Environmental Policy (Board Resolution No. R2004-06)
- Sound Transit 3, the Regional Transit System Plan for Central Puget Sound (Sound Transit 2016b)
- Sound Transit Sustainability Plan (Sound Transit 2019f)
- Sound Transit Stream Assessment Guidelines (Sound Transit 2016c)
- Sound Transit EO Number 1: Establishing a Sustainability Initiative (Sound Transit 2007)
- City of Kent critical areas regulations (Kent City Code Chapter 11.06), amended July 21, 2015
- City of Federal Way critical areas regulations (Federal Way Revised Code Chapter 19.145), amended June 15, 2015
- King County Mitigation Reserves Program – In-Lieu Fee Program Instrument (King County 2011)
- Hylebos Watershed Plan (EarthCorps 2016)
- Executive Proposed Basin Plan for the Hylebos Creek and Lower Puget Sound basins (King County 1991)

1.4 Study Areas

Sound Transit established distinct study areas for aquatic resources, terrestrial resources, and wetlands based on proposed project footprints and areas outside the footprint that could be potentially affected by the project, such as nearby wildlife habitat affected by noise. The project footprint consists of the construction limits – the maximum extents within which clearing, grading, and the operation of construction machinery would occur – for the OMF South alternatives, as well as any areas of modifications to roadways and other existing infrastructure to accommodate the proposed facilities.

The project footprint for each OMF South alternative includes the OMF site, short segments of lead tracks that connect the site to the mainline tracks, and any new mainline tracks that would be constructed to connect the site to the southern terminus of the FWLE. The footprints for two of the build alternatives also encompass a track design option near the northern end of the mainline tracks that would reduce the curve of the mainline tracks, allowing for higher speeds. In addition to the project footprint, the study areas also include specified adjacent areas that could be affected by activities within the project footprint. Study areas for each resource are specified in Section 1.4.1 through Section 1.4.3, below. Study areas are shown in Figures G3.1-6, G3.1-7, and G3.1-8.

1.4.1 Aquatic Species and Habitat

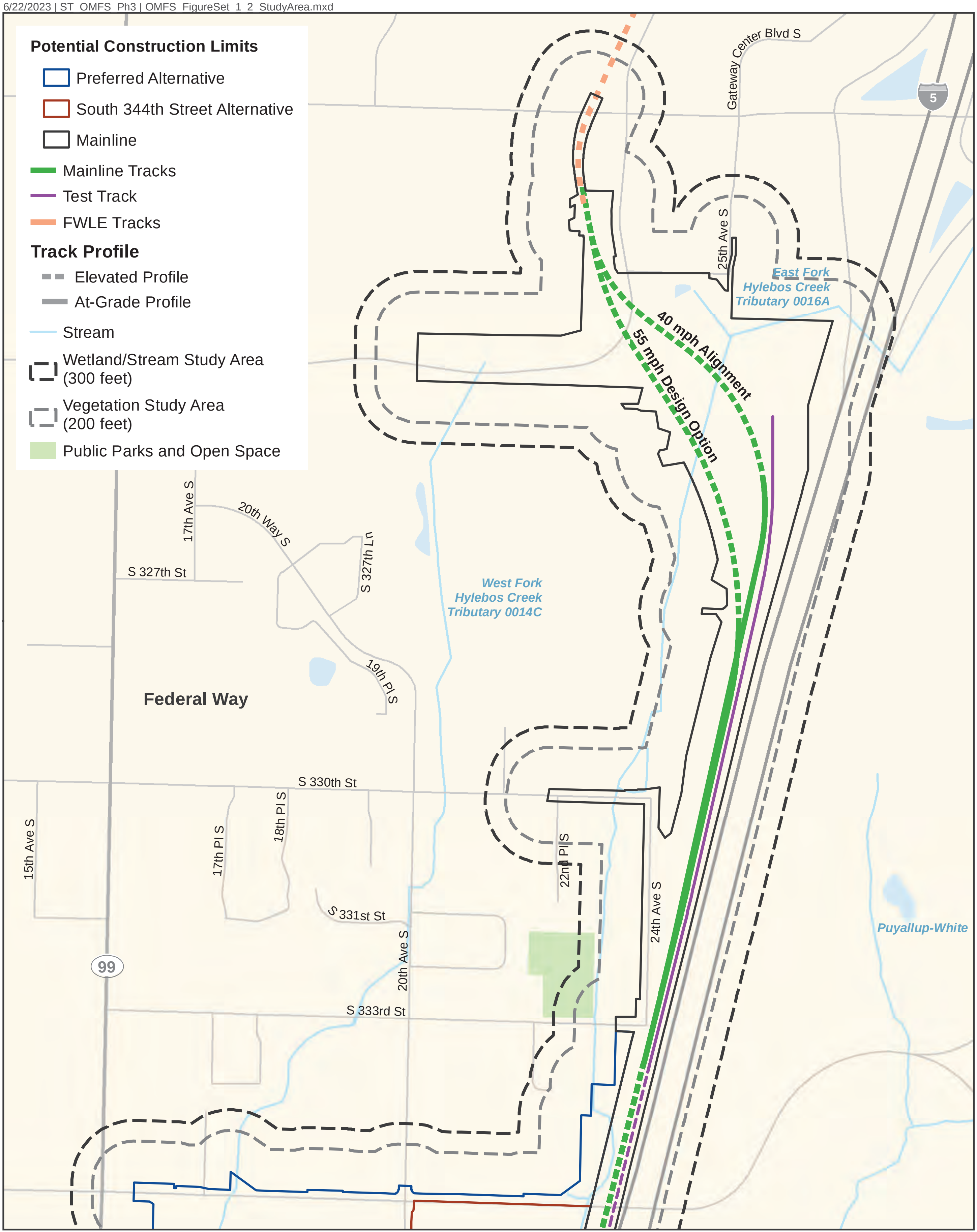
Reconnaissance-level aquatic habitat surveys were conducted 300 feet downstream and 100 feet upstream of each water body crossing, and the entire stretch of any water body paralleling the project within 200 feet of the project limits. The survey extended to 300 feet upstream if channel configuration resulted in stream buffers overlapping the project limits.

1.4.2 Vegetation, Wildlife, and Wildlife Habitat

The study area for vegetation and wildlife habitat consists of the project footprint, plus the areas within 200 feet of the project footprint. This represents a conservative estimate of the area in which project construction and operation could affect vegetation cover and habitat quality for terrestrial wildlife. To address wildlife potentially affected by project-related noise and human activity, resource analysts also reviewed documented occurrences of sensitive wildlife species within 0.25 mile of project construction areas.

1.4.3 Wetlands

The study area for wetlands consists of the project footprint, plus the areas within 300 feet of the project footprint to account for the typical largest applicable potential buffer width for wetlands in the area. Wetlands evaluated include those features that are wholly or partly within the study area.

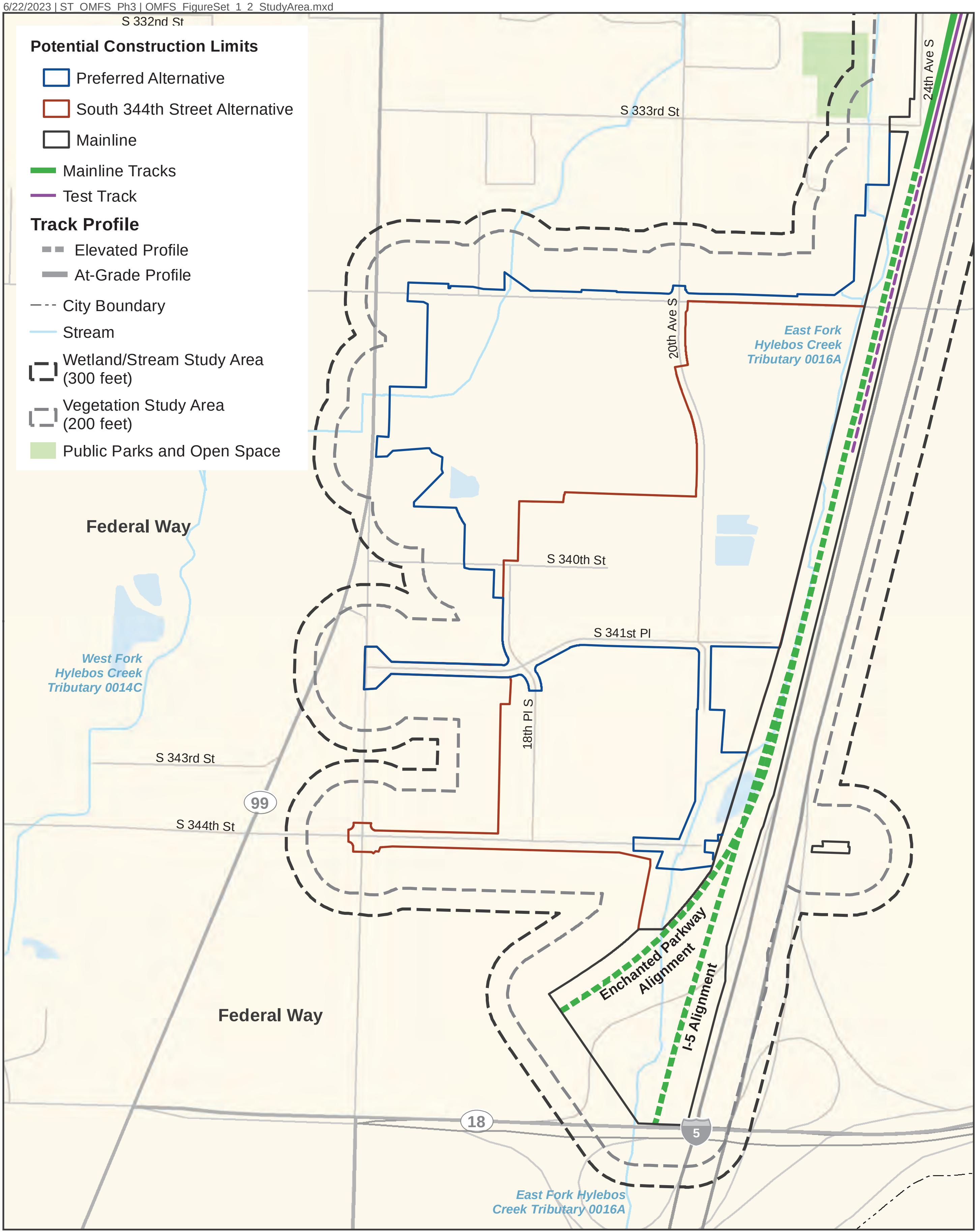

Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Stream
Wetland/Stream Study Area (300 feet)
Vegetation Study Area (200 feet)
Public Parks and Open Space
Gateway Center Blvd S
5
25th Ave S
East Fork Hylebos Creek Tributary 0016A
40 mph Alignment
55 mph Design Option
17th Ave S
20th Way S
S 327th Ln
S 327th St
West Fork Hylebos Creek Tributary 0014C
19th Pl S
Federal Way
S 330th St
15th Ave S
17th Pl S
18th Pl S
22nd Pl S
24th Ave S
S 331st St
20th Ave S
99
S 333rd St
Puyallup-White
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G3.1-6
Ecosystem Resources Study Area
Mainline Track Options

OMF South

6/22/2023 | ST OMFS Ph3 | OMFS FigureSet 1 2 StudyArea.mxd


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Stream
Wetland/Stream Study Area (300 feet)
Vegetation Study Area (200 feet)
Public Parks and Open Space
S 332nd St
S 333rd St
24th Ave S
20th Ave S
East Fork Hylebos Creek Tributary 0016A
Federal Way
S 340th St
S 341st Pl
West Fork Hylebos Creek Tributary 0014C
18th Pl S
S 343rd St
99
S 344th St
Enchanted Parkway Alignment
I-5 Alignment
Federal Way
18
5
East Fork Hylebos Creek Tributary 0016A

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

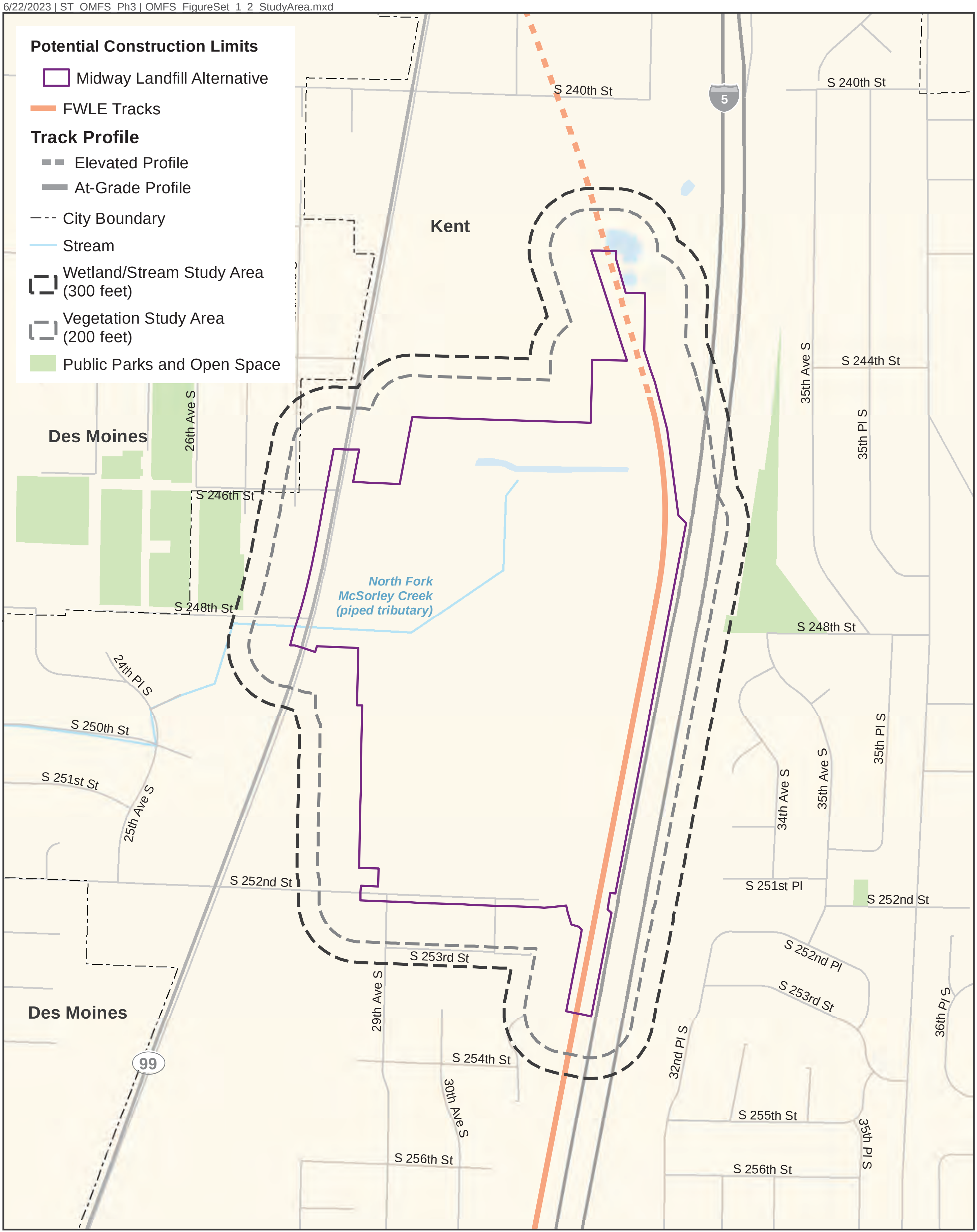
0 500 1,000 Feet

FIGURE G3.1-7

Ecosystem Resources Study Area

Preferred and South 344th Street Alternatives

OMF South


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Stream
Wetland/Stream Study Area (300 feet)
Vegetation Study Area (200 feet)
Public Parks and Open Space
S 240th St
S 240th St
5
Kent
Des Moines
26th Ave S
S 244th St
35th Ave S
35th Pl S
S 246th St
North Fork McSorley Creek (piped tributary)
S 248th St
S 248th St
24th Pl S
S 250th St
S 251st St
25th Ave S
35th Pl S
35th Ave S
34th Ave S
S 252nd St
S 251st Pl
S 252nd St
S 253rd St
29th Ave S
S 252nd Pl
S 253rd St
Des Moines
99
S 254th St
30th Ave S
32nd Pl S
36th Pl S
S 255th St
35th Pl S
S 256th St
S 256th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

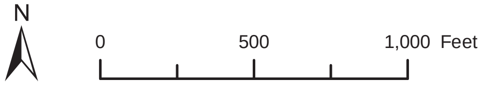

N
0
500
1,000 Feet

FIGURE G3.1-8
Ecosystem Resources Study Area
Midway Landfill Alternative

OMF South

2 STUDY OBJECTIVES AND METHODS

This section describes the objectives and methods used to study and evaluate potential impacts on aquatic resources, terrestrial resources, and wetlands. Discussions in this section are based on the approach defined in the OMF South Environmental Methodology Report (Sound Transit 2019g).

2.1 Aquatic Species and Habitat

2.1.1 Study Objectives

The purpose of the aquatic resource investigation is to describe aquatic resources near the build alternative sites and the potential for impacts on these resources. Objectives included the following:

- Characterize all surface water bodies and riparian habitat near the project limits for each alternative.
- Identify all water bodies potentially affected (directly or indirectly) by the construction and/or operation of each alternative.
- Identify aquatic species presence and use of the surface water bodies near each project alternative.
- Identify potential effects of the proposed project on aquatic resources near each project alternative.
- Identify avoidance, minimization, and mitigation opportunities to address potential direct and indirect effects of each alternative on aquatic resources.

2.1.2 Methods

2.1.2.1 Review of Existing Maps and Documentation

Biologists reviewed existing maps and documentation to identify known streams and water bodies in the study area and vicinity (see Section 1.2, Data Gathered). When applicable, documentation of aquatic species and habitat was analyzed from Water Resource Inventory Area (WRIA), county, and subbasin reports. These streams were then verified and evaluated in the field within the field reconnaissance survey area. Existing geographic information system (GIS) data were gathered from Kent, Federal Way, and King County. Streams that extend beyond the field reconnaissance survey area and other previously mapped streams outside of the WSDOT or other public rights-of-way were also incorporated into the GIS database. Background information about riparian vegetation, physical in-stream habitat, biological connectivity, water quality and quantity, stream typing, and fish presence and habitat use was collected during the pre-field review phase.

Species known to use habitats in the study area are those whose presence is documented by the information sources identified in Section 1.2, Data Gathered, as well as species observed during site visits conducted for this analysis. Species whose known or expected distribution encompasses the study area and that are associated with habitat types in the study area are considered potentially present.

Aquatic habitats and species of concern are those with a regulatory status that prompts individual attention through federal, state, and/or local permitting processes. Specific habitat types that receive consideration under local critical areas regulations are also identified. Species and habitats of concern include the following:

- Species listed or proposed for listing as threatened or endangered under the ESA, as well as proposed or designated critical habitat for those species
- Species for which fish and wildlife habitat conservation areas (FWHCAs) have been established under local critical areas rules
  - The Kent City Code (Section 11.06.710) identifies the following as FWHCAs:
    - Areas with the documented presence of federally or state-listed endangered, threatened, or sensitive species
    - Areas with the documented presence of species or habitats identified in the WDFW PHS database, current city habitat maps, or other relevant databases
    - Naturally occurring ponds
    - Waters of the state (including streams and lakes)
  - The Federal Way Revised Code (Section 19.145.260) identifies the following as FWHCAs:
    - Areas with which federally listed endangered or threatened species or state-listed endangered, threatened, or sensitive species have a primary association
    - State priority habitats and areas associated with state priority species, as identified by WDFW
    - Habitats and species of local importance (Federal Way has not identified any habitats or species of local importance)
    - Streams
    - Lakes

2.1.2.2 Field Reconnaissance and Delineation

The aquatic species and habitat assessment focused on key habitats and aquatic features that may be affected by the project and that are directly related to ecological functions that support aquatic ecosystems. After collecting and reviewing existing information, biologists conducted detailed field reconnaissance and delineation surveys within the study area to identify and confirm ecosystem resources that could be affected. Biologists conducted formal delineations (flagging and professional land surveying) of the ordinary high water line (OHWL) of East Fork Hylebos Tributary, and its associated wetlands, on the east side of the Preferred and South 344th Street alternatives due to the anticipated high level of interest from agencies, Tribes, and the public and to aid design work. Other locations of East Fork Hylebos Tributary and other Hylebos Creek tributaries were not delineated for this analysis and habitat conditions were documented at a reconnaissance level.

Sound Transit’s Stream Habitat Assessment Guidelines (Sound Transit 2016c) (Attachment G3-2) were used to determine the level of information that should be collected for each identified stream. In accordance with the guidelines, research and field surveys were conducted to identify, map, and describe aquatic species and the condition of in-stream and riparian habitats within the study area. The Phase 1 project approach (planning-level study) was used to provide analysis for NEPA, SEPA, and ESA coordination. Within the Phase 1 approach, the project used the Track A methods for assessing aquatic area impacts where property access is not granted and for all streams other than East Fork Hylebos Tributary. Track B methods were used on East Fork Hylebos Tributary and Sound Transit, WSDOT, or other publicly owned right-of-way/easement areas. Track A is typically used where access is limited or impacts are not anticipated; Track B is typically used where access is possible and impacts are anticipated (Sound Transit 2016c).

Habitat was assessed with the assumption that anadromous fish may one day be able to enter stream reaches where no natural barriers exist, even if human-created barriers currently prevent access. Using information gathered during field reconnaissance and from sources such as Tribes, local jurisdictions, WSDOT, and fish passage barrier maps maintained by WDFW, biologists evaluated the accessibility of each stream in the study area, identifying downstream impediments to fish passage.

Biologists classified streams according to the interim water typing definitions in WAC section 222-16-031, and the applicable stream classification systems in the city of Kent's Environmental Management Code and the city of Federal Way's Zoning and Development Code. The biologists then identified regulatory buffers based on each stream's water type or classification.

2.2 Vegetation, Wildlife, and Wildlife Habitat

This section identifies the objectives of the investigations into terrestrial resources in the study area and describes the methods used to characterize the vegetation and wildlife habitats in the project vicinity and to identify potential impacts on those habitats. It also includes a discussion of threatened and endangered species, species of concern, and high-value habitats in the vegetation and wildlife study area.

2.2.1 Study Objectives

The purpose of the investigation into terrestrial resources was to characterize the existing condition of vegetation and wildlife habitat in the study area and to identify species of concern that may be affected by the proposed alternatives. Study objectives included the following:

- Identify, map, and describe the existing conditions of the vegetation communities and wildlife habitat resources in the study area.
- Characterize the potential for species of concern to use habitats in the study area.
- Evaluate the potential effects of each alternative on vegetation, wildlife, and wildlife habitat.
- Identify potential measures to avoid, minimize, or compensate for unavoidable adverse effects.

2.2.2 Methods

To establish the basis for the analysis of effects on vegetation, wildlife, and wildlife habitat, biologists delineated and classified land cover on aerial photographs and visited a sample of these areas during the field reconnaissance surveys. Land cover types were identified and classified based on study area-specific refinements of the structural categories defined by Johnson and O'Neil (2001). Forest composition, relative age, native species cover, and habitat features were key attributes in determining vegetation types. Vegetation data, including dominant plant species composition, were gathered and classified by habitat type using field observation, aerial photographs, and pertinent literature.

To support the analysis of effects on wildlife, the biologists identified wildlife species associated with the land cover types in the study area, as well as specific habitat elements within each cover type. Biologists used geospatial data from the WDFW PHS Program and the WDNR Natural Heritage Program to identify documented locations of priority species, priority habitats, rare plant populations, and high-quality ecosystems in the study area. Biologists also reviewed site-specific wildlife data, including bird surveys (e.g., Opperman et al. 2006, eBird 2022), supplemented with data gathered during field visits.

Wildlife habitat values were not evaluated for each occurrence of each land cover type along the project corridor but instead were assigned to the cover type as a whole. Habitat value within a cover type at a specific location can vary and depend on several factors, such as size of the area; degree of fragmentation or isolation; presence of (or proximity to) other valuable habitat; potential role as a travel corridor; level and type of human disturbance; diversity of plant species; presence of multiple cover layers (i.e., tree, shrub, and herbaceous layers); presence of threatened, endangered, or sensitive species; and extent of invasive weeds.

Species known to use habitats in the study area are those whose presence is documented by the information sources identified in Section 1.2, Data Gathered, as well as species observed during site visits conducted for this analysis. Species for which known or expected distribution encompasses the study area and that are associated with habitat types in the study area are considered potentially present.

Plant and animal species of concern are those with a regulatory status that prompts individual attention through federal, state, and/or local permitting processes. Specific habitat types that receive consideration under local critical areas regulations are also identified. Species and habitats of concern include the following:

- Species listed or proposed for listing as threatened or endangered under the ESA, as well as proposed or designated critical habitat for those species.
- Species for which FWHCAs have been established under local critical areas rules.
  - The Kent City Code (Section 11.06.710) identifies the following as FWHCAs:
    - Areas with the documented presence of federally or state-listed endangered, threatened, or sensitive species
    - Areas with the documented presence of species or habitats identified in the WDFW PHS database, current city habitat maps, or other relevant databases
    - Areas with unusual nesting or resting sites, such as heron rookeries or active nests of raptors that are included in the listing categories specified above
    - Naturally occurring ponds
    - Waters of the state (including streams and lakes)
  - The Federal Way Revised Code (Section 19.145.260) identifies the following as FWHCAs:
    - Areas with which federally listed endangered or threatened species or state-listed endangered, threatened, or sensitive species have a primary association
    - State priority habitats and areas associated with state priority species, as identified by WDFW
    - Habitats and species of local importance (the city of Federal Way has not identified any habitats or species of local importance)
    - Streams
    - Lakes
- Bird species protected under the Migratory Bird Treaty Act

2.3 Wetlands

2.3.1 Study Objectives

The wetland study was conducted to identify, map, and describe wetlands in the study area. Study objectives included the following:

- Thoroughly research and assess field site conditions with respect to wetlands
- Evaluate the effects of the alternatives on these features
- Identify potential measures to avoid, minimize, or compensate for unavoidable adverse effects on wetlands

2.3.2 Methods

Wetland assessments are based on background research (see Section 1.2, Data Gathered) and analysis of existing information and datasets, combined with field surveys to document current conditions. Wetland assessments include both delineated and estimated extents for all wetlands in the study area. The extents of wetlands on properties lacking access were estimated by using remote sensing and best professional judgment. Vegetation and potential wetlands in areas where rights of entry had not been obtained were identified based on field reconnaissance from public areas; current local, state, and federal habitat maps and reports; and the examination of aerial photographs. Documented wetlands from other projects or sources were evaluated and, where appropriate, included in the wetland findings.

Where property access was obtained, wetland boundaries were formally delineated. While a formal delineation level of study is not required at this stage of the environmental review process, Sound Transit felt that the interest expressed during the scoping period justified collecting detailed information, particularly to advise the engineering design team and avoid resources where possible. This detailed work was conducted to provide comprehensive information in areas with an anticipated high level of interest from agencies, Tribes, and the public (specifically, areas associated with tributaries to Hylebos Creek). Other wetlands in the study area were identified at the reconnaissance level in which wetland boundaries were not formally delineated. Almost all wetlands in the study area are associated with tributaries of Hylebos Creek, and property access was obtained for almost all parcels where access was needed. As a result, most wetlands in the study area were delineated.

Wetland boundaries were estimated or delineated using methods outlined in the Corps Wetland Delineation Manual (Environmental Laboratory 1987) and indicators defined in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0 (Corps 2010). Detailed methodology for wetland assessments is included in Attachment G3-2. Observations of existing conditions and characteristics were recorded for each wetland and associated buffer.

Wetlands were classified according to the USFWS (Cowardin et al. 1979, FGDC 2013) and hydrogeomorphic (Brinson 1993) classification systems. These were rated according to local jurisdiction critical area ordinance and the Washington State Wetland Rating System for Western Washington: 2014 Update (Hruby 2014). The width of each wetland’s regulatory buffer was identified based on the wetland’s rating and habitat function score, as required under the critical area code of the local jurisdiction. All wetland ratings, and therefore associated regulatory buffer widths, are preliminary and are subject to change. Wetland functions were based on using the Washington State Wetland Rating System for Western Washington: 2014 Update (Hruby 2014).

Wetland determination forms and rating forms are included in Attachment G3-4 and G3-5, respectively. Representative photographs of wetlands in the study area are in Attachment G3-6. Scientific names of plants and animals are presented in Attachment G3-7.

2.4 Impact Assessment Methods and Assumptions

Resource analysts evaluated long-term and temporary (construction-related) impacts on ecosystem resources. The following subsections describe the process by which direct, indirect, and cumulative impacts on each ecosystem component were identified, as well as the supporting assumptions for the impact analyses.

2.4.1 Direct Impacts

For this analysis, the design team identified a permanent impact footprint based on the preliminary (less than 10 percent) design for the South 344th Street Alternative and Midway Landfill Alternative OMF sites, including lead tracks, mainline tracks, and other project features that would result in long-term impacts on ecosystem resources. The design level of the Preferred Alternative has been advanced since publication of the 2021 Draft EIS. This analysis has been updated to assess the refined design, which is near 20 percent. The design team also defined a temporary impact footprint, which encompasses the permanent impact footprint and surrounding areas where vegetation clearing and ground-disturbing work are likely to be required for project construction. Areas outside the permanent impact footprint but within the temporary impact footprint would be expected to be restored to pre-project conditions, or better, following construction. These footprints were overlain on mapped locations of streams, wetlands, and vegetation cover types to determine the extent of the potential impacts of the alternatives on ecosystem resources. Following identification of the Preferred Alternative, the long-term and temporary impact footprints for that alternative were refined.

Direct impacts on aquatic species and habitat were determined by evaluating the length (in linear feet) of each water body and the acreage of riparian buffers that would be altered or eliminated for each alternative. Calculations of riparian buffer impacts were based on impacts to functional buffers. The functional buffer of a stream is the width of its standard regulatory buffer or the distance to the nearest edge of a developed area, whichever is smaller. In other words, the functional buffer does not include areas where riparian functions are compromised by high-intensity land uses and development such as buildings, parking lots, or roads. This approach is consistent with the critical areas regulations of many local jurisdictions, which do not require mitigation for impacts to developed areas within the standard regulatory buffer distance from streams.

Direct impacts on aquatic species were assessed qualitatively by considering such factors as the regional importance of the resident and anadromous fish species resource, fish habitat value (such as its role as a migration corridor or spawning), degree of connectivity and loss of habitat following project implementation, overall habitat quality, and potential for enhancing or restoring aquatic habitat or connectivity. Construction and operational impacts on aquatic species from water quality degradation and loss of habitat were also assessed. Potential long-term impacts on threatened and endangered species were determined, including direct mortality, disturbance and displacement effects, and loss or degradation of habitat. The assessment also included a review of potential effects on Essential Fish Habitat.

Potential impacts of each alternative on terrestrial resources were quantitatively evaluated by evaluating the acreage of major vegetation types that would be temporarily or permanently affected by project construction and operation. Impacts on rare plant populations were determined by evaluating the acreage of any mapped populations that would be affected by construction or operation of each alternative. The potential for the introduction or removal of noxious or invasive plant species was also evaluated.

Potential impacts on wildlife, including species of concern, were also assessed qualitatively by considering such factors as the regional importance of the resource, wildlife habitat value of affected areas (such as its role as a wildlife movement corridor), degree of fragmentation and loss of the habitat following project implementation, overall habitat quality, and the potential for enhancing or restoring unique plant communities or wildlife habitat or connectivity. Evaluations of the potential for increased human access, noise, and light to affect sensitive wildlife species were based on the proximity of project features and work sites to known locations of sensitive sites such as breeding areas or communal roosts.

Impact analyses on wetlands and buffers were based on direct impacts from both long-term effects (filling or other permanent displacement) and short-term construction-related effects (vegetation clearing). If a contiguous wetland lies partially within and partially outside the project limits, project effects on the portion of the wetland not directly affected by the project were assessed using guidance in Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Ecology et al. 2021). As with riparian buffers, calculations of impacts to wetland buffers were based on impacts to functional buffers. If a wetland were eliminated, the surrounding area would no longer serve as a wetland buffer and impacts on that surrounding area would not constitute wetland buffer impacts. Elimination of a wetland and actual buffer impacts would be determined through the permitting process. For this analysis, calculations include buffers of wetlands that may be permanently eliminated by project construction and therefore likely represents an over-estimation of buffer impacts.

2.4.2 Indirect Impacts

Indirect impacts are project-related effects that are reasonably foreseeable but separated from project implementation by distance or time. Examples may include changes in land use patterns, population density, or water quality in the areas affected by the project. Indirect impacts may also occur through the implementation of mitigation measures for other environmental impacts, or through supporting projects that are not yet defined or considered part of the project alternatives. Indirect impacts on ecosystem resources were analyzed qualitatively in this document.

2.4.3 Cumulative Impacts

Cumulative impacts are the effects of the project when combined with other past, present, and reasonably foreseeable future actions. The cumulative impacts analysis incorporated the effects of Sound Transit’s other proposed light rail extension projects, including the FWLE project and the Tacoma Dome Link Extension (TDLE) project which are assumed to be part of the No-Build Alternative. Reasonably foreseeable projects include the WSDOT State Route (SR) 509 Completion project, WSDOT’s I-5/SR 161/SR 18 Triangle project, the Creekside Commons Townhomes development, and the Federal Way City Center Access project.

2.4.4 Analysis Assumptions

The process of analyzing and estimating project impacts requires a series of assumptions regarding the physical extent of impacts, the duration of impacts, site restoration following construction, and measures that would be implemented to avoid or minimize potential impacts.

This analysis also includes temporary construction impacts and permanent operational impacts within the project right-of-way.

For the impact analysis, Sound Transit assumes that all aquatic resources, terrestrial resources, and wetlands within the limits of the specific facilities proposed under each alternative, including the area within the footprint of the mainline and lead tracks, would be modified during construction. In most areas, the ecosystem functions of such areas would be substantially degraded or eliminated. In the case of streams within the project footprint, Sound Transit would minimize impacts on streams by avoiding, to the degree feasible, enclosing any surface-flowing stream channels in new culverts or pipes.

Compared to the impacts of site facilities and at-grade tracks, the impacts of elevated portions of the mainline, lead, tail, and test tracks (under the Preferred Alternative or the South 344th Street Alternative) would be less severe. These structures would be relatively narrow (typically 20 to 30 feet wide) and generally more than 15 feet above the ground surface. Vegetation would be able to grow in such areas, although the density and variety of vegetation would be limited by the reduced availability of sunlight and water. For operational safety, trees and other tall vegetation would not be allowed to grow near the mainline, lead, tail, or test tracks. Sound Transit's Design Criteria Manual specifies a clear zone of at least 11 feet between the guideway edge and the edge of a tree's canopy. Shorter-stature trees may be allowed under elevated guideways, provided there is at least 5 feet of vertical clearance between the top of the tree and the height of the support column. For this analysis, the permanent impact footprint is defined to include a 15-foot clear zone from the edges of track segments. This represents an estimate of the areas where the alternatives would likely have long-term impacts on vegetation.

Based on site-specific conditions, retaining walls would be built in some areas to minimize disturbance to the aquatic features and their buffers. To allow maintenance access and to avoid damage, trees and other large vegetation would not be allowed to grow near the base or top of the walls.

The permanent and temporary impact footprints developed for this analysis represent Sound Transit's best estimates of the areas that may be affected by the OMF South alternatives. These estimates are conservative. For example, clearing of all areas within the temporary impact footprint may not be necessary, but analyses of construction-related impacts are based on the assumption that the entire temporary impact footprint would be cleared for construction. In addition, the permanent impact footprint may include some areas where project components could be scaled down or eliminated as the project design progresses from its current, preliminary status. Moreover, not all areas within the project footprint would be converted to structures or hard surfaces. Some vegetated areas, for example, would be converted to other land cover types, such as landscaping or stormwater facilities. In other areas, existing hard surfaces may be converted to vegetation.

By applying a consistent set of assumptions for all of the alternatives, these footprints allow analysts to evaluate the relative degree of the potential impacts of the alternatives on ecosystem resources. Actual anticipated impacts would be determined when an alternative is selected to be built and the project design is sufficiently advanced to undergo permitting review. Additional field work would be conducted for the selected alternative to refine project impacts.

Vegetation in temporarily disturbed areas (e.g., in construction access areas and related rights-of-way) would be restored after construction is complete. Site restoration would include replanting disturbed areas with appropriate native vegetation immediately following construction. The length of time required for recovery of ecological functions would vary depending upon the intensity of the temporary impact (e.g., vegetation clearing *versus* temporary fill), as well as the type, age, and diversity of the existing plant community in the affected areas. The estimated extent of areas that would be temporarily affected by project construction is based on mapping provided by the project design team.

OMF South would be designed and constructed in compliance with all applicable federal, state, and local regulations. Sound Transit assumes the overall extent and magnitude of potential temporary construction impacts would be controlled by the types of construction activities and by the implementation of best management practices (BMPs; see Section 5.1.1, Avoidance and Minimization During Design Development and Section 5.1.2, Construction Best Management Practices). These BMPs would be designed to accommodate site-specific characteristics such as the widths of wetland and stream buffers.

Adverse effects on ecosystem resources would be avoided or minimized first through the project design process and through careful implementation, monitoring, and maintenance of BMPs during project construction and operation. Compensatory mitigation for unavoidable adverse effects would be implemented in accordance with permit requirements and local critical areas regulations (see Section 5, Mitigation Measures).

3 AFFECTED ENVIRONMENT

The alternative sites characterized within the affected environment include the Midway Landfill Alternative in Kent and two sites in Federal Way, the Preferred and South 344th Street alternatives. The Preferred and South 344th Street alternatives each include the two alternatives for the mainline tracks that would connect the sites to the Federal Way Downtown Station, known as the 40 mph Alignment and the 55 mph Design Option. The site footprints in Federal Way, including the mainline tracks, are largely overlapping and are described as one unit for the purposes of simplifying the description of resources in the affected environment section.

3.1 Aquatic Species and Habitat

This section identifies aquatic species and habitats that may be affected by the construction and operation of OMF South. The study area is in an urban area where aquatic habitats have been highly modified by past development. The proposed facilities lie within areas disturbed by the construction of I-5, the Midway Landfill, and commercial, institutional, and light industrial development. Several streams in the study area have been placed partially in conveyance systems consisting of pipes, stormwater facilities, and ditches, interfering with natural flow patterns and processes, such as groundwater recharge and floodplain connectivity. The surrounding areas are dominated by commercial, institutional, residential, and light industrial development with extensive areas of impervious surface.

The portion of the study area in Kent drains to the North Fork McSorley Creek in WRIA 9, the Duwamish-Green watershed. The study area in Federal Way drains to Hylebos Creek in WRIA 10, the Puyallup-White watershed.

Many species of fish, both native and introduced, inhabit WRIAs 9 and 10. Discussions in this document focus on salmonids – anadromous salmonids in particular – because these species are a management concern due to habitat degradation and population declines. Salmonids in WRIAs 9 and 10 are a mix of native and introduced stocks. For example, sockeye salmon that spawn in some areas appear to be descendants of introduced fish, while those in other areas may be native fish (Hendry et al. 1996). Little genetic information is available for salmon originating from smaller independent tributaries to Puget Sound, such as McSorley Creek and Hylebos Creek. No unique stocks have been identified in Hylebos Creek or McSorley Creek (WDFW and WWTT 1994). However, LeClair (1999) determined that fall chum salmon stocks occurring in Hylebos Creek are of an unknown stock origin. King County (1991) identified regionally and locally important resource areas in the Hylebos Creek basin. Such areas are defined as drainage basins, wetlands, or stream reaches that are important to the viability of fish and wildlife populations as biological, social, and/or economic resources. No regionally or locally important resource areas are mapped in the study area (King County 1991).

An important aspect of documenting fish distribution into streams within each alternative’s study area is the presence of both natural and human made barriers that obstruct or limit use of streams by all fish species. In this assessment, the focus is primarily on salmonids, given their cultural, economic, and recreational significance, but also because many of the populations are experiencing significant declines. Many salmonids are currently listed as threatened or endangered species under the ESA. A significant contributing factor to salmonid population declines is the inability to reach historically accessible habitat, reproduce, and complete other necessary life history requirements due to human made barriers (e.g., improperly constructed culverts or dams). WDFW has evaluated thousands of potential barriers across Washington and maintains a database that applies a percent fish passability rating to each of the assessed barriers. The percent passability is estimated for all fish passage features and uses a combination of professional judgment and species ability to negotiate water surface drop, velocity, and depth. A feature may be evaluated as a total barrier (0 percent passable), a partial barrier (33 percent passable; some passage), a less severe partial barrier (67 percent passable), or a non-barrier (100 percent passable; passable during all times when flow is present, up to the high fish passage flow). The guidance is based upon the abilities of a 15.24-centimeter (6-inch) trout, so it should not be construed as an absolute value for all salmonid species and life stages. The percent passability estimates are intended to represent general categories of passability, not actual estimates of the number of fish that may pass. The percent passability is one factor used for prioritizing barrier correction (WDFW 2019). This document includes results of WDFW's assessment, primarily as a means of documenting the probability of fish presence when fish distribution data are unavailable from other resources, such as SWIFD, StreamNet, or SalmonScape.

3.1.1 Streams in the Study Area

Consistent with Sound Transit's stream habitat assessment guidelines (Sound Transit 2016c), this subsection describes the streams in the study area, or those potentially affected by the project, and provides information about the following key aquatic habitat elements:

- Riparian vegetation
- Physical in-stream habitat
- Biological connectivity
- Water quality and quantity
- Fish presence and habitat use, and stream typing

The proposed OMF South facilities (including lead tracks) and mainline tracks would cross or parallel two streams in the study area: East Fork Hylebos Tributary and West Fork Hylebos Tributary. Both streams are tributaries to Hylebos Creek, an independent tributary that discharges to the Hylebos Waterway along the eastern shore of Puget Sound's Commencement Bay in Tacoma. A third stream (North Fork McSorley Creek) is a tributary to McSorley Creek, an independent tributary that discharges to the eastern shore of Puget Sound in Saltwater State Park in Des Moines. Figures G3.3-1 through G3.3-3 show stream locations, conditions (surface-flowing or piped), and fish passage barriers. Table G3.3-1 summarizes regulatory information for the streams either in the study area, or potentially affected by the project.

Table G3.3-1 Summary of Streams in the Study Area

Stream Name	Stream Index No.[1]	State Interim Water Type[2]	Local Jurisdiction	Local Jurisdiction Stream Classification	Local Jurisdiction Buffer Width[3]
East Fork Hylebos Tributary	10.0016A	3	Federal Way	F	100
West Fork Hylebos Tributary	10.0014C	3	Federal Way	F	100
North Fork McSorley Creek[4]	09.0382	NA	N/A	F	NA

Notes: Streams listed from north to south.

(1) WRIA identification numbers according to Williams et al. (1975) and King County (1990)

(2) WAC 222-16-031

(3) Federal Way Municipal Code 19.145.270 (Revised 10/15/2019)

(4) No surface-flowing portion of North Fork McSorley Creek is within the study area; however, because the Midway Landfill Alternative may potentially discharge stormwater to the stream, it is included in this analysis.

3.1.1.1 East Fork Hylebos Tributary

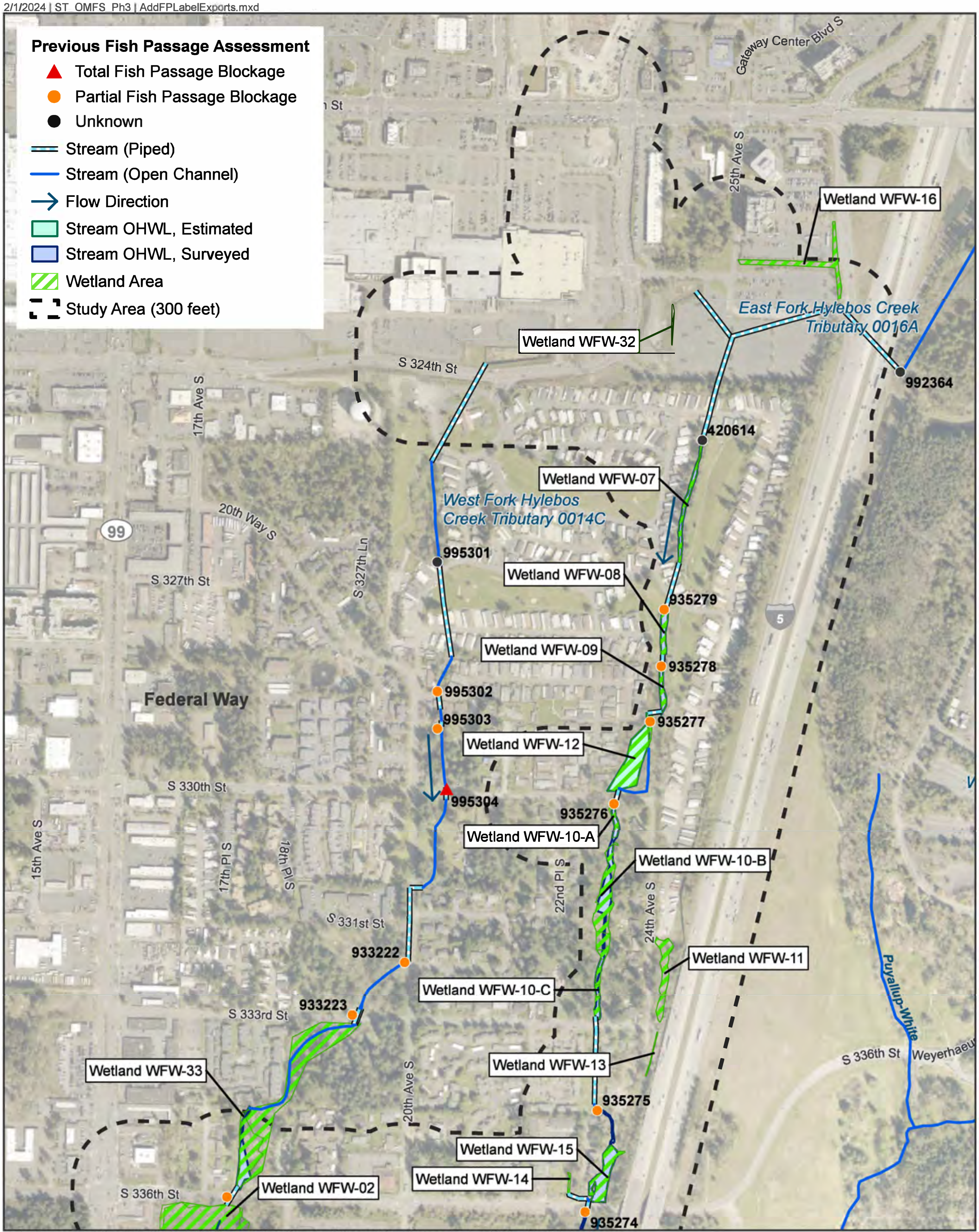
East Fork Hylebos Tributary flows through the eastern portions of both the Preferred and South 344th Street alternatives west of I-5. Surface-flowing segments near the stream's headwaters are within the study area for both mainline track options. Before the construction of I-5 in 1965, the reaches of this stream that flow through the study area were the headwaters of Tributary 0013 in the West Fork Hylebos Creek subbasin. Construction of the I-5 system created a drainage catchment that permanently diverted the tributary into the East Fork Hylebos Creek subbasin (WSDOT and FHWA 2009).

East Fork Hylebos Tributary originates on the east side of I-5 north of S 320th Street in Federal Way. The stream is piped under the freeway and beneath the King County Park and Ride lot, emerging in the study area in Belmor Park Golf and Country Club (Belmor). In this area, a defined channel is more consistently present in surface-flowing segments of the stream. The stream flows south for approximately 2.1 miles before turning east near S 356th Street and crossing underneath I-5, flowing south of SR 161 (Enchanted Parkway S) to join other tributaries to form East Fork Hylebos Creek. The stream channel in the study area is low gradient, straight, and confined between I-5 and residential, commercial, institutional, and light industrial developments. Approximately 8,500 linear feet of the stream are within the study area for the Preferred and South 344th Street alternatives. Of that length, approximately 6,450 linear feet flow in open channels and 2,050 linear feet are piped (Figures G3.3-1 and G3.3-2).

East Fork Hylebos Creek continues on the east side of I-5, flowing through the city of Milton, and turns to the southwest along the Interurban Trail until it converges with West Fork Hylebos Creek near the Porter Way crossing of I-5. From this point, the stream continues south as Hylebos Creek, crossing back across to the west side of I-5 and discharging to the Hylebos Waterway in Tacoma.

Before the mid-19th century, the Hylebos Creek watershed is thought to have been one of the most productive small, salmon-bearing streams draining to southern Puget Sound (King County 1990). Development of the region began in 1851, when the first Euro-American settlers began arriving in the Tacoma area. Since that time, extensive forest cover has been removed, wetlands have been drained and filled, stream channels have been modified, and forested areas have been converted to impervious surfaces. Currently, Hylebos Creek is located in one of the most heavily urbanized watersheds in the state (Kerwin 1999). Most of East Fork Hylebos Tributary is in Federal Way, where population growth continues. Land in Federal Way is largely built out, with most remaining undeveloped lands containing environmentally sensitive areas such as streams and wetlands and their regulatory buffers.

The following subsections describe key habitats and stream features that are directly related to ecological functions supporting stream ecosystems and may be affected by the project, consistent with the stream habitat assessment guidelines established by Sound Transit (2016c).

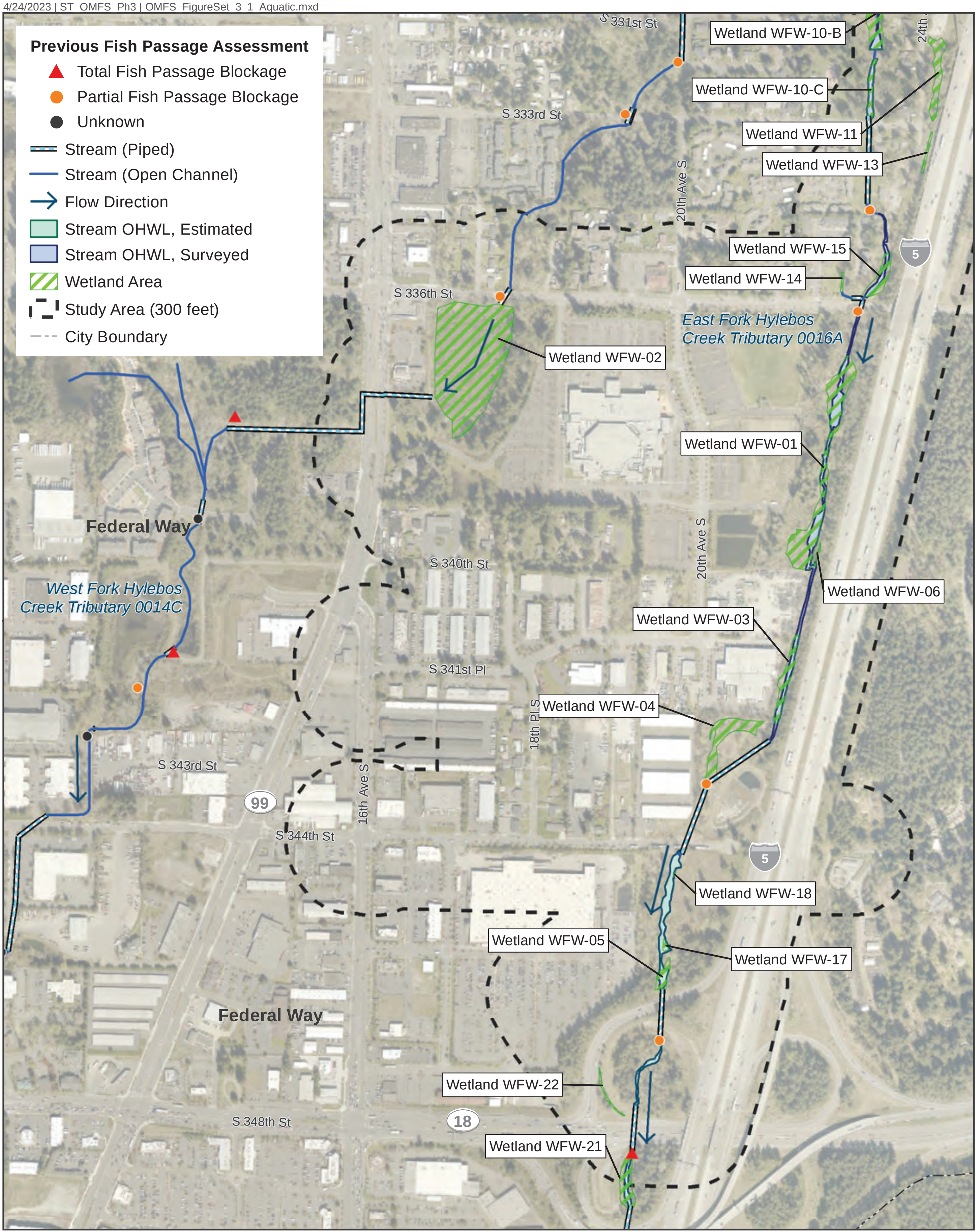

Previous Fish Passage Assessment
▲ Total Fish Passage Blockage
● Partial Fish Passage Blockage
● Unknown
Stream (Piped)
Stream (Open Channel)
→ Flow Direction
🟩 Stream OHWL, Estimated
🟦 Stream OHWL, Surveyed
▨ Wetland Area
Study Area (300 feet)
Gateway Center Blvd S
25th Ave S
Wetland WFW-16
East Fork Hylebos Creek Tributary 0016A
Wetland WFW-32
S 324th St
992364
420614
17th Ave S
Wetland WFW-07
West Fork Hylebos Creek Tributary 0014C
20th Way S
99
995301
S 327th St
S 327th Ln
Wetland WFW-08
935279
5
Wetland WFW-09
935278
995302
Federal Way
995303
935277
Wetland WFW-12
S 330th St
995304
935276
Wetland WFW-10-A
Wetland WFW-10-B
15th Ave S
17th Pl S
18th Pl S
22nd Pl S
24th Ave S
S 331st St
933222
Wetland WFW-11
Wetland WFW-10-C
933223
S 333rd St
Puyallup-White
S 336th St
Weyerhaeu
Wetland WFW-13
Wetland WFW-33
20th Ave S
935275
Wetland WFW-15
Wetland WFW-14
S 336th St
Wetland WFW-02
935274
N
0
500
1,000 Feet

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

FIGURE G3.3-1
Wetland and Stream Existing Conditions
Mainline Track Options

OMF South

4/24/2023 | ST_OMFS_Ph3 | OMFS_FigureSet_3_1_Aquatic.mxd


Previous Fish Passage Assessment
▲ Total Fish Passage Blockage
● Partial Fish Passage Blockage
● Unknown
Stream (Piped)
Stream (Open Channel)
→ Flow Direction
🟩 Stream OHWL, Estimated
🟦 Stream OHWL, Surveyed
▨ Wetland Area
Study Area (300 feet)
City Boundary
S 331st St
S 333rd St
20th Ave S
24th
S 336th St
Wetland WFW-10-B
Wetland WFW-10-C
Wetland WFW-11
Wetland WFW-13
Wetland WFW-15
Wetland WFW-14
5
East Fork Hylebos Creek Tributary 0016A
Wetland WFW-02
Wetland WFW-01
Federal Way
West Fork Hylebos Creek Tributary 0014C
S 340th St
20th Ave S
Wetland WFW-06
Wetland WFW-03
S 341st Pl
Wetland WFW-04
18th Pl S
S 343rd St
99
16th Ave S
S 344th St
5
Wetland WFW-18
Wetland WFW-05
Wetland WFW-17
Federal Way
Wetland WFW-22
18
S 348th St
Wetland WFW-21

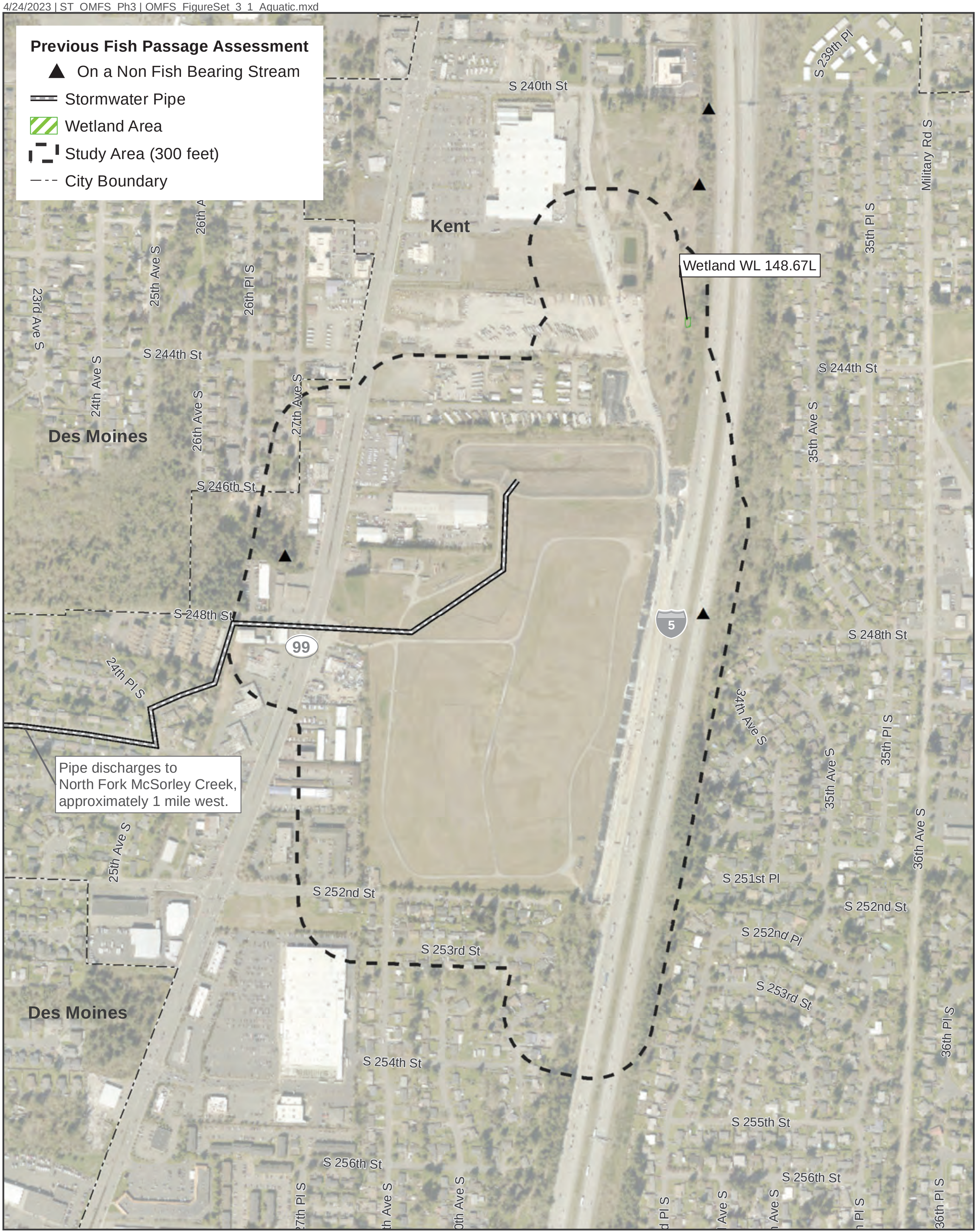
Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G3.3-2
Wetland and Stream Existing Conditions
Preferred and South 344th Street Alternatives

OMF South

4/24/2023 | ST_OMFS_Ph3 | OMFS_FigureSet_3_1_Aquatic.mxd


Previous Fish Passage Assessment
▲ On a Non Fish Bearing Stream
Stormwater Pipe
▨ Wetland Area
Study Area (300 feet)
City Boundary
S 240th St
S 239th Pl
Kent
Military Rd S
35th Pl S
26th A
25th Ave S
26th Pl S
23rd Ave S
Wetland WL 148.67L
S 244th St
24th Ave S
26th Ave S
27th Ave S
S 244th St
Des Moines
35th Ave S
S 246th St
S 248th St
5
99
S 248th St
24th Pl S
34th Ave S
35th Pl S
35th Ave S
Pipe discharges to North Fork McSorley Creek, approximately 1 mile west.
36th Ave S
25th Ave S
S 251st Pl
S 252nd St
S 252nd St
S 252nd Pl
S 253rd St
S 253rd St
Des Moines
36th Pl S
S 254th St
S 255th St
S 256th St
S 256th St
27th Pl S
th Ave S
0th Ave S
d Pl S
Ave S
h Ave S
n Pl S
36th Pl S

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G3.3-3
Wetland and Stream Existing Conditions
Midway Landfill Alternative

OMF South

Riparian Vegetation

Riparian vegetation along some portions of East Fork Hylebos Tributary in the study area is dominated by native forest and wetlands. In other areas, native riparian vegetation has been replaced with landscaping, mowed grasses, or invasive shrubs.

In the area near the Preferred and South 344th Street alternatives, riparian vegetation is characterized as a mixed deciduous and coniferous forest. The forested canopy consists of bigleaf maple, black cottonwood, Oregon ash, Douglas-fir, red alder, Sitka willow, and western redcedar. The understory vegetation consists of cascara, vine maple, salmonberry, beaked hazelnut, sword fern, osoberry, red-twig dogwood, skunk cabbage, lady fern, stink currant, red elderberry, Himalayan blackberry, trailing blackberry, stinging nettle, and reed canarygrass. A large portion of the riparian corridor contains wetland habitats and associated vegetation. The left bank riparian zone in this area includes the fill slope for I-5 and is dominated by upland-associated vegetation, such as Douglas-fir. The right bank riparian zone is dominated by more typical riparian species, as described above.

Because the riparian corridors in the study area are dominated by native forest and wetlands that support a diversity of functions, they are considered high-quality riparian habitat. The functions provided include fish and wildlife habitat provision; food chain support; water temperature maintenance; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; and stream channel formation and maintenance. In other parts of the study area, riparian habitat along East Fork Hylebos Tributary has been degraded through the conversion of native and structurally complex habitats into landscaping, mowed grasses, or invasive shrubs.

The width of the vegetated riparian area south of S 336th Street ranges from 130 feet on the right bank to 150 feet on the left bank. Starting approximately 500 south of S 336th Street, the width of the functional riparian buffer is limited by a retaining wall along the eastern boundary of the Christian Faith Center property. The wall parallels the stream for approximately 500 feet. The width of the vegetated area between the retaining wall and I-5 is approximately 230 to 260 feet.

Downstream of the Christian Faith Center (until the stream reaches the culvert upstream of the WSDOT stormwater facility north of S 344th Street), the stream is confined by I-5 on the east and developed properties to the west. Similar to the reach a little farther north, the width of the functional riparian buffer in this area is limited by a retaining wall along the eastern boundary of the Ellenos Yogurt parcel. The wall parallels the stream for approximately 350 feet. The width of the vegetated area between the retaining wall and the cleared right-of-way for I-5 in this area is approximately 80 feet. Where the stream resurfaces in the cloverleaf interchange between southbound I-5 and SR 18, the vegetated riparian area varies between 100 and 150 feet, narrowing as the stream approaches culverts on the upstream and downstream ends.

Canopy cover was measured every 150 feet along the surveyed stream length. The average stream canopy cover between S 336th Street and S 344th Street is 75 percent. Stream canopy cover in the onramp from southbound I-5 to westbound SR 18 is 79 percent; stream canopy cover in the onramp from southbound I-5 to eastbound SR 18 is 41 percent.

Physical In-Stream Habitat

As observed in the field, habitat in East Fork Hylebos Tributary is degraded. Glides (one of the least desirable habitat types for salmonids) make up more than 50 percent of the stream length between S 336th Street and S 344th Street. Riffles constitute approximately 30 percent of stream habitat in the study area, followed by pools (15 percent) and wetlands (4 percent). The average channel width for the stream within this reach is 8 feet.

The gradient of the stream is low, generally 1 percent or less. As a result, fine sediments have accumulated over time, resulting in the shallowing and widening of the streambed. Dense patches of reed canarygrass have become established in some low-energy areas, exacerbating the deposition of fine sediments. Fine sediments, including sand and silt, dominate the substrate composition in the study area. Patches of gravel are present, primarily in riffle areas; in most areas, however, these gravels are 30 to 40 percent embedded with fine sediments. Pebble count data collected from representative riffle habitats indicate that medium- to coarse-sized gravels (8 mm to 64 mm) are dominant and small gravel and small cobble are subdominant.

Channel sinuosity in the study area is low. Much of the channel is confined within a straight and uniform (ditch-like) channel profile. Reaches with a more natural, meandering profile are rare and short. Fine sediment deposition throughout the reach in the study area is raising the streambed elevation, resulting in frequent channel overtopping and the formation of backwaters and high-flow channels adjacent to the primary channel. During higher flows, the stream overtops its banks quickly and engages the floodplain and riparian wetlands. Large woody debris (LWD) is present in and near the stream channel, creating the potential for increased habitat complexity.

Key restoration opportunities in East Fork Hylebos Tributary in the study area include removal of fish passage barriers, human-made debris, and garbage; removal and control of invasive plant species; LWD installation; and possible channel reconfigurations to increase pool quantity and quality, stream sinuosity, stream flow infiltration, temperature moderation (thermal protection), and overall habitat complexity.

Table G3.3-2 summarizes the characteristics of physical in-stream habitat of East Fork Hylebos Tributary in the study area, using the metrics and measurements recommended by Sound Transit (2016c).

Table G3.3-2 Characteristics of Physical In-Stream Habitat for East Fork Hylebos Tributary in the Study Area

Parameter	Metric/Measurement	Condition in Study Area
Channel Form and Profile	Macrohabitat – habitat type	Habitats in the study area were dominated by glide habitat, followed by low gradient riffle habitat, pools, and wetlands.
	Macrohabitat – pool characteristics	No pools in the project area exceeded 2 feet in depth with average residual pool depths of 0.71 feet throughout the corridor. The intermittent nature of the stream, combined with moderately infiltrative soils, indicates that while pools may have some moderate ability to retain water, this water quickly dries up.
	Stream Slope	East Fork Hylebos Tributary is a low-gradient stream within the project area. Stream slopes ranged from 0.4 percent to 1.1 percent.
	Stream Patterns	Straight
	Confinement	The entrenchment ratio for all measurements was > 2.2, indicating that East Fork Hylebos Tributary is only slightly entrenched and has good connectivity to the adjacent floodplain.
	Channel Dimension/Shape	East Fork Hylebos Creek is characterized by a shallow U-shaped channel with an average bankfull width of 10.5 feet and an average bankfull depth of approximately 1.2 feet.

Table G3.3-2 Characteristics of Physical In-Stream Habitat for East Fork Hylebos Tributary in the Study Area (continued)

Parameter	Metric/Measurement	Condition in Study Area
Streambank Condition	Stability	Streambanks are typically stable with some areas of low scour.
	Bank Hardening/Revetments	Shoreline armoring is largely absent from the streambanks except for riprap armoring at many of the culvert crossings.
Substrate/ Sediment	Particle Frequency	Representative pebble counts were conducted at several riffles and pool tail-out locations throughout the assessed reaches. In general, gravels (particles ranging from 8-64 mm) were dominant, with small gravel (2-8 mm) and small cobble being subdominant (64-128 mm).
	Percentage of Fine Sediments/Embeddedness	Gravels, where present, are typically between 30 and 40 percent embedded with fines.
Large Woody Debris (LWD)	LWD Presence, Frequency, and Location	Approximately 71 pieces of LWD were observed over the 3,234 feet of assessed stream length. This equates to a density of 115 pieces per mile. A total of 66 percent of pieces were in the water, 31 percent spanned the channel, and 2 percent were not in the water but were below the bankfull elevation.
	Debris Jams	No debris jams were observed throughout the assessed reach.
	LWD Size	Coniferous logs averaged 28 feet in length and 12.2 inches in diameter. Deciduous logs averaged 23 feet in length and 8.1 inches in diameter.
	Age and Type	31 percent coniferous logs, 18 percent coniferous root wads, and 51 percent deciduous logs. The coniferous logs were typically in better condition with an average decay class of 2, which indicates the bark was typically still intact and the log maintained its original color. The majority of deciduous logs had a decay class between 3 and 4, meaning that most of the bark had gone and deterioration was advanced or advancing.
Cover and Refuge	Pool Quality	Pools in the project area have pool quality index values ranging from 2 to 4, with the majority being between 2 and 3. Pools, where present, were small, lacked sufficient depth, and had low to moderate cover.
	Undercut Banks	Undercut banks were rare throughout the reach. Undercut banks, where present, were shallow and provided little to no cover.
	Off-channel/Side-channel Habitat	The surveyed reach was devoid of off-channel habitat, such as side channels and beaver dams.
	In-stream Cover/Protection	Other than LWD, no boulders or aquatic macrophytes were present that would provide any type of cover. The intermittent nature of the stream prevents the colonization of the stream channel by aquatic macrophytes. Reed canarygrass is present in some areas; however, where present, this material tends to choke the channel and divert water around the channel and is effectively inaccessible to rearing fish.

Note: *PQI = Pool Quality Index for Puget Sound Lowland Streams (modified from Platts et al. 1983)

Biological Connectivity

Numerous barriers to fish passage exist within and downstream of the study area. Table G3.3-3 summarizes the status of known fish passage barriers in East Fork Hylebos Tributary within and downstream of the study area for the Preferred and South 344th Street alternatives. Under current conditions, access to the study area is obstructed by two culverts downstream of the study area that are identified as total barriers to fish passage. Access is further limited by three partial barriers and one structure that WDFW was unable to evaluate (Table G3.3-3). Notably, WSDOT is developing plans for the correction of one total barrier and three partial barriers downstream of the study area, as well as one total barrier and two partial barriers within the study area (Table G3.3-3). It is assumed for this analysis that those barriers will have been removed before work on the OMF South project would begin under any of the build alternatives. Even with the removal of those seven barriers, several barriers (including one total barrier) will continue to impede access to stream reaches in the study area. The remaining total barrier is on a private road crossing approximately 1 mile downstream of the study area. If this barrier is removed, anadromous salmonids will have improved access to reaches of East Fork Hylebos Tributary in the study area.

Table G3.3-3 Fish Passage Barrier Assessment for East Fork Hylebos Tributary Within and Downstream of the Study Area

Approximate Road Crossing	Unique Site ID	Barrier Status
Within Study Area		
Winged Foot Way	992364	Unknown
Burning Tree Boulevard	935279	Partial
Golf Course Path	935278	Partial
Abandoned Utility Corridor	935277	Partial
S 330th Street	935276	Partial
S 333rd Street	935275	Partial
S 336th Street	935274	Partial
WSDOT Stormwater Facility near S 344th Street	935271	Partial[1]
I-5 SB Off-ramp at Exit 142B	995293	Partial[1]
SR 18 at Exit 142B	995298	Total[1]
Downstream of Study Area		
I-5 SB On-Ramp at Exit 142B	995297	Total[1]
I-5	995292	Partial[1]
WSDOT NB Right-of-way Access Road	995295	Partial[1]
20th Avenue S	995296	Partial[1]
20th Place S	932946	Unknown
S 363rd Place	932945	Total
Private Parcel South of 1st Street E	936030	Total

Source: WDFW Fish Passage and Diversion Screening Inventory Database (WDFW 2023)

Note:

(1) Barrier slated for correction by WSDOT.

The stream is conveyed under S 336th Street in two parallel, 65-foot-long concrete culverts. One of these has a diameter of 28 inches and the other has a diameter of 18 inches. WDFW (2023) has identified this crossing as a partial barrier to fish passage (Site ID 935274).

Water Quality and Quantity

East Fork Hylebos Tributary is not on the most recent (2018) 303(d) list of impaired waters (Ecology 2023). The nearest listed segment is approximately 2 miles downstream, where East Fork Hylebos Creek is listed as impaired due to elevated levels of fecal coliform bacteria.

East Fork Hylebos Tributary flows intermittently near the Preferred and South 344th Street alternatives. The streambed in this area is typically dry during summer and early fall. The stream channel was completely dry during the October 9, 2019, reconnaissance survey, and a soil pit excavated to a depth of 20 inches below the ground surface elevation in the stream failed to reach the groundwater table. Two weeks later (October 22, 2019), after several days of consistent rainfall, flows were reestablished in the stream channel. In 2022, a notably droughty fall, the stream channel was observed to be dry from August through the second week of October. Several culverted and un-culverted discharges to East Fork Hylebos Tributary were observed during site surveys. On the left bank, a culvert discharges to the stream directly from S 336th Street, which was assumed to be stormwater from the roadway. Another 12-inch-diameter corrugated plastic pipe discharges to the stream along the left bank at Station 1,530 and appears to originate from the adjacent commercial property. A quarry spall-lined channel, originating from a small culvert adjacent to I-5 and presumably conveying stormwater runoff from I-5, enters the right bank at Station 2,042.

Fish and Habitat Use

Current salmonid use of the Hylebos Creek watershed includes fall-run Chinook salmon, fall-run chum salmon, coastal cutthroat trout, odd-year pink salmon, coho salmon, and winter steelhead (HDR 2014; Marks et al. 2018, 2019, 2020, 2021). According to the SWIFD web map, several species of salmon and winter steelhead may potentially be present in East Fork Hylebos Tributary based upon accessible stream gradient (NWIFC 2023). However, there is no documented or presumed[1] salmonid use in East Fork Hylebos Tributary (WDFW 2022; NWIFC 2023). Under current conditions, human-created barriers to fish passage prevent anadromous salmonids from entering stream reaches in the study area (WDFW 2022; NWIFC 2023). No resident salmonids are present given the intermittent flow of the stream, lack of pools with sufficient depth to hold fish during periods when stream channel is dry, and the presence of barriers between the study area and potential population sources downstream. However, resident, non-salmonid species, such as sculpins and sticklebacks, could be present. In addition, the basin size, channel width, and gradient of the stream indicate the potential to support fish in the future. For this reason, the stream is classified as a Type F stream, in accordance with Federal Way Municipal Code section 19.145.260.

The documented distribution of Chinook salmon distribution in the Hylebos Creek watershed does not extend into East Fork Hylebos Creek or its tributaries except for the lowest 730 feet of the stream (WDFW 2022). This is approximately 3 miles downstream of the Preferred and South 344th Street alternatives (WDFW 2022). Chinook salmon are not presumed to use habitats in East Fork Hylebos Creek or its tributaries upstream of that point, but there are no gradient barriers that preclude access to East Fork Hylebos Tributary in the study area (WDFW 2022).

Coho salmon and winter-run steelhead have been documented in East Fork Hylebos Creek approximately 1.85 miles downstream of the Preferred and South 344th Street alternatives (WDFW 2022). Chum salmon have been documented in East Fork Hylebos Creek approximately 2.3 miles downstream of the Preferred and South 344th Street alternatives. Pink salmon have been documented in the lower reaches of Hylebos Creek system and are presumed to occur in East Fork Hylebos Creek as far upstream as 3 miles downstream of the Preferred and South 344th Street alternatives (WDFW 2022; NWIFC 2023). As noted above, the basin size, channel width, and gradient of East Fork Hylebos Tributary in the study area indicate the potential to support these species in the future.

3.1.1.2 West Fork Hylebos Tributary

One surface-flowing segment of West Fork Hylebos Tributary flows through the northwestern corner of the project limits of the Preferred Alternative. An approximately 500-foot-long piped segment of the stream is present at the northern end of the mainline portion of the study area.

West Fork Hylebos Tributary originates on the west side of I-5, near The Commons at Federal Way and Belmor. The stream flows south through residential development to S 336th Street, where it enters a series of stormwater detention ponds. The stream then turns west and crosses

---

[1] Presumed use means reliable documentation of fish use is lacking, but available data and consensus indicate that fish are likely to be present.

SR 99 in a long, piped segment, before joining several other tributaries to form West Hylebos Creek just north of S 356th Street. West Hylebos Creek continues southeast and joins East Fork Hylebos Creek on the east side of I-5 near the Porter Way crossing of I-5. From this point, the stream continues as Hylebos Creek, crossing back across to the west side of I-5 and discharging to the Hylebos Waterway in Tacoma.

Approximately 2,300 linear feet of the stream are within the study area for the Preferred and South 344th Street alternatives. Of that length, less than 400 linear feet flow in open channels and approximately 1,300 linear feet are piped (Figures G3.3-1 and G3.3-2). The remaining 600 linear feet are where the stream lacks a defined channel as it flows through Wetland WFW-02. The stream length in that area is estimated based on linework obtained from the King County iMap interactive mapping tool.

The development history of the area is similar to that of East Fork Hylebos Creek; however, the intensity of development is greater, resulting in higher levels of impervious surface area. With this higher level of development in the basin, West Fork Hylebos has experienced flooding and water quality problems associated with the increased impervious surface area. The city of Federal Way has constructed numerous stormwater facilities across the basin to address the flooding issues, including the stormwater facilities through which West Fork Hylebos Tributary flows near the Preferred Alternative.

Riparian Vegetation

West of the Preferred Alternative, West Fork Hylebos Tributary flows through a stormwater pond north of S 336th Street and enters a second, larger stormwater facility south of S 336th Street. Vegetation within the latter stormwater facility is dominated by native trees and shrubs (Pacific willow, black cottonwood, red-twig dogwood, salmonberry, and Douglas' spiraea) that provide high-quality riparian habitat. This stormwater facility is also mapped as Wetland WFW- 02.

Physical In-Stream Habitat

As noted above, West Fork Hylebos Tributary near the Preferred Alternative is confined within stormwater facilities or pipes. There is no defined channel within Wetland WFW-02. Where it exits the wetland/stormwater facility, the stream flows through a raised outlet standpipe and then enters an approximately 500-foot-long culvert under SR 99. When it is ponded, this facility could retain and support fish use; however, once the facility drains, there is little or no holding water for fish. The pond's substrate is predominantly fine sediment and, as such, provides no suitable spawning habitat for anadromous or resident salmonids.

The surface-flowing segment of West Fork Hylebos Tributary in the mainline portion of the study area is associated with a stormwater facility in Belmor. In contrast to the segment in the Preferred Alternative portion of the study area, the stream's connection to the stormwater facility in Belmor is off-line rather than in-line, which means the stormwater facility has a connection to the stream, but the stream does not flow through the facility.

Biological Connectivity

Numerous barriers to fish passage exist within and downstream of the Preferred and South 344th Street alternative portions of the study area, including seven partial barriers, four total passage barriers, and four crossings that have been assigned an "unknown" barrier status, which means they have been evaluated, but for one reason or another a barrier status could not be assigned. Table G3.3-4 summarizes the status of known fish passage barriers downstream of the Preferred and South 344th Street alternatives.

Table G3.3-4 Fish Passage Barrier Assessment for West Fork Hylebos Tributary Within and Downstream of the Study Area

Approximate Road Crossing	Unique Site ID	Barrier Status
Within Study Area		
The Dunes Court	995301	Unknown
S 328th Place	995302	Partial
Private Property	995303	Partial
S 330th Street	995304	Total
20th Avenue S	933222	Partial
S 333rd Street	933223	Partial
S 336th Street	933224	Partial
Downstream of Study Area		
SR 99	933225	Total
S 340th Street	933226	Unknown
Private Property	933227	Total
Private Property	933229	Partial
Private Property	933061	Unknown
Private Property	933060	Unknown
S 348th Street	933058	Total
S 356th Street	992011	Partial

Source: WDFW Fish Passage and Diversion Screening Inventory Database (WDFW 2023)

The stream is conveyed under S 336th Street in a pair of parallel, 86-foot-long concrete culverts. Both culverts have a diameter of 42 inches. Based on a 2015 field review, WDFW (2023) has identified this crossing as a partial barrier to fish passage.

Water Quality and Quantity

A segment of West Fork Hylebos Tributary approximately 0.2 mile downstream of the Preferred project limits is on the most recent (2018) 303(d) list of impaired waters, based on violations of state standards for copper, lead, zinc, dibenzo(a,h)anthracene, and benzo(a)pyrene (Ecology 2023). Large amounts of impervious surface area in the upper watershed have likely contributed to elevated levels of pollutants associated with vehicle use, including metals such as copper, lead, and zinc.

The high level of development and associated impervious surface in the West Fork Hylebos Creek basin have resulted in severe flooding issues over the years and have contributed to altered peak and base flows in West Fork Hylebos Tributary (King County 1990). As a result, Federal Way has initiated and completed numerous flood control projects, including large stormwater facilities throughout the basin.

Fish and Habitat Use

The SWIFD web map shows no salmonid fish present in West Fork Hylebos Tributary (NWIFC 2023). Based on the presence of human-created barriers to fish passage, no anadromous fish are documented or presumed to use West Fork Hylebos Tributary in the Preferred and South 344th Street alternatives portions of the study area (WDFW 2022; NWIFC

2023). No resident salmonids are present, given the intermittent flow of the stream, lack of pools with sufficient depth to hold fish during periods when stream channel is dry, and the presence of barriers between the study area and potential population sources downstream. However, resident, non-salmonid species, such as sculpins and sticklebacks, could be present. In addition, the basin size, channel width, and gradient of the stream indicate the potential to support fish in the future. For this reason, the stream is classified as a Type F stream, in accordance with Federal Way Municipal Code section 19.145.260.

The documented distribution of Chinook salmon in the Hylebos Creek watershed extends into the lower reaches West Fork Hylebos Creek (NWIFC 2023). The upstream limit of documented Chinook salmon presence mapped by NWIFC (2023) is near S 373rd Street, approximately 2.9 miles downstream of the Preferred Alternative. However, fisheries biologists from the Puyallup Tribe of Indians have observed Chinook salmon in West Fork Hylebos Creek as far upstream as S 356th Street, another 1.4 miles farther upstream (Marks et al. 2018, 2019, 2020, 2021). Chinook salmon are not known or presumed to use habitats in West Fork Hylebos Creek or its tributaries upstream of that point, but there are no gradient barriers that would preclude access to West Fork Hylebos Tributary in the study area if human-created barriers are removed (WDFW 2019b).

The Puyallup Tribal Fisheries Department has documented chum salmon, coho salmon, pink salmon, and steelhead spawning in reaches of West Fork Hylebos Creek approximately 2.2 miles downstream of the study area for the Preferred Alternative (Marks et al. 2018, 2019, 2020, 2021). According to NWIFC (2023), reaches of West Fork Hylebos Creek 1.5 miles downstream of the Preferred Alternative support spawning by coho salmon. Other fish species documented in West Fork Hylebos Creek include threespine stickleback, western brook lamprey, yellow perch, bass and sculpin (HDR 2014; Marks et al. 2018, 2019, 2020, 2021). As noted above, the basin size, channel width, and gradient of West Fork Hylebos Tributary in the study area indicate the potential to support these species in the future.

Based on habitat conditions, bull trout are not expected to use stream habitats in the Hylebos Creek watershed. Bull trout are strongly associated with snowmelt-dominated streams that maintain cold water temperatures in headwater tributaries year-round. Streams in the Hylebos Creek watershed are rainfall-dominated. In addition, stream temperatures are regularly higher than the temperatures this species requires. Despite these conditions, a single sub-adult bull trout was captured near the S 373rd Street crossing of West Fork Hylebos Creek in August 2018, approximately 4 miles downstream from the study area of the Preferred Alternative. For this analysis, it is assumed that individual bull trout could venture into accessible segments of Hylebos Creek and its tributaries in the future. The presence of any such fish would likely be brief based on the lack of high-quality habitat for bull trout in those streams.

3.1.1.3 North Fork McSorley Creek

North Fork McSorley Creek is included in the Lower Puget Sound–Des Moines/Federal Way drainage basin of WRIA 9 and originates in Des Moines, approximately 2,000 feet west of the Midway Landfill Alternative. The headwaters of North Fork McSorley Creek are near Parkside Elementary School west of SR 99. From there, the stream flows west and then south-southwest through primarily single-family residential areas before entering Saltwater State Park on the west side of 16th Avenue S. At that point, the stream joins South Fork McSorley Creek to form McSorley Creek, continuing west to its discharge point in Puget Sound. The stream length from the headwaters to McSorley Creek’s discharge point into Puget Sound is approximately 1.8 miles. The portion of stream within the residential areas has been highly modified and confined to a straight and narrow ditch-like feature with a limited riparian corridor.

While no surface-flowing portions of North Fork McSorley Creek are within the Midway Landfill Alternative study area, a regional stormwater detention facility at the north end of the study area discharges to North Fork McSorley Creek approximately 1.1 miles west of the study area at the S 250th Street stream crossing. Figure G3.3-3 shows the pipe discharging from the stormwater detention facility. This pipe conveys only stormwater; it is not part of the stream network. Limited information is provided below to describe what is known about existing water quality and fish use of North Fork McSorley Creek, because these are the elements that could potentially be affected by any stormwater discharges from the Midway Landfill Alternative to the regional stormwater facility.

Biological Connectivity

Numerous barriers to fish passage exist downstream of the Midway Landfill Alternative study area, including one culvert on a non-fish-bearing segment of stream, three total fish passage barriers, and four partial barriers. Table G3.3-5 summarizes the status of known fish passage barriers on North Fork McSorley Creek downstream of the Midway Landfill Alternative.

Table G3.3-5 Fish Passage Barrier Assessment for North Fork McSorley Creek

Approximate Road Crossing	Unique Site ID	Barrier Status
Parkside Elementary School	940301	On a non-fish-bearing stream
20th Avenue S	940300	Total
S 245th Place	940299	Partial
S 246th Place	940298	Partial
Outlet of Martindale Lake	940296	Total
S 250th Street	940295	Total
Private Property	940294	Partial
Saltwater State Park	940284	Partial

Source: WDFW Fish Passage and Diversion Screening Inventory Database (WDFW 2023)

Water Quality and Quantity

North Fork McSorley Creek is not listed on the Ecology 303(d) list of impaired waterbodies for any parameters. The nearest listed stream segment is McSorley Creek, approximately 1.2 miles from the Midway Landfill Alternative. McSorley Creek contains 303(d) listings for bacteria and dissolved oxygen (Ecology 2023).

No hydrologic data are available for North Fork McSorley Creek; however, the stream is known to have intermittent or seasonal flow between the headwater area at Parkside Elementary School and Martindale Lake just upstream of S 250th Street.

Fish and Habitat Use

Electrofishing surveys conducted by Washington Trout (2003) documented the presence of coastal cutthroat trout in North Fork McSorley Creek as far upstream as S 250th Street (approximately 1 mile from the study area) and western brook lamprey as far upstream as 20th Avenue S (a total barrier to fish passage approximately 0.5 mile west of the study area). Washington Trout also found juvenile chum salmon, juvenile coho salmon, juvenile rainbow trout/steelhead, sculpin, and sea-run and resident cutthroat trout in the lower reaches of the main stem of McSorley Creek.

According to NWIFC (2023), fall-run Chinook salmon, fall-run chum salmon, coho salmon, and winter-run steelhead are potentially present[2] in North Fork McSorley Creek as far upstream as Martindale Lake, approximately 1 mile west of the study area. With the exception of the potential presence of Chinook salmon, these determinations of potential presence are all superseded by the documented observations of the Washington Trout survey (2003).

3.1.2 Aquatic Species of Concern

3.1.2.1 ESA-listed Species and Critical Habitat

Discussions in this document pay particular attention to species with listing status under the ESA because such status triggers additional regulatory review. The ESA requires each federal agency to ensure that any actions it undertakes or approves do not jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of their designated critical habitat. For this project, federal approval would be required for construction and operation of OMF South facilities in the I-5 right-of-way. To meet this requirement, a lead federal agency would evaluate the potential impacts of the project selected by the Sound Transit Board of Directors on ESA-listed species and critical habitat and, if necessary, initiate consultation with USFWS and NMFS. The assessment would also include a review of potential effects on Essential Fish Habitat, as required by the Magnuson-Stevens Fishery Conservation and Management Act.

Aquatic species that are currently protected under the ESA and that have the potential to occur in the study area include Chinook salmon and steelhead, which are listed as threatened. In addition, the USFWS Information for Planning and Consultation planning tool identified bull trout (another regionally important and federally threatened species) as potentially occurring in areas that might be affected by the project. As discussed above, it is possible, albeit unlikely, that individual bull trout could venture into accessible segments of Hylebos Creek and its tributaries in the future. Numerous barriers to fish passage, combined with small stream sizes and intermittent flow regimes, prevent any of these species from entering stream reaches in the study area. The distribution of these species within affected waterbodies is discussed in more detail above in Section 3.1.1, Streams in the Study Area.

None of the stream reaches in the study area includes any proposed or designated critical habitat for ESA-listed species. However, historically accessible reaches of these streams are designated as Essential Fish Habitat for Pacific salmon, triggering consultation requirements under the Magnuson-Stevens Fishery Conservation and Management Act.

Critical habitat has been designated for Chinook salmon and steelhead within the Hylebos Creek watershed, but not East Fork Hylebos Tributary or West Fork Hylebos Tributary. With respect to East Fork Hylebos Creek and Preferred and South 344th Street alternatives, the nearest designated critical habitat for Chinook salmon is approximately 3 miles downstream of the study area, and the nearest designated critical habitat for steelhead is approximately 1.85 miles downstream of the study area. With respect to West Fork Hylebos Creek and the Preferred Alternative, the nearest designated critical habitat for Chinook salmon is approximately 2.5 miles downstream of the study area, and the nearest designated critical habitat for steelhead is approximately 1.6 miles downstream. Critical habitat has not been designated for any aquatic species in McSorley Creek or North Fork McSorley Creek with respect to the Midway Landfill Alternative.

---

[2] Fish are classified as potentially present in a stream segment if artificial obstructions, degraded habitat quality, or extirpation of local populations currently preclude their presence, but the stream segment has the potential to support these species if obstructions were removed, habitat restored, and/or fish reintroduced (WDFW 2022c).

Critical habitat for bull trout is not present within any of the stream reaches in the study area; however, bull trout critical habitat has been designated along the marine nearshore of Puget Sound at the mouths of both Hylebos Creek and McSorley Creek and includes the upstream extent of tidal influence into both streams.

3.1.2.2 Other Aquatic Species of Concern

Currently, no state-listed fish species are expected to occur in streams within the study area. Resident coastal cutthroat trout, identified as a state priority species due to its recreational importance, has not been documented as occurring in either East Fork Hylebos Tributary or West Fork Hylebos Tributary. However, there is a potential for this species to occur in these streams downstream of the study area. It is possible that remnant populations have persisted in these streams after the barriers were installed, but the potential is very low given the presence of numerous barriers on the system, seasonal flow, and lack of pools with adequate holding depth to remain wetted over the drier summer months. Presence within North Fork McSorley Creek and the Midway Landfill Alternative is not anticipated. The cities of Kent and Federal Way have not identified any species of local concern at this time.

3.2 Vegetation, Wildlife, and Wildlife Habitat

The study area includes a variety of cover types and wildlife habitats. Much of the study area is dominated by urban development, including industrial, institutional, commercial, and residential areas. These areas support plant and animal species adapted to disturbed urban areas. However, patches of less-developed habitats occur along the Hylebos Creek tributaries in Federal Way and at the Midway Landfill in Kent. Vegetation conditions and wildlife habitats are described in the following subsections, followed by a summary of species and habitats of concern that are known or expected to be present in the study area.

3.2.1 Vegetation

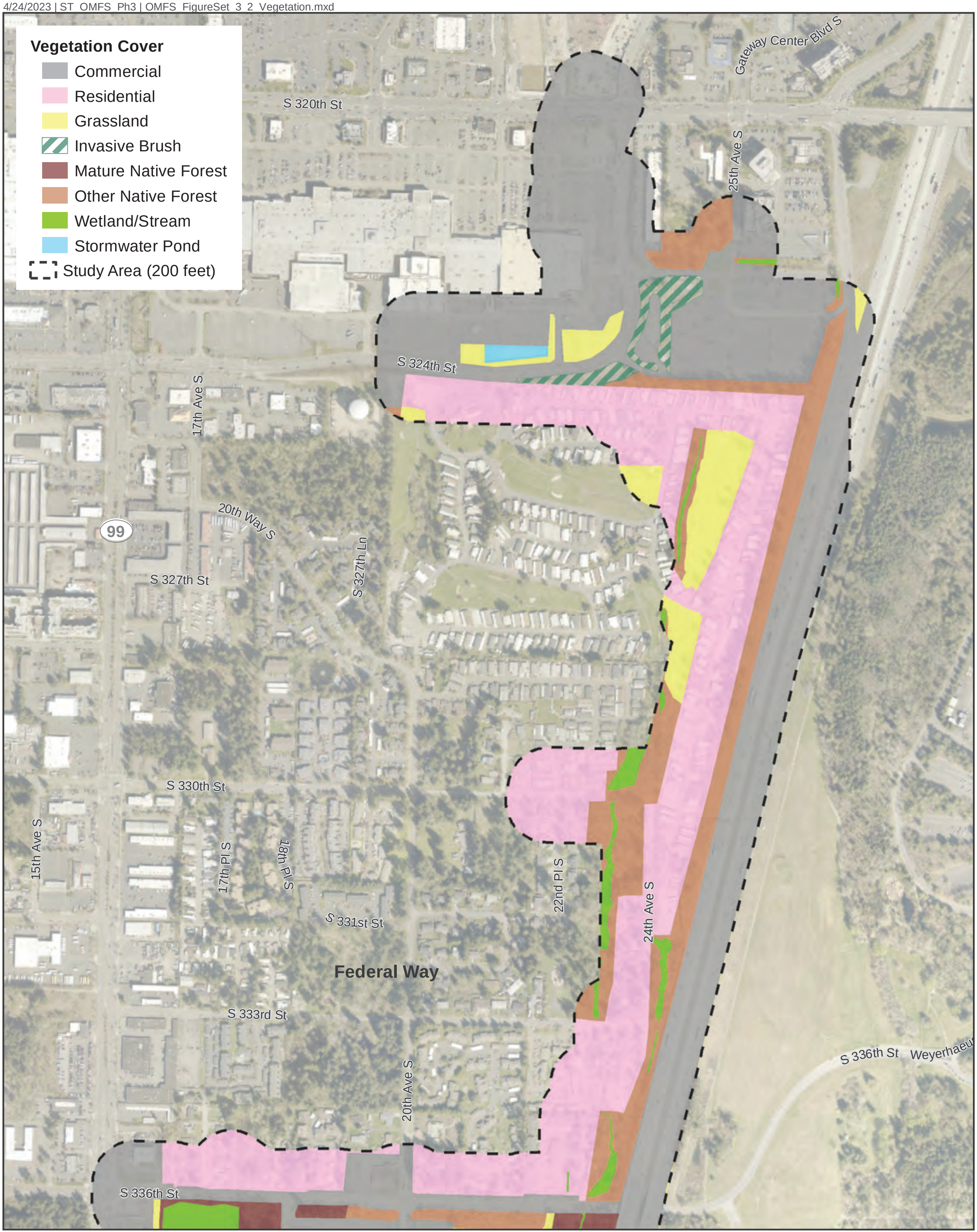
Vegetation in the study area was classified in land cover types and characterized according to the methods described in Section 2.2.2, Methods. Ten cover types were identified in the study area: commercial, residential, grassland, invasive brush, native brush, non-native forest, mature native forest, other native forest, wetland/stream, and stormwater pond. Table G3.3-6 lists these cover types and summarizes the acreage of each. Because the footprints of the two project alternatives in Federal Way overlap substantially, land cover acreage values for the portion of the study area surrounding those two sites (including lead tracks) are presented together. Similarly, land cover acreage values for the mainline track options are presented together. Figures G3.3-4, G3.3-5, and G3.3-6 depict the distribution of the cover types in the study area around the project alternatives. The figures also depict priority habitats that have been identified and mapped by WDFW. Representative photographs of each cover type are included in Attachment G3-6.

The following subsections describe and summarize the relative habitat value of the land cover types in the study area. Relative habitat value is based on habitat structure, scarcity in the study area, disturbance types and frequency, and time required for ecosystem functions to recover following clearing and replanting. Priority habitats, based on WDFW definitions (WDFW 2008) are identified and described in Section 3.2.3, Species and Habitats of Concern.

Table G3.3-6 Vegetation and Wildlife Habitats in the OMF South Study Area

Land Cover Type	Acres in Study Area			
	Preferred and South 344th Street Alternatives	Mainline	Midway Landfill	Total
Commercial	73	104	40	217
Residential	11	33	12	56
Grassland	4	10	61	75
Invasive Brush	5	4	6	15
Native Brush	0	2	0	2
Non-native Forest	1	0	1	2
Mature Native Forest	9	4	0	13
Other Native Forest	7	32	10	49
Wetland/Stream	2	4	0	6
Stormwater Pond	2	< 0.5	5	7
Total	**114**	**193**	**135**	**442**

4/24/2023 | ST_OMFS_Ph3 | OMFS_FigureSet_3_2_Vegetation.mxd


Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Mature Native Forest
Other Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
Gateway Center Blvd S
S 320th St
25th Ave S
S 324th St
17th Ave S
20th Way S
99
S 327th Ln
S 327th St
S 330th St
15th Ave S
17th Pl S
18th Pl S
22nd Pl S
24th Ave S
S 331st St
Federal Way
S 333rd St
20th Ave S
S 336th St
S 336th St
Weyerhaeu

Data Sources: Valtus (2017); King County; Cities of Des Moines, Federal Way, Kent (2019).

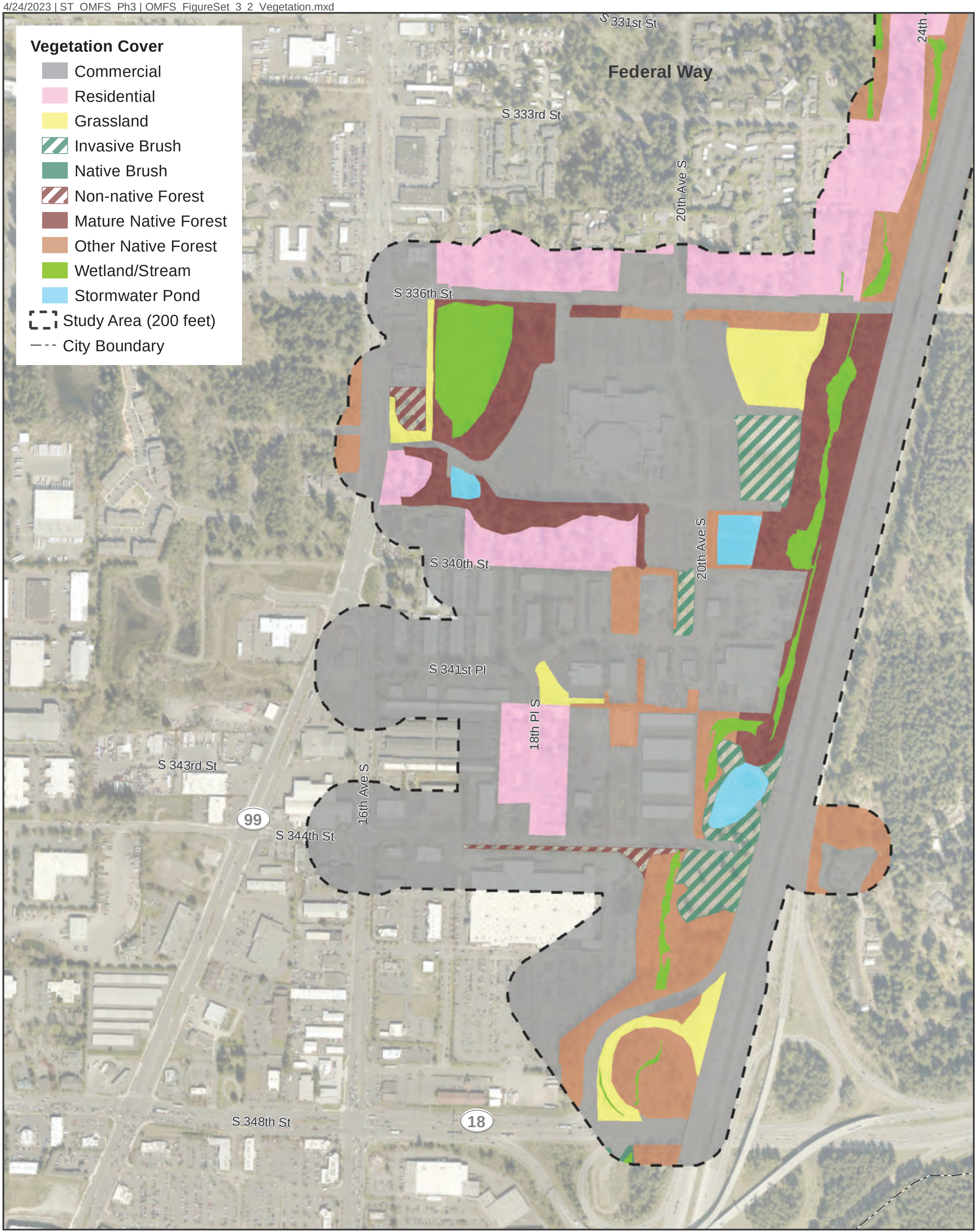
FIGURE G3.3-4
Vegetation Cover Existing Conditions Mainline Track Options

OMF South

N

0 500 1,000 Feet

4/24/2023 | ST_OMFS_Ph3 | OMFS_FigureSet_3_2_Vegetation.mxd


Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Native Brush
Non-native Forest
Mature Native Forest
Other Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
City Boundary
S 331st St
Federal Way
24th
S 333rd St
20th Ave S
S 336th St
S 340th St
20th Ave S
S 341st Pl
18th Pl S
S 343rd St
16th Ave S
99
S 344th St
S 348th St
18

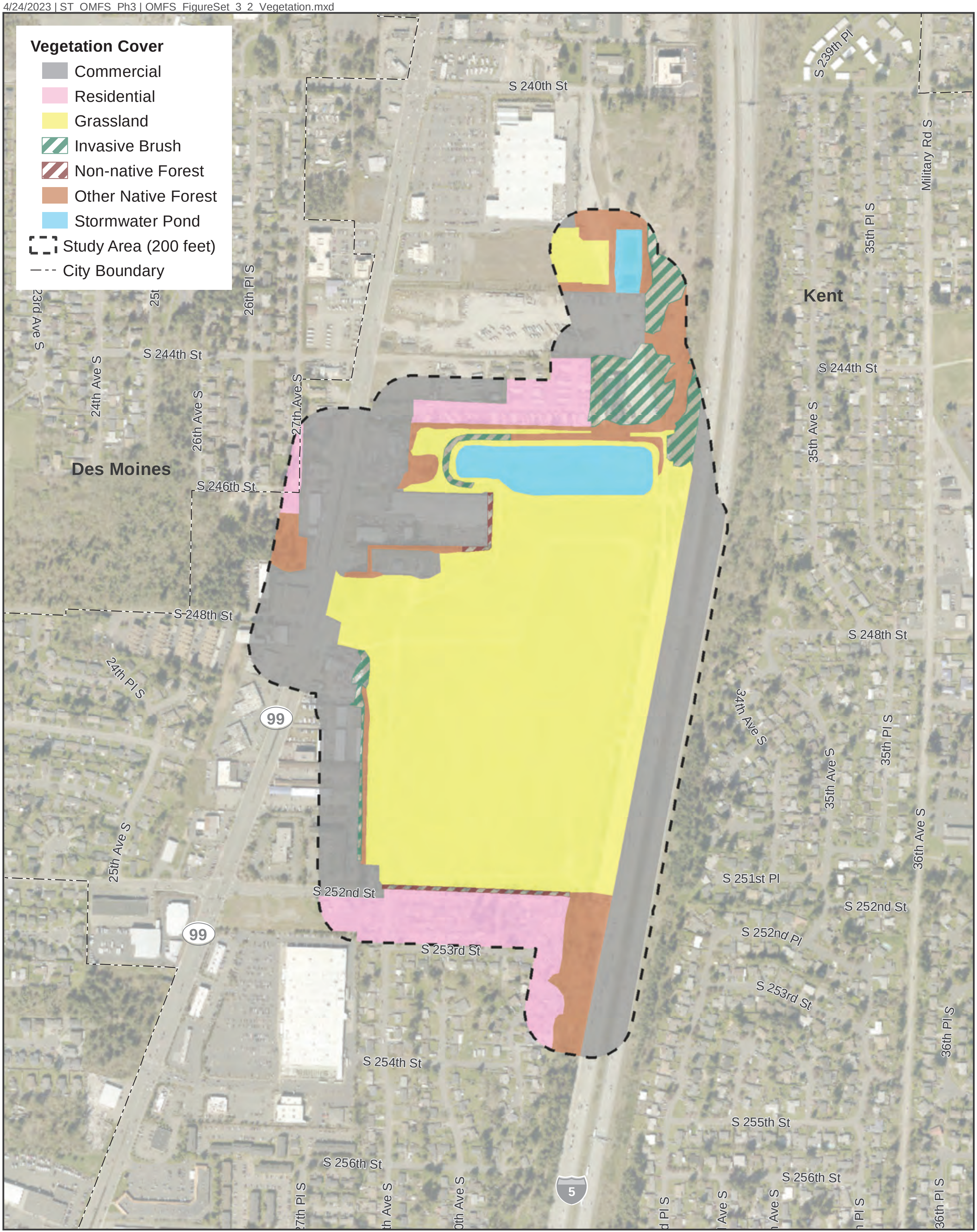
Data Sources: Valtus (2017); King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G3.3-5
Vegetation Cover Existing Conditions
Preferred and South 344th Street Alternatives

OMF South


Vegetation Cover
■ Commercial
■ Residential
■ Grassland
▨ Invasive Brush
▨ Non-native Forest
■ Other Native Forest
■ Stormwater Pond
Study Area (200 feet)
City Boundary
Des Moines
Kent
S 239th Pl
S 240th St
Military Rd S
35th Pl S
23rd Ave S
25th
26th Pl S
S 244th St
24th Ave S
26th Ave S
27th Ave S
S 244th St
35th Ave S
S 246th St
S 248th St
S 248th St
24th Pl S
99
34th Ave S
35th Pl S
35th Ave S
36th Ave S
25th Ave S
S 251st Pl
S 252nd St
S 252nd St
99
S 252nd Pl
S 253rd St
S 253rd St
S 254th St
36th Pl S
S 255th St
S 256th St
S 256th St
5
27th Pl S
th Ave S
0th Ave S
d Pl S
Ave S
h Ave S
h Pl S
36th Pl S

Data Sources: Valtus (2017); King County; Cities of Des Moines, Federal Way, Kent (2019).

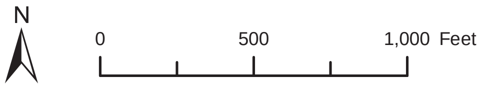

N
0
500
1,000 Feet

FIGURE G3.3-6
Vegetation Cover Existing Conditions
Midway Landfill Alternative

OMF South

3.2.1.1 Commercial

The commercial cover type represents the heavily developed and built portions of the study area. It includes large buildings and parking lots, most of which are commercial areas. These areas contain minimal habitat value for wildlife. Vegetation is restricted to scattered non-native trees in landscaping, and invasive species. These features could provide some habitat for species adapted to disturbed and developed conditions (e.g., house sparrows, American robins, European starlings, American crows). Dominant species within commercial areas within the study area are non-native trees and shrubs, including horticultural species and invasive species, such as Himalayan blackberry.

This cover type has a relatively low value for wildlife. If disturbed during construction, there would be minimal effects on existing vegetation or wildlife habitat. The minimal habitat present could be easily replaced following construction. The built portions of the proposed project would have similar vegetation condition and habitat value compared to current conditions.

3.2.1.2 Residential

The residential cover type represents developed areas with houses, driveways, yards, and associated landscaping. Vegetation includes mown lawns, horticultural species, and native species in some areas. Regular disturbances from humans and domestic animals limit habitat value for some wildlife species. However, the higher cover and diversity of vegetation provides some habitat value, compared to fully developed and built commercial areas. Relative habitat value is low.

If disturbed during construction, there would be effects on existing vegetation and wildlife habitat. The habitat present could be replaced following construction as landscaped elements of OMF South. However, the configuration of the habitat and overall cover may change compared to current conditions, based on the design.

3.2.1.3 Grassland

The grassland cover type represents areas dominated by upland grasses and other herbaceous species. They are maintained in the study area through mowing and brush control. The largest patch of this habitat occurs at the Midway Landfill. Large patches of grassland are relatively rare in the vicinity of the study area and restricted to large landholdings. Wildlife species associated with grassland habitats in the study area include Savannah sparrows, barn swallows, swallowtail butterflies, meadow voles, and Townsend’s moles. Red-tailed hawks and other raptors prey on voles and other small mammals that are found in abundance in grassy habitats. Relative habitat value is moderate.

If disturbed during construction, the habitat present could be easily replaced following construction, as the establishment of grasses could occur within weeks following construction.

Dominant species within the study area surrounding the Preferred and South 344th Street alternatives are fescues, velvetgrass, and bluegrass. Dominant species within the Midway Landfill study area were bentgrass, bluegrass, fescues, Bermuda grass, and other non-native grass and herbaceous species.

3.2.1.4 Invasive Brush

The invasive brush land cover type represents areas dominated by non-native brush species such as Himalayan blackberry, Scotch broom, and butterfly bush. Although non-native, this habitat does provide nesting, foraging, and refuge habitat for several species of birds and small mammals.

If disturbed during construction, the habitat present could be easily replaced and restored following construction. Temporarily disturbed areas would be restored with native plants suitable to the site, and/or horticultural species in landscaped areas. Re-establishment of native and non-native brush species is expected to be rapid (within a year). Relative habitat value is low.

3.2.1.5 Native Brush

The native brush cover type represents areas dominated by native species that include shrub species and/or sapling-sized tree species. Typical species observed in the study area include Nootka rose, sweet gale, salmonberry, black cottonwood, and red alder. This habitat provides nesting, foraging, and refuge habitat for birds and small mammals, as well as native species resources for the wildlife food web, including pollinators. Overall habitat value is moderate; it provides good habitat for native species and is able to reestablish quickly following disturbances.

3.2.1.6 Non-Native Forest

Forests composed primarily of non-native species occur in the study area. Although most of these non-native forests represent plantings of horticultural species as part of residential or commercial development, some areas have been colonized by non-native species. The planted areas are dominated by Austrian pine, Norway maple, and Lombardy poplar. Areas colonized by non-native trees are dominated by honey locust, European mountain ash, and bird cherry.

These forests, though non-native, do provide some habitat value for local wildlife, as well as stormwater moderation and other ecosystem functions. If removed as part of this project, these functions would be temporarily lost, and the recovery of these functions would take years to decades (time for the trees to mature). Given the vigorous nature of these species, however, it would not be difficult to reestablish these plant communities given time. Relative habitat value is moderate.

3.2.1.7 Mature Native Forest

Some of the upland forested areas in the study area meet WDFW’s criteria for the Mature Forest priority habitat type. These stands are generally over 80 years old, with trees exceeding 21 inches in diameter at breast height, on average (WDFW 2008). These forests are dominated by Douglas-fir, western redcedar, western hemlock, and black cottonwood. The understory in many areas is dominated by native shrubs and groundcovers, although English ivy, Himalayan blackberry, and other weeds have encroached on some areas.

Compared to other cover types, structurally complex habitats, such as native forested areas and wetlands, have more biological diversity and higher value as wildlife habitat. With habitat features such as large trees, snags, decaying logs, and a diverse understory, areas classified as Mature Native Forest typically support diverse communities of forest-associated wildlife. Because of the long time period (decades to centuries) needed to reestablish native forested conditions, disturbance or removal of this habitat type would have a substantial effect on habitat throughout the time period needed to reestablish the forests.

3.2.1.8 Other Native Forest

The other native forest land cover type represents forests dominated by native tree species but lacking the defining features of mature forest (see Section 3.2.1.7, Mature Native Forest, above). Several types of native forests (coniferous, deciduous, and mixed) were observed in the study area. Relative habitat value is high.

Coniferous forests in the study area are dominated primarily by Douglas-fir and western redcedar, with occasional occurrences of Sitka spruce and shore pine. Deciduous forests are dominated by black cottonwood and red alder, with some occurrence of bigleaf maple, bitter cherry, and the broad-leaved evergreen tree, Pacific madrone. Mixed forests are dominated by a combination of the species described above. Forests with native understory commonly contain sword fern, salal, osoberry, beaked hazelnut, and red elderberry. Forests with an invasive understory typically contain Himalayan blackberry, cut-leaf blackberry, butterfly bush, and English ivy.

Dominant species within the study area surrounding the Preferred and South 344th Street alternatives are Douglas-fir, western redcedar, western hemlock, and black cottonwood. Dominant species within the Midway Landfill Alternative study area are bigleaf maple, red alder, black cottonwood, and madrone.

All native forest areas provide high habitat value for native wildlife, based on the diversity and structural complexity provided by overstory trees and understory shrubs. Many areas classified as other native forest are several decades old and would require several decades to recover following disturbance. For these reasons, the other native forest cover type is considered to have a high habitat value.

3.2.1.9 Wetland/Stream

The wetland/stream land cover type represents areas with high water tables, including stream channels, wetlands, and frequently flooded areas. In the study area, streams and wetlands are interwoven into complexes of vegetated wetlands, scoured channels, and vegetated areas within the OHWL of streams. Areas classified as wetland/stream provide habitat functions similar to those described above for forests, brush areas, and grasslands (i.e., nesting, perching, hiding, and foraging habitats for many species), but with added habitat value due to the presence of water and unique habitats for water-dependent species, such as fish and amphibians. Relative habitat value is high. The existing conditions and habitat values of individual wetlands and streams are described previously in Sections 3.1, Aquatic Species and Habitat, and 3.2, Vegetation, Wildlife, and Wildlife Habitat. Habitat value is discussed by wetland.

Forested areas associated with wetlands and streams in the study area are dominated by Pacific willow, red alder, Oregon ash, and black cottonwood, with an understory of Douglas' spiraea, salmonberry, Himalayan blackberry, slough sedge, and reed canarygrass. Similar to the forests described in the section above, the removal or disturbance of forested areas associated with wetlands would take years to decades to recover temporarily lost habitat functions.

Scrub-shrub areas associated with wetlands and streams in the study area are dominated by Scouler's willow, salmonberry, Himalayan blackberry, red-twig dogwood, and Douglas' spiraea. Re-establishment of scrub-shrub vegetation can be rapid after disturbances (within a few years), but often slower than emergent systems (within a year).

Emergent areas associated with wetlands and streams in the study area are dominated by reed canarygrass, bulrushes, beggar ticks, and smartweeds. Re-establishment of emergent vegetation can be rapid after disturbances.

3.2.1.10 Stormwater Pond

The stormwater ponds support native and non-native wetland species adapted to fluctuating water tables and disturbances related to maintenance. Common species in the stormwater ponds are reed canarygrass, cattails, bulrushes, and willows. Areas of open water in constructed stormwater ponds provide resting and foraging areas for birds such as waterfowl and great blue herons. Due to extreme water level fluctuations and regular disturbance for maintenance, the relative habitat value of this cover type is low. Stormwater ponds that are designed to rapidly fill with water and hold water only for a short period following precipitation events (as a way of maximizing groundwater recharge or minimizing mosquito populations) can attract amphibians and other aquatic species and then compromise embryonic and larval survival when the pond dries or water elevation rapidly increases. Regular maintenance, including removal of vegetation and accumulated sediments, further reduces habitat value by altering habitat structure, soils, and in-water conditions.

3.2.1.11 Priority Habitats

In addition to the priority areas mapped by WDFW (see Section 3.2.3, Species and Habitats of Concern), some portions of the study area meet the criteria established by WDFW for Priority Habitats. The streams in the study area and the vegetated areas along the streams are Riparian priority habitats. Approximately 13 acres of the upland forested habitat in the study area meet the criteria for Mature Forest priority areas. Streams are shown in Figures G3.3-1, G3.3-2, and G3.3-3. Areas of Mature Forest are shown in Figures G3.3-4 and G3.3-5.

3.2.2 Terrestrial Wildlife

Wildlife use of habitats in urban landscapes depends on the general location of the habitat, the size and type of undisturbed habitats, the degree of connectivity and extent of travel corridors between and among these habitats, and the types and levels of human activity. Much of the study area falls within commercial, industrial, institutional, and residential areas that provide habitat only for adaptable species, such as house sparrows, European starlings, rats, mice, raccoons, Virginia opossums, and eastern gray squirrels. Birds, such as rock pigeons and cliff swallows, commonly build nests on bridges and road overpasses, and many bat species use such structures as temporary roosting sites. Animals that use habitats in the study area are also exposed to high levels of disturbance generated by human activity in commercial and industrial areas and by traffic on I-5 and major arterial roadways.

Most patches of forest cover in the study area are fragmented and separated from surrounding habitat areas by commercial and residential developments and roads. Despite their isolation, these areas still provide habitat for forest-associated resident and migratory songbirds, as well as for hawks, owls, woodpeckers, and small mammals. The largest patch of forested habitat in the study area, approximately 10 acres, is adjacent to I-5, along the eastern boundary of the Preferred and South 344th Street alternatives. As indicated by the detection of an ensatina (a terrestrial salamander whose eggs develop directly into adults without an aquatic larval stage, a reproductive strategy that depends on cool and humid conditions) during a site visit in October 2019, this patch supports many ecosystem functions, despite its isolation from other, less-disturbed areas of forest habitat.

Larger habitat patches and those connected to other natural areas or heavily vegetated residential neighborhoods support a larger variety of species, such as songbirds, raptors, small mammals, coyotes, and black-tailed deer. Songbird species commonly found in habitats similar to those in the study area include American robin, song sparrow, Steller's jay, American crow, spotted towhee, black-capped chickadee, white-crowned sparrow, northern flicker, Bewick's wren, and red-breasted nuthatch. Raptors include American kestrel, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, and great horned owl. Red-tailed hawks and other raptors prey on voles and other small mammals that are found in abundance in the grassy vegetation at Midway Landfill and in the I-5 right-of-way. A northern harrier was observed near the stormwater detention pond at the Midway Landfill site in October 2019. Open-water habitats, such as wetlands and stormwater detention ponds, provide resting and foraging areas for waterfowl.

Structurally complex habitats, such as forested areas and wetlands, generally have comparatively high levels of biological diversity and value as wildlife habitat. With habitat features such as large trees, snags, decaying logs, and a diverse understory, areas classified as mature native forest typically support diverse communities of forest-associated wildlife.

Streams and riparian areas are used as travel corridors by many wildlife species. Despite the widespread urbanization of the study area, riparian areas along streams may serve as a connective corridor between pockets of wildlife habitat. In general, however, patches of forest and other native habitat types in the study area are isolated from other areas of similar habitat and do not serve as connective corridors to other areas of habitat outside of the study area. I-5 impedes the movement of wildlife between the Green River valley in the east and the Puget Sound shoreline to the west.

3.2.3 Species and Habitats of Concern

The Natural Heritage Program database does not include any records of extant rare plant populations or high-quality ecosystems in the study area (WDNR 2019). The only such record within 5 miles of the project alternatives is a population of Canadian St. John's-wort, a state sensitive species. It is mapped east of I-5 and approximately 0.6 mile southeast of the South 344th Street Alternative. The only high-quality ecosystems identified within 5 miles of the project alternatives are a bog identified by WSDOT east of I-5 and just north of S 320th Street and a forested bog in West Hylebos Wetlands Park, approximately 0.5 mile southwest of the South 344th Street Alternative. No rare plant species or high-quality ecosystems (as defined by the Natural Heritage Program) were observed in the study area during field surveys.

WDFW (2022) does not identify any occurrences of priority wildlife species within 0.25 mile of any of the project alternatives. The only mapped priority habitats within or near the study area are wetland areas (WDFW 2022). Wetlands are discussed in Section 3.3. Riparian areas, another WDFW priority habitat type, occur adjacent to surface-flowing streams in the study area but are not mapped by WDFW. The condition of riparian habitats in the study area is described in Section 3.1.1, Streams in the Study Area. Mature forest, meeting the definition of state priority habitat, was also identified in the field as shown on Figures G3.3-4 and G3.3-5.

Historically, King County (1991) identified regionally and locally important resource areas in the drainage basins that include the study area. Important resource areas are subcatchments, wetlands, or stream reaches that are important to the viability, diversity, and abundance of fish and wildlife populations. No such areas were identified in the study area (King County 1991).

Based on field observations, literature review, and sightings databases (e.g., eBird 2022; Opperman et al. 2006; Seattle Audubon Society 2022; WDFW 2022), biologists identified wildlife species of concern that may use habitats in the study area (i.e., non-marine habitats in lowland urban and residential settings, excluding unique habitats that are not found in the study area, such as old-growth forest or sphagnum bogs). Table G3.3-7 lists these species and summarizes each species' known or expected use of habitats in the study area. No wildlife species of concern were observed in the study area during field surveys conducted for this project.

No wildlife species that are listed or proposed for listing under the ESA are known or expected to use habitats in the study area. For this reason, based on the definition of species of concern in Section 2.2.2, Methods, the only species of concern identified in Table G3.3-7 are state priority species (including one state-listed sensitive species, the common loon). Table G3.3-7 also lists the priority areas that have been identified by WDFW for each of these species. In many cases, WDFW considers species to be a priority only within known limiting habitats (e.g., breeding areas) or within areas that support a relatively high number of individuals (e.g., regular concentrations). For example, great blue herons are often found feeding along shorelines, but they are considered a priority only in breeding areas (WDFW 2008).

Table G3.3-7 Wildlife Species of Concern Potentially Occurring within the Study Area

Species[1]	Priority area(s)	Known or Expected Habitat Use in the Study Area
Amphibians		
Western toad	Any occurrence	No recent records near the study area. May breed in permanent wetlands, ponds, lakes, and off-channel habitats or rivers; adults may move through uplands for several miles.
Birds		
Band-tailed pigeon	Regular concentrations, occupied mineral sites	Observed in suitable habitat near the study area year-round, but no regular concentrations or mineral springs have been recorded. May nest in trees, commonly in tall conifers near open sites.
Barrow's goldeneye	Breeding areas	No known observations in the study area. Occasionally seen on larger waterbodies nearby (e.g., Lake Killarney), primarily during winter. Not expected to breed in or near the study area.
Brant	Regular concentrations in foraging and resting areas, migratory stopovers	No known observations in the study area. The study area is not expected to provide migratory stopover sites or foraging or resting areas.
Common goldeneye	Breeding areas	No known observations in the study area. Occasionally seen on larger waterbodies nearby, primarily during winter. Not expected to breed in or near the study area.
Common loon	Breeding sites, migratory stopovers, regular concentrations	No known observations in the study area. No suitable breeding sites (large lakes with low disturbance levels) in or near the study area. The study area is not expected to provide migratory stopover sites.
Great blue heron	Breeding areas	Observed in suitable habitats near the study area year-round. Nests in mature forests, forages in shallow, slow-moving, or still water. No known breeding sites within 1 mile of any site alternatives.
Hooded merganser	Breeding areas	Observed in suitable habitats near the study area year-round. May nest in tree cavities near small, forested, freshwater wetlands with emergent vegetation.
Oregon vesper sparrow	Any occurrence	Associated with open habitats. Breeding population in Washington is largely limited to remnant prairies and grasslands in Pierce, Thurston, and Skagit counties. Rarely observed in southwestern King County during migration periods.
Pileated woodpecker	Breeding areas	Occasionally seen, year-round; breeding possible. Requires forested habitats with large trees and snags. No evidence of presence in forested area near Preferred Alternative site.

Table G3.3-7 Wildlife Species of Concern in the Study Area (continued)

Species[1]	Priority area(s)	Known or Expected Habitat Use in the Study Area
Trumpeter swan	Regular concentrations	No known observations in the study area. Occasionally seen on larger waterbodies nearby, primarily during winter. The study area is not expected to support concentrations.
Tundra swan	Regular concentrations	No known observations in the study area. Occasionally seen on larger waterbodies nearby, primarily during winter. The study area is not expected to support concentrations.
Vaux's swift	Breeding areas, communal roosts	Observed in suitable habitat near the study area, primarily during the breeding season. Nests and roosts in natural cavities with vertical entranceways, such as hollow trees and snags, in areas of coniferous or mixed forest.
Western grebe	Breeding areas, regular concentrations, migratory stopovers, regular occurrences in winter	Occasionally seen near open water, generally outside of the breeding season. Not expected to breed in or near the study area. The study area is not expected to provide migratory stopover sites or support concentrations.
Wood duck	Breeding areas	Observed in suitable habitats near the study area year-round. May nest in tree cavities near wooded wetlands.
Mammals		
Big brown bat, *Myotis* bats	Regular concentrations in naturally occurring breeding areas and other communal roosts	No known maternity or hibernation colonies or other concentrations in or near the study area. Summer roosts generally are in buildings, bridges, hollow trees, spaces behind exfoliating bark, rock crevices, or tunnels. Maternity colonies may form in attics, barns, rock crevices, or tree cavities. Caves, mines, and buildings are used for hibernation.
Townsend's big-eared bat	Any occurrence	No known maternity or hibernation colonies or other concentrations in or near the study area. Maternity and hibernation colonies typically are in caves, mine tunnels, and old buildings. Caves, tunnels, buildings, and tree cavities are used as night roosts.

Sources: eBird 2022; Opperman et al. 2006; Seattle Audubon Society 2022; WDFW 2008, 2022.

Note:

(1) All species in this table are State priority species; the common loon is a state sensitive species as well. No wildlife species listed or proposed for listing under the ESA are known or expected to use habitats in the study area.

Forested areas in the study area could provide suitable habitat for the following priority species: band-tailed pigeon, pileated woodpecker, Vaux's swift, big brown bat, *Myotis* bats, and Townsend's big-eared bat. Hooded mergansers and wood ducks may nest in forested wetlands. Open, grassy habitats at Midway Landfill may provide suitable habitat for migrating Oregon vesper sparrows.

The USFWS Information for Planning and Consultation planning tool identified five ESA-listed wildlife species, and one species proposed for listing, as potentially occurring in areas that might be affected by the project. None of these species is expected to occur in the study area, however, for the following reasons:

- Marbled murrelets, listed as threatened, require old-growth forest for nesting and marine habitat for foraging. No breeding or foraging habitat is present in the study area and no observations have been documented within 10 miles (WDFW 2022). The nearest location where critical habitat has been designated for the marbled murrelet is more than 25 miles from the study area.
- Yellow-billed cuckoos, listed as threatened, require large blocks of riparian forest habitat for breeding and foraging. Yellow-billed cuckoos nest almost exclusively in low- to mid-elevation riparian woodlands that cover 50 acres or more (Hughes 1999). No such habitat is present in or near the study area. Currently, the species no longer breeds in western Canada or the

northwestern continental United States (Washington, Oregon, and Montana) (79 FR 59992, October 3, 2014). No observations of this species have been documented within 10 miles of the study area (WDFW 2022). No critical habitat for the yellow-billed cuckoo has been proposed in Washington.

- Streaked horned larks, listed as threatened, are known to occur in Washington only in portions of southern Puget Sound, along the Washington coast, and at lower Columbia River islands (78 FR 61452, October 3, 2013). Breeding habitat for streaked horned larks in Washington consists of grasslands and sparsely vegetated areas at airports, sandy islands, and coastal spits. The subspecies is largely absent from the Puget Trough during the nonbreeding season; individuals observed in this area outside of the breeding season have been seen using habitats similar to those used for breeding. The only potential suitable habitat for streaked horned larks in the study area is at the Midway Landfill site, which includes about 60 acres of grassy land cover. The likelihood that streaked horned larks use the Midway Landfill site is minimal, however, due to the site’s size, distance from occupied sites, and scarcity of bare-ground habitat. Sites used by larks typically encompass hundreds of acres, but larks may use smaller sites that are located relatively close to occupied sites and/or along rivers (Anderson and Pearson 2015). The smallest site with evidence of streaked horned lark use in the Puget Trough region is 90 acres (Anderson and Pearson 2015). While the approximately 60acre Midway Landfill site is substantially smaller than 90 acres, the adjacent I-5 corridor may create a visual impression similar to that of a river, potentially increasing the site’s size, as perceived by larks. However, the nearest occupied site is more than 15 miles away (WDFW 2022). In addition, the Midway Landfill site is dominated by densely growing sod-forming grasses (although a few scattered patches of bare ground are present along access roads). Streaked horned larks typically select habitat patches with low, sparse vegetation and a relatively high percent cover of bare ground, avoiding areas dominated by shrubs or sod-forming grasses (Anderson and Pearson 2015). Streaked horned larks have not been documented at the landfill or in surveys at Seattle-Tacoma International Airport north of the action area, and their presence in the action area is unlikely (Sound Transit 2016a). The nearest designated critical habitat for the streaked horned lark is more than 100 miles from the study area.
- Taylor’s checkerspot butterflies, listed as endangered, require grassland dominated by fescue or other short-stature grass species, with a diversity of larval host plants and spring nectar sources (Stinson 2005). The nearest known population is more than 15 miles from the project area. Populations in the Puget Sound region are primarily associated with shallow-soil balds and grasses within forested landscapes. In Washington and Oregon, Taylor’s checkerspot butterfly larvae feed primarily on native paintbrush and closely related species (e.g., *Castilleja hispida*, *C. levisecta*, *Tryphasaria* spp.), and on plantain species such as non-native *Plantago lanceolata* and native *Plantago maritima* (61938 FR 77, October 11, 2012). Other annuals documented as larval host foods include several species of speedwell (*Veronica* spp.), blue-eyed Mary (*Collinsia grandiflora* and *C. parviflora*), and sea blush (*Plectritis congesta*). *Plantago lanceolata* and *Plantago maritima* could be present at Midway Landfill and in other areas dominated by low-stature plants. Other larval host species have not been observed and are unlikely to be present. Grosboll (2011) found that, within areas of broadly suitable grassland vegetation structure, Taylor’s checkerspot butterfly adults lay their eggs in the areas with very high densities of host plants. Of 31 oviposition locations studied, the volume of host plants in all but one exceeded 10,000 cubic centimeters per square meter. No areas with such high densities of paintbrush or plantain species have been observed in the study area.

- North American wolverines, listed as threatened, avoid people and developed areas and prefer cold and remote mountainous areas with persistent spring snow cover. No such habitat is present in the lowland, urban setting of the study area.
- Northwestern Pond Turtle, proposed for listing as threatened, occurs at only six locations in the state, including three sites in Skamania County, and one each in Klickitat, Mason, and Pierce counties (Hallock et al. 2017). In Washington, they are found associated with ponds, small lakes, and wetlands at elevations below 300 m (985 ft.) (Hays et al. 1999). The closest population is over 10 miles from any of the alternatives. In addition to small population size and distance to known populations, the developed nature of the project areas and dense road networks limit the potential for presence of the species; the potential for the species to occupy habitats in the study area without human intervention is extremely unlikely.

The list provided by USFWS does not identify the gray wolf as an ESA-listed species potentially present in the action area. This may be a product of the rule issued by USFWS on November 3, 2020 (85 Federal Register [FR] 69778), removing gray wolves from the list of species protected under the ESA. However, on February 10, 2022, the U.S. District Court for the Northern District of California vacated and remanded USFWS' delisting rule. The court's decision effectively reinstated the listing status the species had before USFWS issued the delisting rule. As a result, gray wolves in western Washington have a listing status of endangered. Gray wolves require habitats with high prey densities and low levels of human disturbance. No such habitat is present in the lowland, urban setting of the project area. Critical habitat for the gray wolf has not been proposed for designation in Washington State.

The Migratory Bird Treaty Act of 1918, administered by USFWS, makes it unlawful to take any migratory bird, or the parts, nests, or eggs of any such bird, except under the terms of a valid permit. In the context of this Act, 'take' is defined as, "pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill" (16 U.S. Code § 715n). Nearly all bird species that may occur in the study area are protected under the Migratory Bird Treaty Act. Birds or bird nests protected under the Act may be present in any of the cover types described in Section 3.2.1, Vegetation. Forested areas, wetlands, and other areas with comparatively complex cover types are likely to support greater densities and more diverse assemblages of nesting birds.

3.3 Wetlands

A total of 23 wetlands were identified in the OMF South study area, which are listed in Table G3.3-8 and are described further in Section 3.3.1, Wetland Descriptions. The wetland descriptions are organized consecutively, as wetlands were identified based on rights of entry and not geographically.

Of the 23 wetlands identified, 21 were fully or partially accessed during field reconnaissance and delineation surveys to assess wetland hydrology, soils, and vegetation. As of the time of this writing, the boundaries of 12 wetlands have been formally delineated and professionally surveyed in their entirety. The boundaries of nine wetlands (or portions of those wetlands) have been estimated using either a handheld global positioning system device or remote sensing and best professional judgment where access was limited. The one wetland that was not accessed for this study was delineated for the WSDOT SR 509 Project.

Wetland determination forms and rating forms for the wetlands accessed during the field surveys are provided in Attachments G3-4 and G3-5, respectively. Photographs of wetlands accessed during the field surveys and from public rights-of-way are included in Attachment G3-6. Wetland boundaries are shown in Figures G3.3-1 through G3.3-3.

Table G3.3-8 Wetlands in the Study Area

Wetland Name	Location[6]	HGM Classification[1]	USFWS Classification[2]	Approximate Wetland Area (Acres)	Wetland Rating (Ecology)[3]	Wetland Rating Habitat Points[4]	Jurisdiction	Wetland Buffer Width (Feet)[3,5]	Boundaries[7]
WFW-01	Preferred & S 344th Street – Site/Mainline	Depressional, Riverine	PFO	1.48	III	6	Federal Way	150	Surveyed
WFW-02	Preferred – Site	Depressional, Riverine	PFO	4.49	II	5	Federal Way	100	Surveyed
WFW-03	Preferred & S 344th Street - Site/Mainline	Riverine	PFO	0.34	III	6	Federal Way	150	Surveyed
WFW-04	Preferred & S 344th Street - Site/Mainline	Depressional	PFO	0.54	III	4	Federal Way	80	Surveyed
WFW-05	S 344th Street – Mainline	Riverine	PFO	0.14	III	6	Federal Way	150	Surveyed
WFW-06	Preferred & S 344th Street - Mainline	Slope	PSS	0.02	IV	5	Federal Way	50	Surveyed
WFW-07	Preferred & S 344th Street – Mainline	Riverine	PEM, PSS	0.19	III	4	Federal Way	80	Surveyed
WFW-08	Mainline	Riverine	PEM, PSS	0.13	III	4	Federal Way	80	Surveyed
WFW-09	Mainline	Riverine	PSS	0.10	III	4	Federal Way	80	Surveyed
WFW-10	Preferred & S 344th Street – Mainline	Riverine	PFO	0.87	III	5	Federal Way	80	Surveyed/ Estimated
WFW-11	Preferred & S 344th Street – Mainline	Depressional	PEM, PFO	0.34	III	5	Federal Way	80	Surveyed
WFW-12	Mainline	Riverine	PEM, PSS, PFO	0.66	III	5	Federal Way	80	Surveyed/ Estimated
WFW-13	Preferred & S 344th Street – Mainline	Slope	PSS	0.04	IV	3	Federal Way	50	Estimated
WFW-14	Preferred – Site	Depressional	PEM	0.02	IV	4	Federal Way	50	Surveyed

Table G3.3-8 Wetlands in the Study Area (continued)

Wetland Name	Location[6]	HGM Classification[1]	USFWS Classification[2]	Approximate Wetland Area (Acres)	Wetland Rating (Ecology)[3]	Wetland Rating Habitat Points[4]	Jurisdiction	Wetland Buffer Width (Feet)[3,5]	Boundaries[7]
WFW-15	Preferred – Site/Mainline S 344th Street – Mainline	Riverine	PSS, PFO	0.39	III	6	Federal Way	150	Surveyed/ Estimated
WFW-16	Mainline	Depressional	PEM, PSS	0.40	III	3	Federal Way	80	Estimated
WFW-17	S 344th Street – Mainline	Riverine	PFO	0.02	III	5	Federal Way	80	Estimated
WFW-18	S 344th Street – Site	Riverine	PSS	<0.01	III	5	Federal Way	80	Estimated
WFW-21	Mainline	Riverine	PSS	0.31	III	6	Federal Way	150	Estimated
WFW-22	Mainline	Depressional	PSS	0.04	III	4	Federal Way	80	Estimated
WFW-32	Mainline	Depressional	PEM, PSS	0.03	IV	3	Federal Way	50	Surveyed
WFW-33	Preferred – Site	Depressional, Riverine	PFO	2.23	II	5	Federal Way	100	Estimated
WL148.67L	Midway Landfill	Depressional	PEM, PSS, PFO	0.03	III	4	Kent	75	Surveyed

Notes:

(1) Hydrogeomorphic classification (Brinson 1993)

(2) PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub, PAB = palustrine aquatic bed (Cowardin et al. 1979; FGDC 2013)

(3) Wetland ratings categorize wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the functions they provide (Hruby 2014). Category I wetlands have a very high level of function; Category IV wetlands have a low level of function. Ratings and regulatory buffer widths are preliminary and subject to change.

(4) Habitat points represent the score that is generated from the habitat analysis section of the wetland rating (Hruby 2014). Often habitat points are used to determine wetland buffer widths for local jurisdictions.

(5) Kent City Code 11.06.600.B; Federal Way Revised Code 19.145.420, Table 1

(6) Location of wetland relative to the site or mainline tracks (which includes the northern curve and tail tracks). Some wetlands are within both site and mainline areas.

(7) Surveyed = professionally surveyed; Estimated = boundaries based on existing information and aerial imagery or points collected with a handheld global positioning system unit; Surveyed/Estimated = wetland boundary contains both surveyed and estimated boundaries

.

3.3.1 Wetland Descriptions

3.3.1.1 Preferred and South 344th Street Alternatives

The Preferred and South 344th Street alternatives are both located in Federal Way. The site of the Preferred Alternative was largely undeveloped until 2004, when the Christian Faith Center was constructed. Portions of the South 344th Street Alternative site were developed as early as the 1960s, with substantial development occurring in the 1980s and 1990s. Both site alternatives are now occupied primarily by institutional and commercial development. The mainline tracks pass through Belmor and then continue south, adjacent to I-5. The mainline tracks for both the Preferred and South 344th Street Alternatives occupy the same footprint, except for the tail track options. Substantial residential development of the mainline track area appears to have started in the 1960s.

An undeveloped forested corridor, approximately 100 to 300 feet wide, exists adjacent to I-5 where East Fork Hylebos Tributary flows south along the eastern boundary of both sites partially on private property and partially within the WSDOT right-of-way. West Fork Hylebos Tributary flows through Wetland WFW-02 along the northwest corner of the Preferred Alternative.

The majority of the wetlands in the study area are associated with East Hylebos Tributary. One wetland, a Category II forested wetland identified as Wetland WFW-02, is contained within the in-line stormwater detention facility associated with West Fork Hylebos Tributary. The remaining wetlands are depressional or slope wetlands. Dominant vegetation communities are primarily forested or scrub-shrub.

Wetland WFW-01

Wetland WFW-01 is located west of I-5 and south of S 336th Street, along the eastern boundary of the Christian Faith Center property. The wetland is associated with East Fork Hylebos Tributary and includes both riverine and depressional elements.

This wetland primarily consists of deciduous forest communities dominated by Oregon ash, red alder, and black cottonwood. Salmonberry, red-twig dogwood, and vine maple are common understory plants. Slough sedge is common in wetter portions of the wetland, including areas that appear seasonally ponded. Reed canarygrass and Himalayan blackberry are present throughout the wetland. Primary hydrology for the wetland is overbank flooding from East Fork Hylebos Tributary, as well as high groundwater and stormwater runoff from nearby impervious surfaces. Soils in Wetland WFW-01 are silt or sandy loams that meet hydric soil indicators redox dark surface (F6) and thick dark surface (A12).

Wetland WFW-01 provides moderate water quality functions because it is a forested, well-vegetated, seasonally ponded wetland with an intermittently flowing outlet, and it also receives stormwater discharges. The wetland provides moderate water quality functions due to an intermittently flowing outlet and moderate ponding depths. The wetland provides moderate habitat functions, because it has diverse hydroperiods, multiple special habitat features, and is valuable due to proximity to East Fork Hylebos Tributary. Based on the above factors, Wetland WFW-01 received a Category III rating and a habitat score of 6. The regulated critical area buffer is 150 feet wide.

Wetland WFW-01 was described in the 2003 Christian Faith Center Environmental Impact Statement (where it was referred to as “Wetland B”) and includes approximately 5,400 square feet of created wetland and an additional 3,500 square feet of wetland enhancement as part of on-site mitigation from the site's previous development (City of Federal Way 2003).

Wetland WFW-02

Wetland WFW-02 is both a riverine and depressional wetland located east of SR 99 and south of S 336th Street in the northwest corner of the Christian Faith Center parcel. Wetland WFW-02 was in the study area for the Christian Faith Center Environmental Impact Statement (in which it was called "Wetland A"). No direct impacts on the wetland occurred during construction of the Christian Faith Center. Dominant vegetation in the wetland is forested and consists primarily of Pacific willow and black cottonwood. Dominant understory species include red-twig dogwood, salmonberry, and hardhack. Hydric soils in Wetland WFW-02 are a combination of histosols and silt loams that meet hydric soil indicators: histosol (A1), hydrogen sulfide (A4), and thick dark surface (A12). West Fork Hylebos Tributary flows through Wetland WFW-02, entering through a culvert under S 336th Street on the northern wetland boundary, and exiting through a standpipe on the west. The tributary lacks a defined channel as it flows through Wetland WFW-02.

This wetland was historically modified by Federal Way as part of a flood mitigation program, which resulted in construction of 4- to 6-foot-high earthen berms along the western and southern boundaries, which allow for greater stormwater storage. In addition to stormwater and stream flows, this wetland also likely receives hydrology from a locally high groundwater table. Wetland WFW-02 scored high for both water quality and hydrologic functions, primarily due to the ability to store large volumes of stormwater; however, the wetland has relatively low-quality forested habitat, and is surrounded on three sides by minimal buffers and substantial human development, resulting in a Category II wetland rating and a habitat score of 5. The regulated critical area buffer is 100 feet wide.

Wetland WFW-03

Wetland WFW-03 is a riverine wetland located along both sides of East Fork Hylebos Tributary in the WSDOT right-of-way west of I-5. Hydrology for Wetland WFW-03 appears to be derived primarily from overbank flooding, as well as groundwater discharge. Wetland WFW-03 receives stormwater discharge from nearby commercial development, as well as surface runoff from I-5.

This wetland primarily consists of a palustrine deciduous forested community. Dominant species include Oregon ash, black cottonwood, and Pacific willow. Dominant understory species include salmonberry, with small pockets of slough sedge. Soils in Wetland WFW-03 meet hydric soil indicator redox dark surface (F6).

Wetland WFW-03 scored high for water quality functions due to the presence of trees and shrubs that filter pollutants and because the wetland is located within a UGA and in close proximity to I-5, which generates excess pollutants. Wetland WFW-03 scored moderate for hydrologic functions since it contains trees and shrubs that slow down water velocities during floods and is located upstream from areas with flooding problems. The wetland scored moderate for habitat functions because it has diverse hydroperiods, multiple special habitat features, and is in proximity to multiple priority habitats. Based on the above factors, Wetland WFW-03 received a Category III rating and a habitat score of 6. The regulated critical area buffer is 150 feet wide.

Wetland WFW-04

Wetland WFW-04 is a depressional wetland located at the edge of the WSDOT right-of-way near a stormwater facility west of I-5, between S 341st Place and S 344th Street. Vegetation in the wetland is dominated by Oregon ash, Pacific willow, and black cottonwood, with an understory consisting primarily of hardhack. Hydric soils in Wetland WFW-04 are a silt loam with high organic content that meet hydric soil indicators, redox dark surface (F6). Hydrology inputs to Wetland WFW-04 include overflow from the adjacent stormwater facility, as well as stormwater inputs from surrounding commercial properties and a high groundwater table. Wetland WFW-04 is a closed depression with no outlet, making it score high for water quality functions. Wetland WFW-04 scored moderate for hydrologic functions because it provides some storage during wet periods and is in proximity to I-5, which generates excess runoff. However, the wetland has relatively poor quality habitat and degraded buffers; it therefore scored low for habitat functions resulting in a Category III rating and a habitat score of 4. The regulated critical area buffer is 80 feet wide.

Wetland WFW-05

Wetland WFW-05 is a riverine wetland located along East Fork Hylebos Tributary between S 344th Street and the offramp from southbound I-5 to Highway 18. This wetland supports both coniferous and deciduous forested communities and is dominated by western redcedar, Oregon ash, and black cottonwood, with an understory of hardhack, Sitka willow, and twinberry. Soils within the wetland are silt loam and meet hydric soil indicator thick dark surface (A12). Primary hydrology inputs for the wetland appear to be from overbank flooding of East Fork Hylebos Tributary, although depressions within the wetland appear to hold water outside of flood events. Wetland WFW-05 has high potential for water quality functions due to dense tree and shrub layers within the wetland, as well as a location within an incorporated city; it has moderate hydrologic potential due to a moderate ability to reduce flood velocities, and it has moderate habitat potential due to its lack of habitat complexity and lack of accessible connections to other habitats on a broader landscape scale despite the presence of priority habitats nearby. Overall, Wetland WFW-05 received a Category III rating and a habitat score of 6. The regulated critical area buffer is 150 feet wide.

Wetland WFW-06

Wetland WFW-06 is a small slope wetland located in the WSDOT right-of-way west of I-5, between S 336th Street and S 344th Street. This wetland is located in an apparently excavated swale feature that drains stormwater from I-5 to East Fork Hylebos Tributary. Although the majority of the swale does not meet the definition of wetland, the far southern end has sufficient hydrology to produce hydric soils meeting indicator redox dark surface (F6) and to support hydrophytic vegetation. The wetland is dominated by scrub-shrub vegetation, primarily salmonberry. Wetland WFW-06 is found on a relatively gentle slope with dense herbaceous vegetation in a basin where water quality is an issue; it therefore scored moderate for water quality functions. Given the stormwater inputs to the wetland, Wetland WFW-06 scored moderate for hydrologic functions. Wetland WFW-06 scored moderate for habitat functions due to proximity to priority habitats. Overall, Wetland WFW-06 received a Category IV rating and a habitat score of 5. The regulated critical area buffer is 50 feet wide.

Wetland WFW-07

Wetland WFW-07 is a small riverine wetland located in the northeast section of Belmor adjacent to golf course greens. Within the Belmor golf course, East Fork Hylebos Tributary has been channelized, and a build-up of sediment has resulted in several wetland benches that are below the OHWL.

The palustrine scrub-shrub and emergent wetland is dominated by Himalayan blackberry, hardhack, Sitka willow, reed canarygrass, and giant horsetail. Hydric soils met two indicators: depleted matrix (F3) and depleted below dark surface (A11).

Wetland WFW-07 scored moderate for water quality because it contains some trees, shrubs, and herbaceous plants that improve water quality by filtering pollutants, and because it is located within an urban growth area (UGA) and within a golf course that produces pollutants for the wetland to filter. The hydrologic function score was low due to only some plants slowing water velocities and the potential to reduce flooding is provided by its location in a UGA, which contributes to higher stream flows. The wetland scored low on habitat due to its lack of habitat complexity and lack of connections to other habitats. Overall, Wetland WFW-07 received a Category III rating and a habitat score of 4. The regulated critical area buffer is 80 feet wide.

Wetland WFW-08

Wetland WFW-08 is a small, riverine wetland located in the northeast section of Belmor adjacent to golf course greens. Wetland WFW-08 is south (downstream) of Wetland WFW-07, separated by a 48-inch concrete culvert. Wetland WFW-08 consists of several bench wetlands located below the OHWL, in which the primary source of hydrology is provided by East Fork Hylebos Tributary. The stream has been channelized in this section.

The palustrine scrub-shrub and emergent wetland is dominated by Himalayan blackberry, Sitka willow, cattail, reed canarygrass, and slough sedge. Soils were dark and underlain by a restrictive layer composed of quarry spalls. Hydric soils in the scrub-shrub and emergent vegetation classes were dark, but indicators were problematic, likely due to widespread land surface modifications and site development. However, the presence of strongly hydrophytic plants, the primary indicators of wetland hydrology, and the wetland’s landscape position within the active floodplain support the assumption that the soils were hydric and therefore the presence of wetland conditions.

Wetland WFW-08 scored low for water quality functions because the wetland’s ability to retain water and to filter pollutants is limited. The wetland scored moderate for hydrologic functions due to its moderate ability to retain water, attenuate water velocities, as well as having a moderate water input from the immediate surrounding area and contributing basin. The wetland scored low on habitat due to its lack of habitat complexity and lack of connections to other habitats. Overall, Wetland WFW-08 received a Category III rating and a habitat score of 4. The regulated critical area buffer is 80 feet wide.

Wetland WFW-09

Wetland WFW-09 is a small riverine wetland located in the southeastern section of Belmor. Wetland WFW-09 is south (downstream) of Wetland WFW-08, separated by twin 18-inch culverts. Wetland WFW-09 consists of several bench wetlands located below the OHWL, in which the primary source of hydrology is provided by East Fork Hylebos Tributary, which has been channelized in this section.

The palustrine scrub-shrub wetland is dominated by Himalayan blackberry, hardhack, and Sitka willow. Hydric soils were dark and/or had a depleted matrix in lower layers and met the hydric soil indicators depleted matrix (F3) and depleted below dark surface (A11) within the scrub-shrub vegetation class.

Wetland WFW-09 scored moderate for water quality because trees and shrubs filter out pollutants, and because it is located within a UGA and within a golf course that produces pollutants for the wetland to filter. The hydrologic function scored moderate because trees and shrub slow water velocities and because the potential to reduce flooding is provided by its location in a UGA, which contributes to higher stream flows. The wetland scored low on habitat due to its lack of habitat complexity and lack of connections to other habitats. Overall, Wetland WFW-09 received a Category III rating and a habitat score of 4. The regulated critical area buffer is 80 feet wide.

Wetland WFW-10

Wetland WFW-10 is a riverine wetland with three wetland units (a, b, and c) located between S 330th Street and S 333rd Street on multiple parcels. Wetland WFW-10 is south (downstream) of Wetlands WFW-12 and WFW-09 and is separated from other wetlands by twin 18-inch culverts. The primary source of hydrology was provided by East Fork Hylebos Tributary and a high groundwater table.

The palustrine forested wetland is dominated by western redcedar, black cottonwood, red alder, Oregon ash with Himalayan blackberry, salmonberry, lady fern, slough sedge, and Kentucky bluegrass in the understory. Hydric soils were dark and/or had a depleted matrix in lower layers. Within Unit A, hydric soils met the hydric soil indicators hydrogen sulfide (A4) and thick dark surface (A12). Hydric soils in Unit B met the hydric soil indicator redox dark surface (F6). Within Unit C, hydric soils met the indicator depleted below dark surface (A11).

The three units are rated together because of their similarity and association with East Fork Hylebos Tributary. These riverine wetlands lack hydrologic constrictions or vegetation breaking larger than 50 feet that would divide them into separate rating units. Wetland WFW-10 scored moderate for water quality functions because its high density of trees and shrubs filter out pollutants, and it is located within a UGA and a dense residential area that contribute pollutants. It scored moderate for hydrologic functions as tree and shrub cover slow down water velocities, and because its potential to reduce flooding is provided by its location in a UGA, which contributes to higher stream flows. The wetland received a low score for habitat functions because it generally lacks habitat complexity and connectivity to other habitats. Overall, Wetland WFW-10 received a Category III rating and a habitat score of 5. The regulated critical area buffer is 80 feet wide.

Wetland WFW-11

Wetland WFW-11 is a depressional wetland located between 24th Avenue S and I-5 in Federal Way both on private land and in the WSDOT I-5 right-of-way. Wetland hydrology was supported by a high groundwater table and precipitation.

The wetland is dominated by black cottonwood, red alder, Oregon ash, Sitka willow, hardhack, and Himalayan blackberry in the forested class, and reed canarygrass in the emergent vegetation class. Hydric soils were depleted below a dark upper layer and met the indicators depleted matrix (F3) and depleted below dark surface (A11) within the forested vegetation class and the indicators redox dark surface (F6) in the emergent vegetation class.

Wetland WFW-11 scored moderate for water quality functions because its outlet flows intermittently providing moderate retention time for filtration. Persistent plants that filter pollutants cover most of the wetland, and surrounding land within the immediate vicinity and within the watershed provide some pollution input that may be filtered by the wetland. Hydrologic functions to reduce flooding within the watershed also scored as moderate due to some water storage capacity, moderate surface water inputs, and flooding problems lower in the watershed. The wetland scored low for habitat functions due to moderate habitat complexity within the wetland and lack of connections to other habitats. Overall, Wetland WFW-11 received a Category III rating and a habitat score of 5. The regulated critical area buffer is 80 feet wide.

Wetland WFW-12

Wetland WFW-12 is a small riverine wetland located at the south end of Belmor and extending into two adjacent parcels. The primary sources of hydrology are flooding from East Fork Hylebos Tributary and a high groundwater table. Wetland WFW-12 is south (downstream) of Wetland WFW-09, separated by a 41-inch pre-cast concrete culvert. Wetland WFW-12 consists of several bench wetlands located below the OHWL.

The palustrine emergent, scrub-shrub, and forested wetland is dominated by red alder, salmonberry, Himalayan blackberry, reed canarygrass, and creeping buttercup. Hydric soil observed in this wetland were largely depleted, but indicators were problematic, likely due to widespread land surface modifications and site development. However, the presence of hydrophytic plants and several primary indicators of wetland hydrology, combined with its landscape position within the active floodplain, support the assumption that hydric soils are present. The wetland boundary was determined by the extent of fill material and evidence of frequent inundation.

Wetland WFW-12 scored moderate for water quality because trees and shrub plants filter out pollutants, and because it is located within a UGA and within a residential area that produces pollutants for the wetland to filter. The hydrologic function score was moderate because trees and shrubs slow water velocities within the wetland, and because it has potential to reduce flooding through its location in a UGA that also has flooding problems downstream. The wetland scored low on habitat due to its combination of moderate habitat complexity and lack of connections to other habitats. Overall, Wetland WFW-12 received a Category III rating and a habitat score of 5. The regulated critical area buffer is 80 feet wide.

Wetland WFW-13

Wetland WFW-13 is a small slope wetland located within a ditch in the WSDOT right-of-way east of I-5 and south of S 333rd Street. The ditch continues south where eventually it transitions to a riprap-lined ditch, and then ends. Wetland WFW-13’s primary sources of hydrology are a high groundwater table and precipitation.

The palustrine scrub-shrub wetland has sparse vegetation, which is dominated by Himalayan blackberry and reed canarygrass. Hydric soils consisted of a depleted matrix overlain by dark soils, which had a restrictive layer of clay and gravel starting at 17 inches below ground level. Hydric soils met the indicators depleted matrix (F3) and depleted below dark surface (A11).

Wetland WFW-13 scored low for water quality because it lacks dense vegetation that can filter pollutants that it receives from highway runoff, and it does not contribute much value to reducing pollutants within the broader watershed. Its hydrologic function score was also low because it lacks the vegetation to slow water velocities. The wetland scored low for habitat functions because it does not have any habitat complexity and lacks connections to other habitats.

Overall, Wetland WFW-13 received a Category IV rating and a habitat score of 3. The regulated critical area buffer is 50 feet wide.

Wetland WFW-14

Wetland WFW-14 is a depressional wetland located in a stormwater pond with wetland characteristics just north of S 336th Street. Its primary source of hydrology is precipitation and stormwater from the nearby apartment complex. Water from the stormwater pond flows south through a culvert and empties into East Fork Hylebos Tributary at S 336th Street.

This palustrine emergent wetland is dominated by Kentucky bluegrass and creeping buttercup. Hydric soils included a depleted matrix (F3).

Wetland WFW-14 scored low for water quality functions due to the lack of persistent, ungrazed plants and low retention time for water in the wetland to filter pollutants. The wetland scored low for hydrologic functions due to the lack of ability to hold back water, even though water inputs are high in the developed contributing basin. Habitat functions are also low due to the lack of structural and habitat diversity and lack of connections to other habitats. Overall, Wetland WFW-14 received a Category IV rating and a habitat score of 4. The regulated critical area buffer is 50 feet wide.

According to King County assessor data and historic aerial imagery, the stormwater pond appears to have been created between 1998 and 1999 during construction of the associated apartment complex. It is unknown whether the stormwater pond was excavated from wetland or upland. Wetlands are not mapped at this site by NWI, Federal Way, or King County iMap, nor do historic aerial photos indicate the presence of a wetland. However, the stormwater pond’s proximity to East Fork Hylebos Tributary, historic topographic maps, and the abundance of nearby wetlands associated with the stream suggest the possibility that a wetland could have been present in this area historically.

Wetland WFW-15

Wetland WFW-15 is a riverine wetland associated with East Fork Hylebos Tributary located north of S 336th Street. The palustrine scrub-shrub and forested wetland is dominated by salmonberry and red alder. Its primary source of hydrology includes overbank flooding from stream and a high groundwater table. Hydric soils in Wetland WFW-15 are dark or depleted silt, clay, or gravelly sandy loams. They meet hydric soil indicator depleted below dark surface (A11) and redox dark surface (F6).

Wetland WFW-15 scored moderate for water quality because trees and shrub plants filter out pollutants, and because it is located within a UGA and within a residential area that produces pollutants for the wetland to filter. The hydrologic function score was moderate because trees and shrubs slow water velocities within the wetland, and because it has potential to reduce flooding through its location in a UGA that also has flooding problems downstream. The wetland scored low on habitat due to its combination of moderate habitat complexity and lack of connections to other habitats.

The rating for Wetland WFW-15 is Category III, with a habitat score of 6. The regulated critical area buffer is 150 feet wide.

Wetland WFW-16

Wetland WFW-16 is a depressional wetland located at the north end of the Federal Way/S 320th Street park-and-ride. Its primary source of hydrology includes stormwater inputs, a high groundwater table, and precipitation. The palustrine emergent and scrub-shrub wetland is dominated by Himalayan blackberry, hardhack, reed canarygrass, cattail, and slough sedge. Hydric soils were depleted and met the indicators for depleted matrix (F3) and depleted below dark surface (A11).

Wetland WFW-16 scored moderate for water quality functions due to the presence of persistent, ungrazed plants and retention time for water in the wetland to filter pollutants. The wetland scored moderate for hydrologic functions due to the ability to retain water and large inputs from the developed contributing basin. Habitat functions are low due to the lack of structural and habitat diversity and lack of connections to other habitats. Overall, Wetland WFW-16 received a Category III rating and a habitat score of 3. The regulated critical area buffer is 80 feet wide.

Wetland WFW-17

Wetland WFW-17 is a riverine wetland located west of I-5 and south of S 344th Street. The wetland is adjacent to East Fork Hylebos Tributary. Vegetation in the wetland is dominated by black cottonwood, with an understory of twinberry and salmonberry. Hydric soils in Wetland WFW-17 are silt loams that meet hydric soil indicator depleted below dark surface (A11). Wetland hydrology is supported by overbank flooding from East Fork Hylebos Tributary and a high groundwater table. Wetland WFW-17 has an intermittently flowing outlet and dense persistent vegetation, resulting in a moderate score for water quality functions. Due to intensive surrounding land uses and flooding problems downstream of the wetland, Wetland WFW-17 received a moderate score for hydrologic functions. Wetland WFW-17 scored moderate for habitat functions due to its proximity to priority habitat features. Overall, Wetland WFW-17 received a Category III rating and a habitat score of 5. The regulated critical area buffer is 80 feet wide.

Wetland WFW-18

Wetland WFW-18 is a riverine wetland located west of I-5 and south of S 344th Street and is located north of Wetland WFW-17 on the same property. Wetland WFW-18 is adjacent to East Fork Hylebos Tributary. The wetland is dominated by scrub-shrub vegetation, including primarily Scouler’s willow, with reed canarygrass present in emergent areas. Soils within the wetland are silt loam and meet hydric soil indicator redox dark surface (F6). Wetland hydrology is supported by a local high groundwater table. Wetland WFW-18 contains areas that occasionally flood as well as an intermittently flowing outlet to East Fork Hylebos Tributary. The intermittently flowing outlet and dense persistent vegetation results in a moderate score for water quality functions. Due to the presence of widespread persistent, ungrazed plants, the wetland received a moderate score for hydrologic functions. Wetland WFW-18 scored moderate for habitat functions due to its proximity to priority habitat features, resulting in a Category III rating and a habitat score of 5. The regulated critical area buffer is 80 feet wide.

Wetland WFW-21

Wetland WFW-21 is a small, riverine wetland located off I-5 in a highway cloverleaf. Wetland WFW-21 is associated with East Fork Hylebos Tributary. A culvert is the outlet from Wetland WFW-21 to East Fork Hylebos Tributary downstream. The primary sources of hydrology for the wetland are flooding and a high groundwater table from the stream. Wetland WFW-21 contains a palustrine scrub-shrub vegetation community, consisting of Pacific nine-bark, Himalayan blackberry, Scouler’s willow, red alder, and salmonberry. Soils found throughout Wetland

WFW-21 meet hydric soil indicator redox dark surface (F6). The wetland boundary was determined by the extent of fill material and evidence of frequent inundation.

Wetland WFW-21 scored moderate for water quality functions because shrubs filter out pollutants, and because it is located within a UGA and in an area that produces pollutants for the wetland to filter. The hydrologic function score was moderate because vegetation slows water velocities within the wetland, and the wetland is in a UGA that contributes to higher stream flows. The wetland scored moderate for habitat functions because it has some habitat complexity and multiple special habitat features, and it is near multiple priority habitats.

Wetland WFW-21 is rated Category III, with a habitat score of 6. The regulated critical area buffer is 150 feet wide.

Wetland WFW-22

Wetland WFW-22 is a small, depressional wetland located on the far western side of an I-5 cloverleaf, north of Wetland WFW-21. Wetland WFW-22 is not associated with East Fork Hylebos Tributary. The wetland is a localized depression that receives its primary source of hydrology from stormwater and precipitation. Wetland WFW-22 contains a palustrine scrub-shrub community, consisting of red osier dogwood, black cottonwood, and Himalayan blackberry. Soils sampled in Wetland WFW-22 meet the criteria for the hydric soil indicator depleted matrix (F3). The wetland boundary was determined by a change in topography and evidence of frequent inundation.

Wetland WFW-22 scored moderate for water quality functions because it receives runoff from areas that generate pollutants, and it is in a basin where water quality is an issue. Based on intensive land uses in surrounding areas, combined with flooding problems in the same subbasin, Wetland WFW-22 received a moderate score for hydrologic functions. The wetland scored low on habitat due to its lack of habitat complexity and lack of connections to other habitats.

Wetland WFW-22 is rated Category III, with a habitat score of 4. The regulated critical area buffer is 80 feet wide.

Wetland WFW-32

Wetland WFW-32 is classified as a depressional wetland with palustrine scrub-shrub and emergent wetland plant communities. It is located at the west side of the Federal Way/S 320th Street Park and Ride and east of 23rd Avenue S. The wetland is a linear depression that receives water from a high groundwater table and from the parking lot and intermittently outflows into a stormwater pond to the north. From the stormwater pond, water flows through pipes to the East Fork Hylebos Creek Tributary 0016A and daylights in Belmor. Soils sampled meet hydric soil indicator depleted matrix (F3) and depleted below dark surface (A11). Dominant vegetation includes Himalayan blackberry, hardhack, reed canarygrass, creeping buttercup, and soft rush.

Wetland WFW-32 provides a moderate value in both water quality and hydrologic functions, primarily due to its ability to store some stormwater and the presence of plants to filter and attenuate flows. The wetland has a low habitat function because it lacks plant diversity and lack habitat features.

Wetland WFW-32 is rated IV rating and a habitat score of 3. The regulated critical area buffer is 50 feet.

Wetland WFW-33

Wetland WFW-33 is classified as a depressional/riverine wetland associated with a palustrine forested wetland plant community. Wetland WFW-33 is located between S 333rd Street and S 366th Street. It is located north of Wetland WFW-02. The wetland boundary was mapped using topography, aerial imagery, and observations from the roads. The wetland is associated with the West Fork Hylebos Tributary 0014C, which contributes water to the wetland. Wetland WFW-33 likely contains areas that occasionally and seasonally flood. Observations from the road and aerial imagery show red alder and black cottonwood in the canopy with Himalayan blackberry, salmonberry and reed canarygrass in the understory.

Wetland WFW-33 provides moderate to high value in both water quality and hydrologic functions, primarily due to its ability to store stormwater and the presence of dense vegetation. The wetland provides an overall low value in habitat function, due to minimal habitat interspersion and proximity to a substantial amount of development and human-made structures.

Wetland WFW-33 is rated II rating and a habitat score of 5. The regulated critical area buffer is 150 feet.

3.3.1.2 Midway Landfill Alternative

The Midway Landfill Alternative is in Kent, primarily on the Midway Landfill site owned by Seattle Public Utilities. The site has been subject to extensive past human disturbances. The site was originally a hillslope, which was then mined as a gravel pit from 1945 to 1968. Following use as a gravel pit, the site was used as a landfill from 1966 to 1983. After methane gas was discovered in the surrounding residential area in 1984, the site was placed on the U.S. Environmental Protection Agency (EPA) Superfund National Priorities List (Opalski 2010). In response, the site was capped with a multi-layered landfill cover system, including a low-permeability silt/silty clay, a 50-millimeter synthetic membrane, a geonet drainage layer, 1 foot of sand, and 1 foot of topsoil planted with shallow-rooted grasses (EPA 2000). A surface water management system was completed, which consisted of site filling and grading to control surface water drainage and prevent surface water from infiltrating into the landfill. These systems were designed to greatly reduce the amount of rain that would seep into the landfill. The landfill site continues to be actively managed and monitored since initial cleanup efforts were completed in 1991. The sand layer is regularly regraded to eliminate standing water. Vegetation on the landfill is regularly mowed throughout the growing season and consists entirely of grasses and herbaceous vegetation.

This site was investigated for wetlands, and five areas that met the three parameters for wetlands were identified. During preparation of the 2021 SEPA Draft EIS, the U.S. Army Corps of Engineers (Corps) determined that the areas do not meet federal criteria for jurisdictional wetlands (Tong 2019), and Ecology verified that they are non-jurisdictional under state definitions (Gresham 2020). On May 25, 2023, the Supreme Court issued a judgment limiting Corps jurisdiction on "waters of the U.S." The Corps is expected to issue a new rule that will revise the definitions of waters of the U.S. in fall 2023. Ecology, which has state authority under RCW 90.48 to regulate wetlands, will likely issue administrative orders to address impacts to waters of the U.S. the Corps no longer regulates. In the case of these five areas at the Midway Landfill, Sound Transit believes that it is not likely the earlier determination will change because the Supreme Court judgment limits jurisdiction. As such, these areas are not considered regulated wetlands and are not discussed further. However, if the definition of waters of the U.S. were to expand and the Midway Landfill is selected as the project to be built, Sound Transit will comply with the applicable regulations and update project documentation as required. One additional wetland at the Midway Landfill Alternative – Wetland 148.67L – is located in the WSDOT right-of-way of I-5. This wetland was not accessed during field reconnaissance surveys but was delineated as part of the WSDOT SR 509 Project.

Wetland WL148.67L

Wetland WL148.67L is a small, depressional wetland located in the WSDOT right-of-way of southbound I-5. It was delineated in April 2019 by Anchor QEA as a component of the SR 509 Completion Stage 1B Project (Anchor 2019). Dominant vegetation in forested areas includes black cottonwood; shrub areas are dominated by salmonberry, hardhack, and willow. Slough sedge and violet are present in emergent areas. Hydrology in the wetland is from surface runoff, including stormwater runoff from I-5. Soils in the wetland are primarily silt loam and meet hydric soil indicator F6, redox dark surface. Wetland WL148.67L is a closed depression and scored high for water quality and moderate for water quality functions. Given the proximity to I-5 and lack of connections to other habitats, Wetland WL148.67L scored low for habitat functions. Overall, Wetland WL148.67L received a Category III rating and a habitat score of 4. The regulated critical area buffer is 75 feet wide.

4 ENVIRONMENTAL IMPACTS

This section describes the potential impacts of the OMF South project alternatives on aquatic resources, terrestrial resources, and wetlands. See Section 2.4, Impact Assessment Methods and Assumptions, for a discussion of how impacts were identified and evaluated. Analyses of project-related impacts assume that the BMPs described in Section 5, Mitigation Measures, would be implemented and would perform as expected to avoid and minimize certain impacts during construction. For each resource area, analyses of direct impacts are divided between long-term (operational) impacts and short-term (construction-related) impacts. Indirect effects are evaluated in Section 4.4; cumulative impacts are evaluated in Section 4.5.

4.1 Aquatic Species and Habitat

Analyses in this subsection address the potential long-term and temporary (i.e., construction-related) impacts of each alternative on streams, aquatic species and habitat. Actual impacts would depend on the location and design of the final alternative, the construction footprint and methods, the BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development and Section 5.1.2, Construction Best Management Practices), and the performance of post-construction restoration.

Sound Transit considered the following potential impacts on aquatic resources:

- Permanent loss of physical habitat (fill)
- Permanent degradation of in-stream physical habitat, such as shading, removal of boulders or LWD from the channel, and loss of riparian vegetation function (loss of nutrient inputs, LWD recruitment, and shade)
- Impacts on fish passage
- Altered hydrology (higher peak flows result in increased scour/deposition downstream, decreased percolation from impervious surfaces results in lower base flows)
- Increased nighttime lighting
- Temporary or permanent degradation of water quality (increased temperature, increased turbidity, increased loading of heavy metals and hydrocarbons)
- Temporary loss of physical in-stream habitat (dewatering, temporary piping during stream relocation or culvert replacement)
- Temporary degradation of habitat (sedimentation, removal of riparian vegetation, disturbance to stream banks)

To the extent that impacts cannot be avoided or minimized through project design changes and use of BMPs, Sound Transit would implement additional measures to reduce adverse effects and provide compensatory mitigation measures where adverse effects are unavoidable. Sound Transit has committed to achieving no net loss of ecosystem function on a project-wide basis (Sound Transit 2007). As discussed in Section 5.3, Compensatory Mitigation, compensatory mitigation would be implemented in accordance with applicable federal, Tribal, state, and local requirements and guidelines.

As discussed in Section 3.1.2, Aquatic Species of Concern, no aquatic species of concern are known or expected to use habitats in the study area under current conditions. Based on intermittent flows, the lack of pools deep enough to remain wetted during dry periods, and the presence of human-created barriers to fish passage, salmonids are neither known nor expected to use either of the Hylebos Creek tributaries. However, the basin sizes, channel widths, and stream gradients of both tributaries indicate the potential to support fish in the future. There are no surface-flowing segments of North Fork McSorley Creek in the study area, and the reach of North Fork McSorley Creek that receives stormwater runoff from the study area is not accessible to anadromous salmonids.

In anticipation of the need for federal approval for construction and operation of OMF South facilities in the I-5 right-of-way, Sound Transit has started preparing a biological assessment to support ESA Section 7 consultation with NMFS and USFWS. The assessment would also include a review of potential effects on Essential Fish Habitat, as required by the Magnuson-Stevens Fishery Conservation and Management Act.

4.1.1 No-Build Alternative

Under the No-Build Alternative, impacts to aquatic resources from construction or operation of OMF South would not occur. However, for the purposes of this technical report, the No-Build Alternative assumes that by the design year 2042, all planned Sound Transit 3 projects, including FWLE and TDLE, are built along with the other public and private projects planned within the study area. TDLE overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Section 4.5, Cumulative Impacts.

4.1.2 Long-Term Impacts

Direct long-term impacts on aquatic resources would occur where permanent features such as project facilities (including lead, mainline, and test tracks) permanently alter in-stream habitat (including habitat accessibility) or riparian functions. Additional impacts may occur where surface waters receive stormwater runoff from impervious surfaces created or replaced by project construction. Aquatic species may also be affected by increases in the amount of light reaching surface waters at night. These potential effects are described in greater detail below. Impacts associated with each alternative are discussed in the subsections that follow.

In-Stream Habitat Alteration

None of the stream segments in the study area are known or expected to support use by salmonids under current conditions. Other aquatic organisms, such as invertebrates and non-salmonid fish, are likely present in study area streams. The construction of mainline or lead tracks could permanently alter in-stream habitat in areas where the elevated mainline or lead tracks run close to or cross the stream. In addition, the loss or degradation of stream habitat could reduce the availability of prey (e.g., benthic invertebrates) for fish and other aquatic species in reaches downstream of the study area. Impacts on stream habitat could also decrease the availability and quality of stream habitats in the future if access is eventually restored through the removal of downstream fish passage barriers. Any work below the OHWL of any streams in the study area would be conducted in accordance with the terms of the Hydraulic Project Approval (HPA), Clean Water Act Section 404 permit and other applicable permits obtained for this project.

Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. However, two to three culverts may need to be replaced as part of the Preferred Alternative, and these replaced culverts, which may be longer, would be made fish passable. If any culverts on potentially fish-bearing streams are replaced, the replacement structures would be designed and installed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013). Unavoidable impacts on streams are described in the discussions of the impacts of the alternatives, below.

Impacts may also occur where elevated segments of mainline, lead, or test tracks pass over surface-flowing streams. In addition to affecting riparian habitat vegetation (see the discussion of Vegetation Removal and Habitat Alteration, below), shade from structures placed over streams may affect the behavior of fish that could enter the affected stream segments if access is restored in the future. Outmigrating juvenile salmonids may respond to shadows by pausing at the upstream end of the darkened area, potentially increasing their vulnerability to predation (Kemp and Williams 2008). These impact areas and the length of the streams affected are summarized in Table G3.4-1.

In some areas, restored, daylighted channels would be constructed for stream segments currently contained within culverts. Daylighting would allow increased interaction between the stream and associated riparian vegetation, resulting in beneficial effects associated with restoring natural processes such as organic input and flow attenuation.

Evaluations of the potential impacts of the alternatives on in-stream habitat conditions are based on the length of surface-flowing streams within the project limits, as well as on the length of stream channel that would be relocated or daylighted (Table G3.4-1). Impacts are depicted in Figures G3.4-1 through G3.4-6.

The impacts described in Table G3.4-1 reflect potential long-term impacts to streams and aquatic resources, based on the overlap between streams or stream buffers and the permanent impact footprint for each alternative. Impacts to aquatic resources within the permanent impact footprint could take several forms. For example, in some areas, project features (including elevated structures such as the mainline, lead, and test tracks) would be built near or over surface-flowing stream channels. In such areas, no ground-disturbing work would take place in the stream channel, but the presence of those structures could have long-term effects on riparian and/or aquatic habitats. In other areas, an existing stream channel would need to be relocated and realigned to accommodate project features. These impacts are described further in the discussions of the impacts of the individual alternatives.

As discussed in Section 2.4.4, Analysis Assumptions, the impact values and areas in the table and figures represent conservative estimates of the impacts of the alternatives. Not all areas within the permanent impact footprint would be converted to structures or hard surfaces. Actual anticipated impacts would be determined when an alternative is selected to be built and (unless the No-Build Alternative is selected) the project design is sufficiently advanced to undergo permitting review.

Table G3.4-1 Potential Long-Term Impacts on Aquatic Resources

Alternative	Design Option	Project Element	Stream[1]	Stream Impact (linear feet)[2]	Total Stream Impact per Alternative (linear feet)	Stream Channel Daylighted (linear feet)	Stream Buffer Impact (acres)[3]	Total Stream Buffer Impact per Alternative (acres)
Preferred	40 mph Alignment	Site	East Fork Hylebos Tributary	900	3,050	420	2.8	7.2
			West Fork Hylebos Tributary[4]	600		0	0.5	
		Mainline[5]	East Fork Hylebos Tributary	1,550		0	3.9	
	55 mph Design Option	Site	East Fork Hylebos Tributary	900	3,100	420	2.8	8.6
			West Fork Hylebos Tributary[4]	600		0	1.6	
		Mainline[5]	East Fork Hylebos Tributary	1,600		0	4.2	
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,850	420	4.5	10.5
		Mainline[5]		1,600		0	6.0	
	55 mph Design Option and I5 Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,900	420	4.6	11.3
		Mainline[5]		1,650		0	6.7	
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,900	420	4.6	10.9
		Mainline[5]		1,650		0	6.3	
	40 mph Alignment and I5 Tail Track Alignment	Site	East Fork Hylebos Tributary	1,250	2,850	420	4.6	11.0
		Mainline[5]		1,600		0	6.4	
Midway Landfill	N/A	N/A	N/A	0	0	0	0	0

Notes:

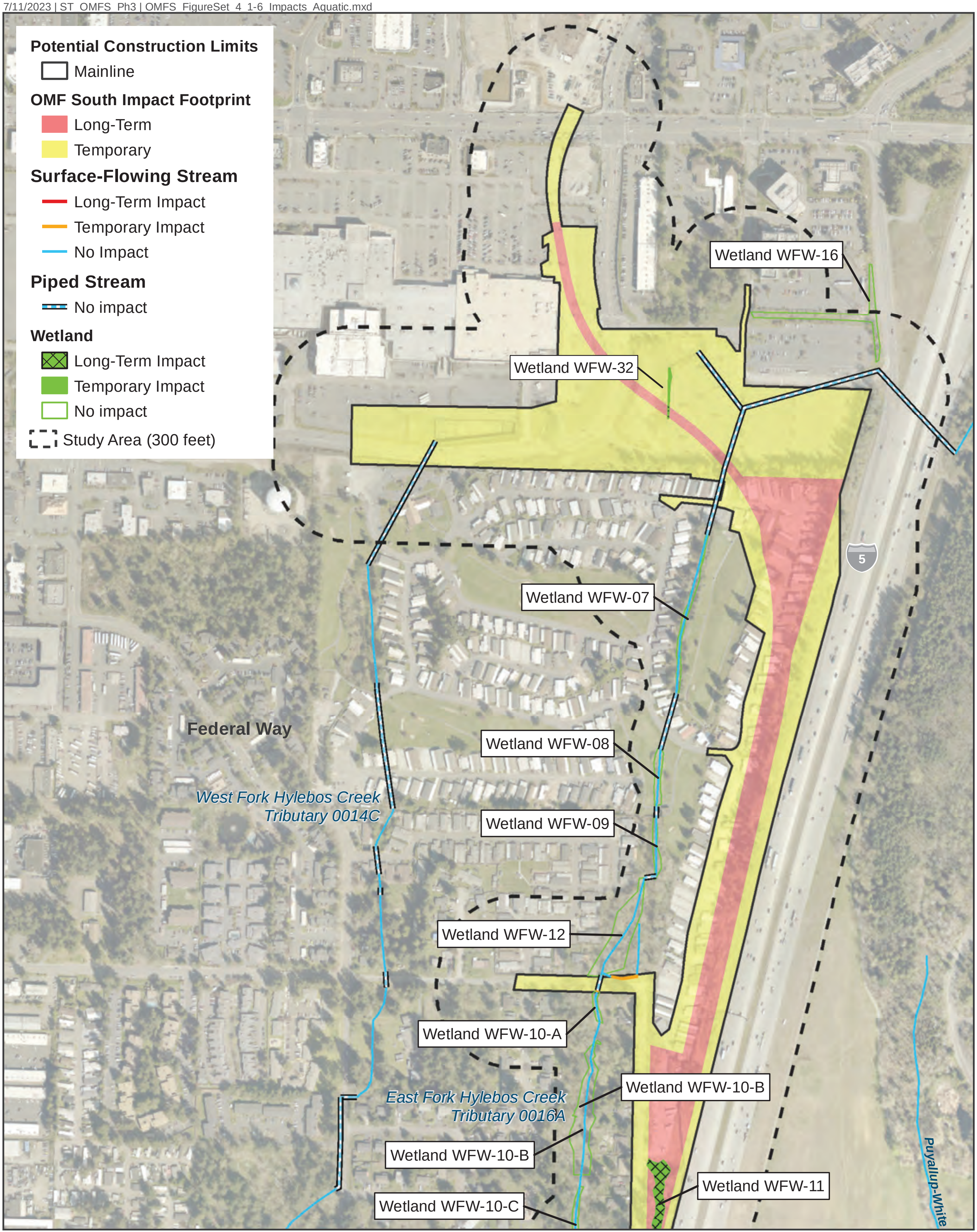
(1) Both affected streams are Type F, per WAC 222-16-030.

(2) Includes the total length of surface-flowing stream within the permanent impact footprint defined for this analysis.

(3) Impact numbers presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. For this reason, stream impacts are based on the approximate centerline of the mapped stream. Permanent impacts on the stream buffer are calculated as the affected area of Wetland WFW-02. See text for further discussion.

(5) If neither the Preferred nor South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.


Potential Construction Limits
Mainline
OMF South Impact Footprint
Long-Term
Temporary
Surface-Flowing Stream
Long-Term Impact
Temporary Impact
No Impact
Piped Stream
No impact
Wetland
Long-Term Impact
Temporary Impact
No impact
Study Area (300 feet)
Wetland WFW-16
Wetland WFW-32
Wetland WFW-07
5
Federal Way
Wetland WFW-08
West Fork Hylebos Creek Tributary 0014C
Wetland WFW-09
Wetland WFW-12
Wetland WFW-10-A
Wetland WFW-10-B
East Fork Hylebos Creek Tributary 0016A
Wetland WFW-10-B
Wetland WFW-11
Wetland WFW-10-C
Puyallup-White

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

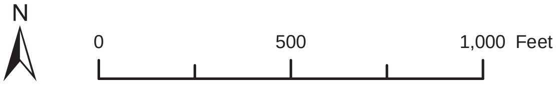
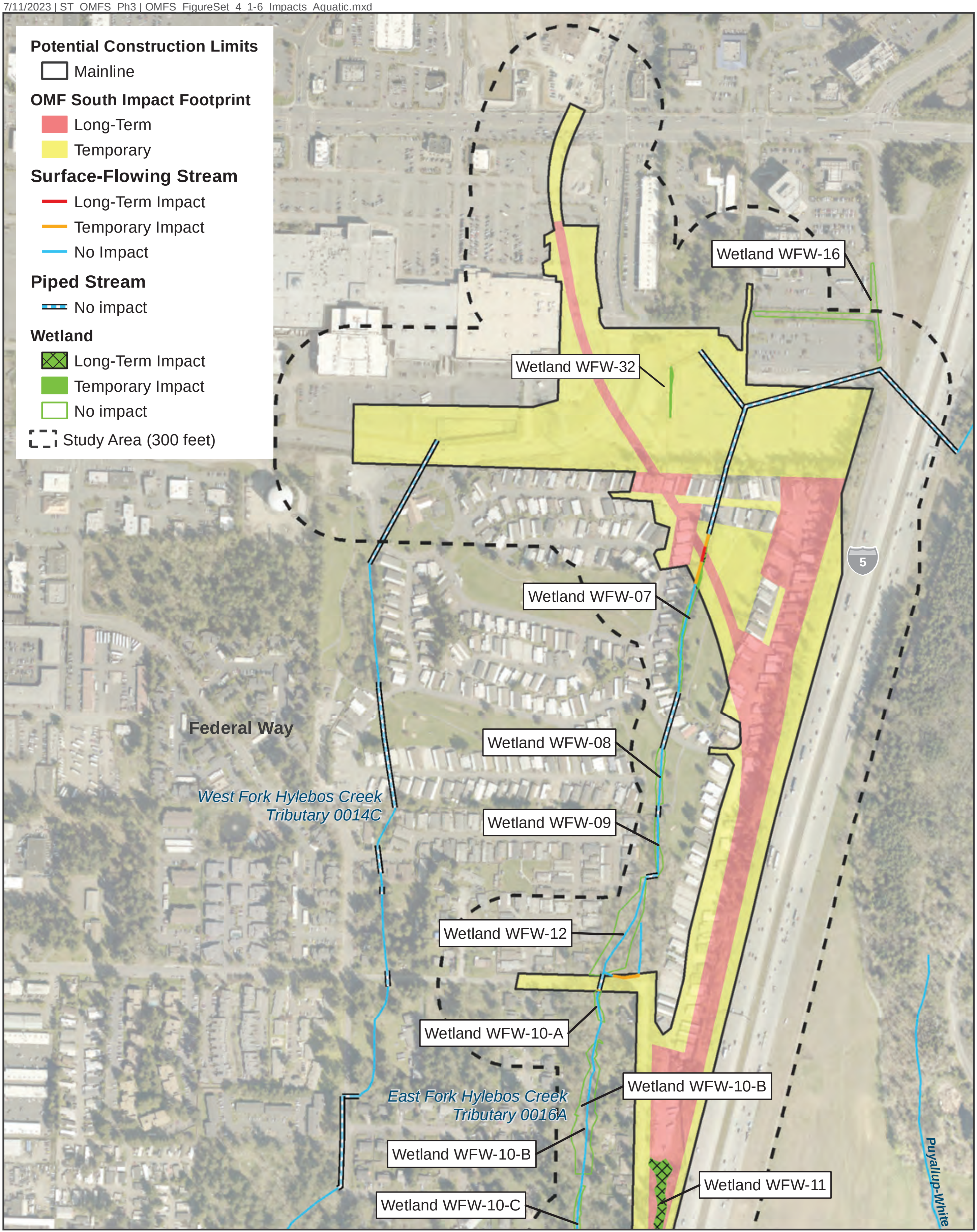

N
0
500
1,000 Feet

FIGURE G3.4-1

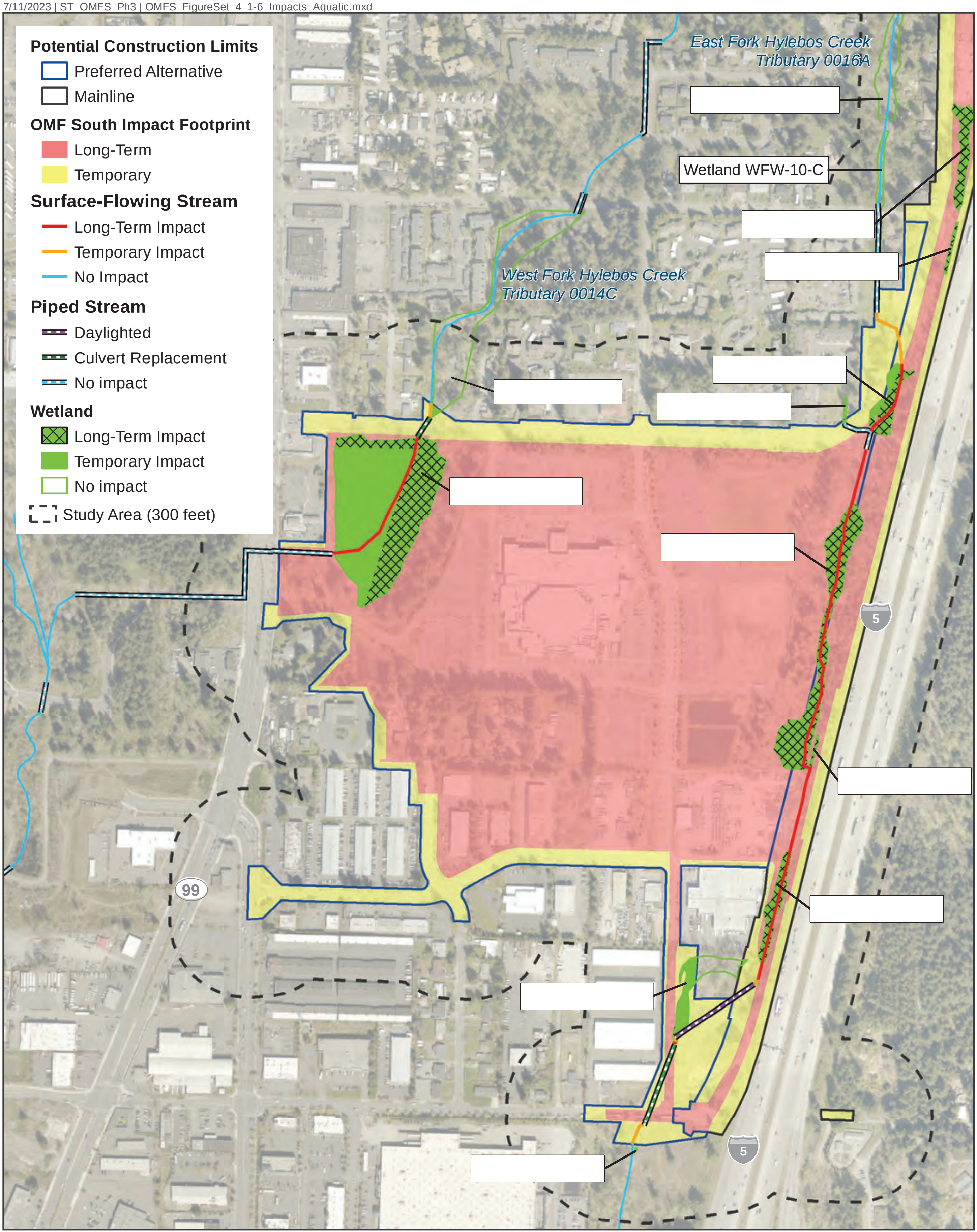
Impacts to Wetlands and Streams
Mainline Track
40 mph Alignment
OMF South


Potential Construction Limits
Mainline
OMF South Impact Footprint
Long-Term
Temporary
Surface-Flowing Stream
Long-Term Impact
Temporary Impact
No Impact
Piped Stream
No impact
Wetland
Long-Term Impact
Temporary Impact
No impact
Study Area (300 feet)
Wetland WFW-16
Wetland WFW-32
Wetland WFW-07
5
Federal Way
Wetland WFW-08
West Fork Hylebos Creek
Tributary 0014C
Wetland WFW-09
Wetland WFW-12
Wetland WFW-10-A
Wetland WFW-10-B
East Fork Hylebos Creek
Tributary 0016A
Wetland WFW-10-B
Wetland WFW-11
Wetland WFW-10-C
Puyallup-White

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G3.4-2
Impacts to Wetlands and Streams
Mainline Track
55 mph Design Option
OMF South


Potential Construction Limits
Preferred Alternative
Mainline
OMF South Impact Footprint
Long-Term
Temporary
Surface-Flowing Stream
Long-Term Impact
Temporary Impact
No Impact
Piped Stream
Daylighted
Culvert Replacement
No impact
Wetland
Long-Term Impact
Temporary Impact
No impact
Study Area (300 feet)
East Fork Hylebos Creek Tributary 0016A
Wetland WFW-10-C
West Fork Hylebos Creek Tributary 0014C
5
99
5

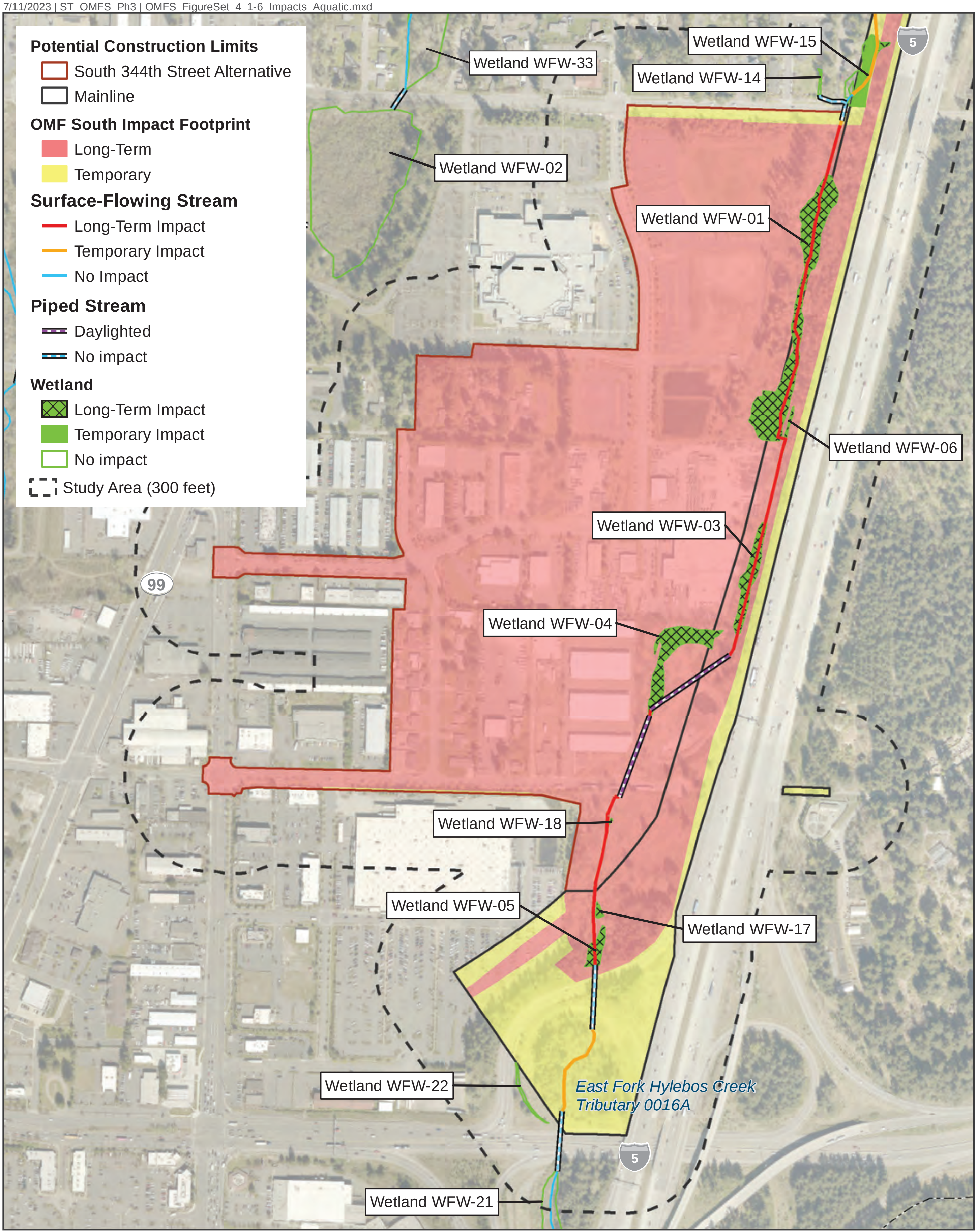
Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G3.4-3
Impacts to Wetlands and Streams
Preferred Alternative

OMF South


Potential Construction Limits
South 344th Street Alternative
Mainline
OMF South Impact Footprint
Long-Term
Temporary
Surface-Flowing Stream
Long-Term Impact
Temporary Impact
No Impact
Piped Stream
Daylighted
No impact
Wetland
Long-Term Impact
Temporary Impact
No impact
Study Area (300 feet)
Wetland WFW-15
Wetland WFW-33
Wetland WFW-14
Wetland WFW-02
Wetland WFW-01
Wetland WFW-06
Wetland WFW-03
Wetland WFW-04
Wetland WFW-18
Wetland WFW-05
Wetland WFW-17
Wetland WFW-22
Wetland WFW-21
East Fork Hylebos Creek
Tributary 0016A
5
99
5

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

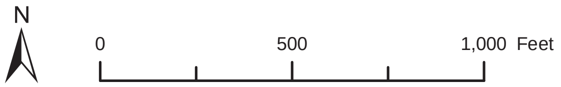
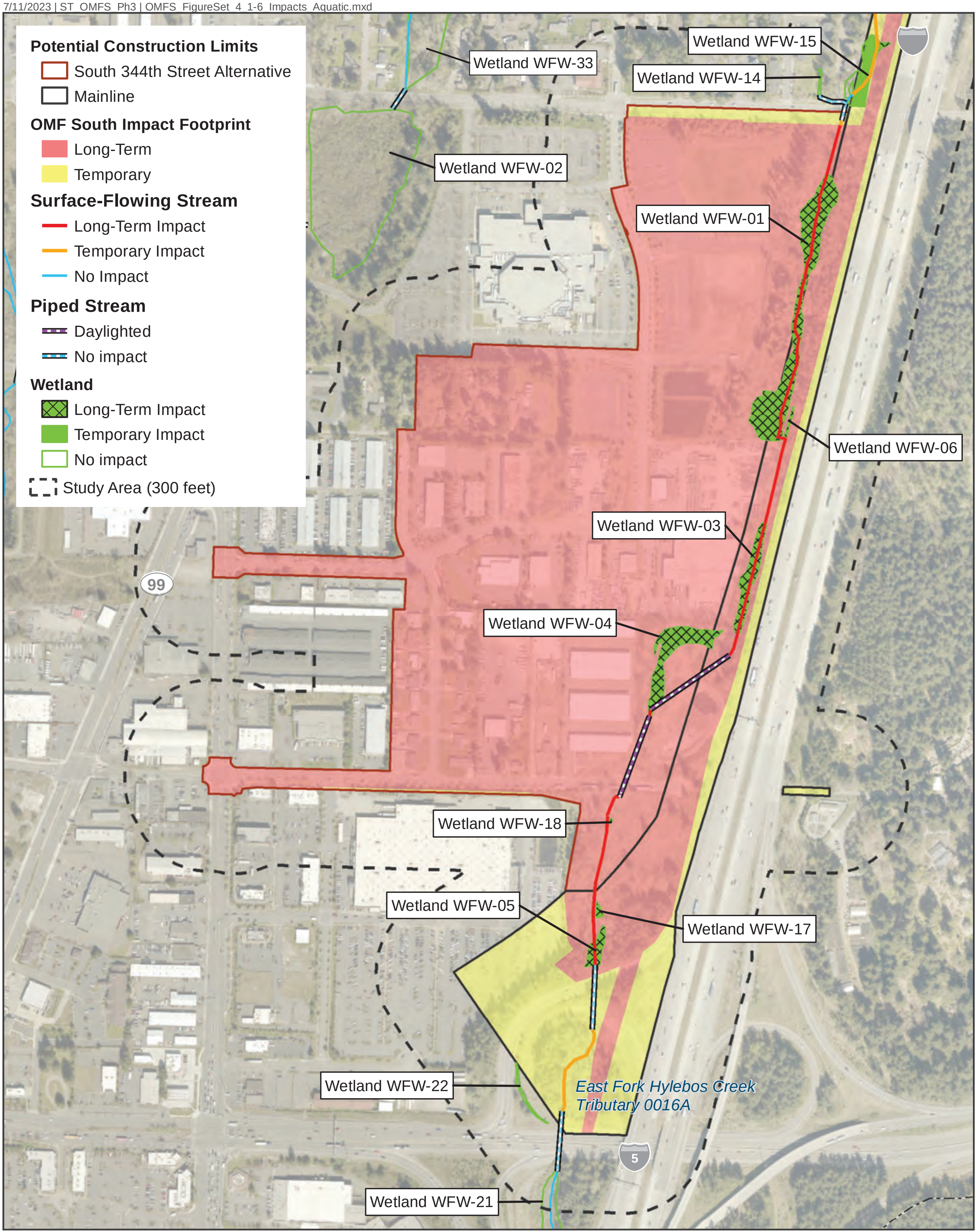

N
0
500
1,000 Feet

FIGURE G3.4-4

Impacts to Wetlands and Streams
South 344th Street Alternative
Enchanted Parkway Alignment
OMF South

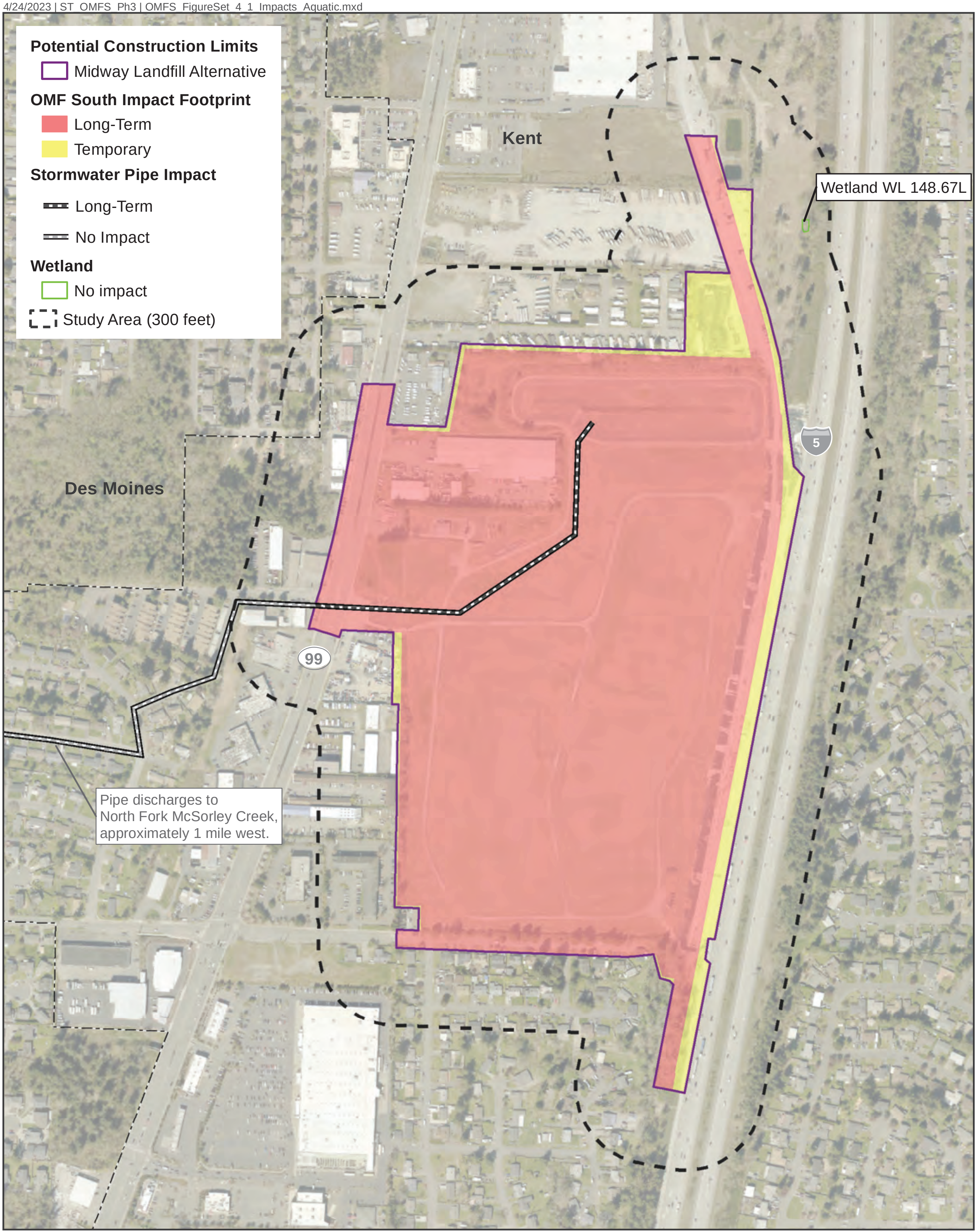

Potential Construction Limits
South 344th Street Alternative
Mainline
OMF South Impact Footprint
Long-Term
Temporary
Surface-Flowing Stream
Long-Term Impact
Temporary Impact
No Impact
Piped Stream
Daylighted
No impact
Wetland
Long-Term Impact
Temporary Impact
No impact
Study Area (300 feet)
Wetland WFW-15
Wetland WFW-33
Wetland WFW-14
Wetland WFW-02
Wetland WFW-01
Wetland WFW-06
Wetland WFW-03
99
Wetland WFW-04
Wetland WFW-18
Wetland WFW-05
Wetland WFW-17
Wetland WFW-22
East Fork Hylebos Creek
Tributary 0016A
5
Wetland WFW-21

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G3.4-5

Impacts to Wetlands and Streams
South 344th Street Alternative
I-5 Alignment
OMF South


Potential Construction Limits
Midway Landfill Alternative
OMF South Impact Footprint
Long-Term
Temporary
Stormwater Pipe Impact
Long-Term
No Impact
Wetland
No impact
Study Area (300 feet)
Kent
Des Moines
Wetland WL 148.67L
5
99
Pipe discharges to North Fork McSorley Creek, approximately 1 mile west.

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G3.4-6
Impacts to Wetlands and Streams
Midway Landfill Alternative

Fish Passage

No impacts on anadromous fish passage are anticipated because none of the stream reaches in the study area are currently accessible to anadromous fish. This analysis considers impacts that could affect the potential availability and accessibility of stream habitats in the future if access is restored through the removal of downstream fish passage barriers.

As discussed above, Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. However, existing culverts at S 336th Street and S 344th Street may need to be replaced for the Preferred Alternative or the South 344th Street Alternative, as discussed in the analyses of the impacts of those alternatives, below. These replaced culverts, which may be longer, would be made fish passable.

If any culverts must be installed or replaced for this project, they would be designed and installed in accordance with WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). Decisions about culvert design would be based on the assumption that all surface-flowing stream segments in the study area have the potential to support fish use in the future. As such, culverts replaced for project construction would not impede fish access through the study area in the future, if access is restored through the removal of downstream fish passage barriers. In addition, Sound Transit would coordinate with WSDOT to ensure that the development of the OMF provides adequate space for any future replacement of WSDOT-owned culverts that are currently barriers to fish passage.

Vegetation Removal and Habitat Alteration

Where the permanent impact footprint overlaps a riparian buffer, the ecological function of that buffer would be diminished. Substantial decreases in current riparian function would occur where areas of tree or shrub cover in a stream's riparian zone are converted to facilities or to vegetation types (e.g., lawns, ornamental landscaping) with less structural or compositional diversity. Where riparian vegetation, regardless of current condition, is removed altogether, potential future riparian functions would be eliminated. Potentially affected riparian functions and processes include fish and wildlife habitat; food chain support; water temperature maintenance; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; and stream channel formation and maintenance.

Based on the urban setting of the study area and disturbed riparian corridors, comparisons of the impacts of the alternatives on riparian habitat are based on the overlap between the project limits[3] and functional stream buffers. As discussed previously, functional stream buffers are defined as standard regulatory buffers for streams that have been trimmed at the edge of existing developed areas. For the two streams addressed in this analysis, this amounts to the contiguous vegetated areas within 100 feet of surface-flowing stream segments that are interrupted by roads, buildings, and institutional or industrial complexes. This reduces the capacity of riparian functions and processes in the OMF South study area. It is widely recognized that the loss of forest habitat can adversely affect riparian functions – the recruitment of wood in particular (Knutson and Naef 1997). Moreover, studies conducted in western Washington, western Oregon, and southeastern Alaska indicate that more than 90 percent of LWD input to streams from riparian areas is recruited from the areas within approximately 100 feet of the stream's edge (Murphy and Koski 1989; McDade et al. 1990; McKinley 1997; Martin et al. 1998).

---

[3] This would include areas within the zone that would be cleared and maintained on either side of the connecting tracks.

Other functions, such as water quality protection, channel maintenance, and detrital input, occur primarily in the first 100 feet (Fischer and Fischenich 2000).

Permanent project-related impacts on riparian habitat would also occur where segments of mainline, test, or lead tracks span areas of riparian vegetation. For operational safety, trees and other tall vegetation would not be allowed to grow near track segments. Where the track alignments pass through areas with trees and tall shrubs, vegetation would be converted to short-statured shrubs and herbaceous vegetation. In addition, the long-term presence of structures above vegetation would reduce the amount of water the vegetation receives from precipitation. Finally, elevated structures with low clearance (generally, less than 15 feet) would limit sunlight. In some areas, short-statured shrubs and herbaceous vegetation cleared from beneath such structures and allowed to grow back may not grow back. The presence of elevated structures would preclude the development of mature forest habitat in these areas, reducing the potential for the recruitment of LWD to nearby streams. Because the elevated structures would be relatively narrow (typically 20 to 30 feet wide), oriented north to south, and generally more than 15 feet above the ground surface, shading impacts on riparian vegetation would be limited in most areas.

Sound Transit would use native vegetation to replant areas temporarily disturbed by construction. At sites where riparian zones are currently dominated by non-native species, the reintroduction of native vegetation could lead to long-term improvements in riparian habitat conditions.

Water Quality/Quantity

The development of any project alternatives would entail the creation of new impervious surfaces and the replacement of existing impervious surfaces. New impervious surfaces would include maintenance buildings, parking areas, tracks, train storage areas, and roadways. These new surfaces would replace a mix of existing impervious and pervious surfaces at each site. Impervious surfaces are associated with negative effects on receiving waters, affecting water quality and flow regimes, which in turn can have negative effects on aquatic life and aquatic habitat.

The sites proposed for the Preferred and South 344th Street alternatives currently include large amounts of pollution-generating impervious surfaces (PGIS), primarily parking lots and access roads. Some of these areas were developed before recent stormwater management requirements were in place, which results in stormwater runoff currently receiving little or no detention or treatment. Development of an operations and maintenance facility at either of the sites proposed for the Preferred and South 344th Street alternatives would replace some existing untreated PGIS with landscaping or other surfaces that are not pollution-generating.

Under any of the build alternatives, runoff from impervious surfaces created or replaced for construction and operation of OMF South would be detained and/or treated, as appropriate, in accordance with the Sound Transit Design Criteria Manual. Depending on the location of the project facilities, this would entail compliance with the city of Kent stormwater manual, the city of Federal Way addendum to the King County Surface Water Design Manual, the King County Surface Water Design Manual, and the WSDOT Highway Runoff Manual.

Appropriate treatment of runoff from PGIS would reduce the concentration of contaminants that enter receiving waters. However, water that passes through stormwater management facilities still contains contaminants (albeit in reduced concentrations) that can harm fish in receiving waters. These impacts could extend a considerable distance downstream, potentially affecting fish (including ESA-listed species) in stream reaches outside of the study area. In addition, during major storm events, the capacity of those facilities may be exceeded, and some runoff may enter streams and other surface waters without receiving treatment. It is important to note that the first-flush runoff from such events (i.e., that with the highest concentrations of contaminants) would enter treatment facilities. Bypassing would occur later in the storm event, after most contaminants have washed off.

The following is a discussion of an emerging contaminant of concern known as 6PPD-quinone. This chemical compound is a breakdown product resulting from the interaction of new car tires with ozone. Recent research has found 6PPD-quinone, a contaminant found in runoff from highways or roadways, to be a major contributor to pre-spawning mortality in adult coho salmon (Tian et al. 2021). The exposure and mortality of adult coho can be linked to both the sensitivity of coho salmon and the overlap of spawn timing with first flush events. The effects of this contaminant on ESA-listed Chinook salmon, steelhead, and bull trout are still being studied, but some of the early studies indicate that first-flush storm events are also lethal to juvenile coho, steelhead, and Chinook salmon (French et al. 2022). However, the concentration at which 6PPD-quinone in stormwater may have toxic effects on those species is still being evaluated. Given that juvenile steelhead and coho, in particular, typically spend more than 1 year rearing in natal streams, it is likely that exposure and mortality is occurring but undocumented thus far in the wild. Research has shown that in addition to juvenile coho, both juvenile steelhead (*Oncorhynchus mykiss*) and juvenile Chinook salmon (*O. tshawytscha*) are also vulnerable to untreated stormwater containing 6PPD-quinone; however, the effects are not as immediate, and instead of mortality occurring within a few hours of exposure (up to 4 hours for coho salmon), it can take 1 or 2 days for the juvenile steelhead and Chinook salmon to display mortality (French et al. 2022). A recent study looked at the sensitivity of early life stage (approximately3- weeks post swim-up [newly feeding] coho salmon and Chinook salmon) and found that juvenile coho salmon are three orders of magnitude more sensitive to 6PPDquinone than Chinook salmon (Lo et al. 2023). This study found a 7.1 percent survival for coho salmon exposed to the lowest concentration treatment group, while Chinook salmon showed 61.4 percent survival in the highest concentration treatment group (Lo et al. 2023). While not showing the degree of sensitivity to stormwater runoff containing 6PPD-quinone as coho salmon, juvenile steelhead and Chinook do appear to exhibit direct mortality, although at higher concentrations and with longer response times (Tian et al. 2021; French et al. 2022; Lo et al. 2023; and Brinkman et al. 2022).

Other harmful contaminants in stormwater runoff include polycyclic aromatic hydrocarbons, which have been found to cause reduced growth, increased susceptibility to infection, and increased mortality in salmonids (Meador et al. 2006; Varanasi et al. 1993). Another common component of stormwater runoff is copper, which can impair the olfactory system of salmonids and hinder their predator avoidance behavior (Sandahl et al. 2007).

Ecology has evaluated the effectiveness of stormwater facilities in providing treatment that prevents or reduces the toxicity of contaminants in receiving waters (Ecology 2022). Under any of the build alternatives, treatment effectiveness would be key consideration in the selection and design of stormwater management facilities. Stormwater ponds or a combination of vaults and ponds, may be considered to provide effective treatment. Construction of stormwater ponds could result in additional impacts on streams. For example, if ponds are located in vegetated stream buffers, pond construction could result in the temporary or permanent degradation of riparian habitat. Also, the siting needs for stormwater ponds could affect the locations of reconfigured stream channels.

Because the volume of runoff from impervious surfaces would be managed in accordance with local, state, and federal requirements, none of the alternatives would be expected to have long-term adverse effects on flow regimes in streams. Peak stream flows would not increase because the stormwater systems built for the proposed project would be designed to simulate predevelopment hydrology. Additional measures to reduce stormwater runoff, such as low-impact development or other on-site measures, would be considered at a more advanced phase of project development. Based on the above, none of the alternatives would be expected to have adverse effects on aquatic species and habitat as a result of altered peak or base flows.

Nighttime Lighting

Operation of OMF South and associated mainline or test tracks is not expected to result in any increases in nighttime illumination of fish-bearing waters (which could increase the risk of predation on juvenile salmonids) for several reasons. First, there are no fish-bearing waters within 200 feet of any of the OMF South project alternatives, including the mainline tracks. Even if downstream fish passage barriers are removed and access is restored, operation of the mainline and test tracks would not illuminate any surface waters because the tracks would have no overhead lighting and the train headlights would be directed parallel to the tracks. Finally, at the OMF South alternative sites, the potential for adverse effects under that future scenario would be avoided or minimized through the implementation of conservation measures for luminaires installed near surface-flowing waters, regardless of the waters' current fish-bearing status. Any luminaires within 50 feet of such waters would be shielded and directed away from the water's surface.

4.1.2.1 Preferred Alternative

Approximately 3,050 to 3,100 linear feet of surface-flowing stream fall within the permanent impact footprint for the Preferred Alternative. The affected stream segments would include approximately 2,450 to 2,500 linear feet of East Fork Hylebos Tributary (depending on whether the 40 mph Alignment or 55 mph Design Option is selected; see below) and approximately 600 linear feet of West Fork Hylebos Tributary (Table G3.4-1). As a result, this alternative would have a greater impact on aquatic habitats than either the Midway Landfill Alternative or the South 344th Street Alternative. Compared to the South 344th Street Alternative (which would affect 2,850 to 2,900 linear feet of streams overall), the Preferred Alternative would affect approximately 400 fewer linear feet of East Fork Hylebos Tributary. But this alternative would impact West Fork Hylebos Tributary, whereas the South 344th Street Alternative would avoid those impacts. Compared to the South 344th Street Alternative, the Preferred Alternative would realign less of East Fork Hylebos Tributary and would not daylight the section near S 344th Street. These impacts are discussed below.

East Fork Hylebos Tributary

Approximately 2,450 linear feet of East Fork Hylebos Tributary (surface-flowing) fall within the permanent impact footprint of this alternative. The affected portion of the stream extends from north of S 336th Street to S 344th Street (Figure G3.4-3). Approximately 1,650 feet of the stream channel in this area would be relocated and realigned. The interim design includes meanders and other features to enhance the availability and diversity of aquatic habitats. Based on the interim design, the addition of meanders would increase the length of the stream channel in this area by approximately 130 linear feet. The actual layout of the stream channel would be developed by the design-build contractor in consultation with Sound Transit, permitting agencies, and other stakeholders. Approximately 350 feet of the stream relocation would occur in the site footprint, and approximately 1,300 feet would be associated with the mainline tracks. The relocated stream channel would be approximately 40 to 70 feet west of the mainline tracks.

Currently, much of East Fork Hylebos Tributary in this area is confined within a straight and narrow channel that lacks complexity. Relocating and realigning the channel could create opportunities to add sinuosity and habitat complexity, potentially improving in-stream habitat conditions in some reaches. LWD would be placed in and near the stream channel to provide additional habitat complexity. The new channel would be designed to maintain flows and water quality conditions. An approximately 500-foot-long segment of the stream between the OMF site and I-5 would be within the permanent impact footprint but would not be relocated. The interim design shows the stream remaining in its existing channel in this area, approximately 70 feet west of the mainline tracks. Two lead track segments would come within approximately 30 to 40 feet of the stream near the northern and southern ends of this segment. Long-term impacts to this stream segment would be associated with reductions in the width of the vegetated riparian zone, as described below.

The interim design indicates that some of the relocated channel would be routed through a parcel immediately south of the Christian Faith Center property. That parcel is currently unvegetated and is used for storage of heavy equipment and construction materials. Under current conditions, the length of the stream channel in the area between that parcel and I-5 is approximately 320 feet, and the vegetated riparian area is confined to an approximately 80-foot-wide strip. Upon project completion, the length of the stream channel in that area would be approximately 380 feet, and the width of the area between the OMF site and the mainline tracks would be approximately 200 feet. It is assumed for this analysis that trees and other woody vegetation would be planted in all allowable areas between the OMF site and the mainline tracks. As a result, a wider area would be available to support riparian functions, but those functions would be limited in some parts of that area because trees and other tall vegetation would not be allowed to grow near the mainline tracks and the crossing that goes over one lead track segment in this area.

Although relocating and realigning the stream channel would have some beneficial effects, changing the physical characteristics of the stream could adversely affect its hydrology and downstream sediment regimes. In addition, the presence of the OMF site to the west and the mainline tracks to the east would further reduce the width of the already limited area available to support riparian functions. From S 336th Street to the southeastern corner of the Christian Faith Center property (a straight-line distance of approximately 0.25 mile), the vegetated riparian zone between the OMF site and the mainline tracks would be approximately 180 feet wide. Compared to the existing width of the vegetated riparian zone in this area (200 to 300 feet), this zone would amount to a 10 to 40 percent reduction in the width of the vegetated riparian zone along approximately 1,400 linear feet of stream channel. Riparian functions in this area would be further reduced by the presence of two lead track segments crossing the stream; trees and other tall vegetation would not be allowed to grow near the lead tracks.

Farther south, the stream would be confined to an approximately 80-foot-wide corridor between the Ellenos Yogurt parcel and I-5. This area would include about 400 linear feet of stream channel. Much of the stream in this area would be beneath or immediately adjacent to the mainline or lead tracks. The presence of support columns near the stream would constrain options for natural or human-created modifications to channel configuration in the future. In addition, existing forested riparian vegetation would be cleared and replaced with lower-growing vegetation or converted to hard surfaces, substantially reducing riparian functions along this stream segment.

Downstream of the Ellenos Yogurt parcel, the realigned channel would tie into the channel that would be daylighted as part of the Preferred Alternative. Under this alternative, approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from a culvert and restored to a daylighted channel (Table G3.4-1). Downstream of the daylighted channel, the stream would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long culvert. The new structure would be designed and installed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013). Under current conditions, the stream is conveyed through this area in a 4-foot-diameter corrugated steel pipe that is not considered to be a barrier to fish passage.

The permanent stream buffer impact areas (Table G3.4-1) reflect the assumption that all of the existing forested riparian habitat along the affected stretch of stream would be cleared for construction. It may be possible to retain existing vegetation (including riparian forest) in some areas; the actual extent of riparian clearing and planting would be determined by the design-build contractor in consultation with Sound Transit. Where safety constraints allow, riparian areas for construction would be restored with native vegetation, with an emphasis on trees and shrubs. As discussed in Section 2.4.4, trees and other tall vegetation would not be allowed to grow back near the mainline tracks, lead tracks, test tracks, and associated facilities. In those areas, some riparian habitat functions would be restored through revegetation with native shrubs and other low-growing species. In areas where mixed deciduous and coniferous forest is replaced with project features and non-forested vegetation, the capacity of those areas to support riparian functions for East Fork Hylebos Tributary would be permanently reduced.

In addition, the 55 mph Design Option at the northern end of the mainline tracks would affect approximately 50 linear feet more of East Fork Hylebos Tributary than would the 40 mph Alignment (Table G3.41). The 55 mph Design Option would intersect the northern end of the stream in Belmor; the 40 mph Alignment would avoid it altogether.

West Fork Hylebos Tributary

Construction and operation of the Preferred Alternative would also affect aquatic and riparian habitats associated with West Fork Hylebos Tributary. The impacts on aquatic habitats in this area are difficult to quantify because the stream lacks a defined channel where it flows through Wetland WFW-02 and an associated in-line stormwater detention facility south of S 336th Street. For this reason, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. That source identifies approximately 600 linear feet of the stream that would fall within the permanent impact footprint of the Preferred Alternative.

Frontage improvements along S 336th Street to meet city standards would necessitate the installation of a longer crossing structure where West Fork Hylebos Tributary is crossed by the road. If the existing culverts at S 336th Street are replaced, the replacement structure or structures would be designed and installed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013). The existing culverts are owned by the city of Federal Way and identified partial barriers to fish passage (WDFW ID# 933224).

The interim design proposes a single, approximately 19-foot-wide, 89-foot-long fish-passable structure to replace the existing culverts. If a structure with these dimensions is included in the final project design, the replacement structure would be longer than the existing, 86-foot-long culverts, reducing the length of surface-flowing stream channel. However, replacing two 42-inch-diameter pipes with a single, 19-foot-wide crossing structure would allow the stream to maintain a more natural channel width through the crossing. This, in turn, would help restore the hydrological capacity at the crossing site, allowing sediment and organic debris to pass through and providing fish unhindered passage beneath the roadway.

The extension of 18th Place S in a portion of Wetland WFW-02 would reduce the area of the stormwater pond/wetland complex through which the stream flows. The construction of this road extension and bike/pedestrian pathway would place fill in the wetland boundary and construct retaining walls in the eastern portion of the wetland. In addition, frontage improvements along S 336th Street could necessitate fill in the northern portion of the wetland, further reducing the extent of the wetland area that supports riparian functions for West Fork Hylebos Tributary. Impacts to wetland area and functions are described in Section 4.3, and potential measures for mitigating wetland impacts are found in Section 5.

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Tributary. The wetland and its buffer are dominated by forest that provides high-quality riparian habitat. Clearing of these forested areas for extending 18th Place S would permanently reduce their capacity to support riparian functions. See Section 4.3.2 for additional discussion of impacts to this wetland.

4.1.2.2 South 344th Street Alternative

The South 344th Street Alternative would affect approximately 2,850 to 2,900 linear feet of surface-flowing stream (Table G3.4-1). Compared to the Preferred Alternative, this alternative would affect approximately 400 more linear feet of the surface-flowing channel of East Fork Hylebos Tributary; however, impacts on West Fork Hylebos Tributary would be avoided altogether (Figure G3.4-4 and G3.4-5).

Impacts on East Fork Hylebos Tributary between S 336th Street and the culvert upstream of the WSDOT stormwater facility would be the same as described above for the Preferred Alternative. South of S 344th Street, approximately 400 linear feet of stream channel would fall within the permanent impact footprint of this alternative. In total, approximately 1,250 feet of the stream impacts would occur in the site footprint, and approximately 1,600 feet would be associated with the mainline tracks (Table G3.4-1). In contrast to the Preferred Alternative, this alternative would not involve the relocation of a short segment of this stream north of S 336th Street. As a result, this alternative would entail 1,650 linear feet of stream relocation impacts, compared to 1,700 linear feet under the Preferred Alternative.

Similar to the Preferred Alternative, the loss of mature, mixed deciduous and coniferous forest would reduce the riparian functions along the affected stream reaches. By affecting reaches downstream of S 344th Street, this alternative would degrade riparian habitat along 400 more feet of the stream than would the Preferred Alternative.

Under this alternative, approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from an existing culvert and restored to a daylighted channel (Table G3.4-1). Daylighting this segment would increase the amount of functioning aquatic and riparian habitat available in the stream system.

Emergency vehicle access to the mainline tracks would be needed near the location of the daylighted stream segment. One of the options under consideration may require approximately 60 feet of channel that is currently culverted (and would otherwise be daylighted, as described above) to be placed in a new crossing structure. Because this alternative would not include the extension of 21st Avenue S, the replacement crossing structure south of the daylighted channel would be shorter, compared to the Preferred Alternative. If a culvert is needed, it would be designed using the stream simulation methodology outlined in WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013), avoiding the potential creation of a barrier to fish passage. It may be possible to eliminate the need for a culvert through detailed design of the access and of the stream meanders. The design of the emergency vehicle access would need to be coordinated and approved by Sound Transit, WSDOT, and the city of Federal Way.

As with the Preferred Alternative, the 55 mph Design Option at the northern end of the mainline tracks would affect slightly more of East Fork Hylebos Tributary than would the 40 mph Alignment. The direct permanent impacts of the tail track design options on streams would be largely identical. The I-5 alignment would affect more stream/wetland buffer along East Fork Hylebos Tributary than would the Enchanted Parkway alignment (Table G3.4-1).

4.1.2.3 Midway Landfill Alternative

The Midway Landfill Alternative would have no direct impact on streams or stream channels because no streams are present on the Midway Landfill Alternative site. The closest mapped extent of North Fork McSorley Creek is approximately 2,000 feet west of the Midway Landfill Alternative and SR 99. The only project features affecting streams under this alternative relate to stormwater runoff and detention, as described below.

Compared to the other alternatives, the Midway Landfill Alternative would convert more vegetated areas to impervious land cover. It should be noted, however, that not all vegetated areas at the landfill function as pervious surfaces under current conditions. In reality, the surface of the landfill consists of grass on dense, compacted soils, underlain by an impermeable membrane cap. The landfill surface is designed to inhibit water from soaking through it. While the engineered multilayer membrane cap may have the capacity to attenuate some amount of runoff in the process, it prevents infiltration. Runoff is routed to an on-site surface water collection system. Thus, the area of grassy landfill cap converted to facilities such as maintenance buildings, parking areas, tracks, train storage areas, and roadways may not be representative of the area of pervious surfaces being converted to impervious surfaces. Nevertheless, based on the total size of the OMF site, the Midway Landfill Alternative would create the greatest amount of new pollution-generating impervious surfaces among the alternatives (see Table G3.4 3).

All stormwater runoff from the Midway Landfill Alternative site would be detained and treated in an underground vault system that would be designed in accordance with the city of Kent Stormwater Manual. The treatment vaults in turn would likely discharge to the on-site regional stormwater treatment and detention facility, which ultimately discharges to the North Fork McSorley Creek approximately 1.1 miles west of the Midway Landfill Alternative. The regional facility has been approved by both WDFW and Ecology. Treated stormwater that is discharged from the vaults would be directed to the regional treatment facility, where it would receive additional detention and treatment. As a result, an increase in the amount of impervious surfaces under this alternative would not be expected to adversely affect fish resources, stream hydrology, or aquatic habitat.

4.1.3 Construction Impacts

Temporary, construction-related impacts on aquatic resources would occur where stream buffers are affected by clearing and ground-disturbing work but are revegetated following construction. Such areas are within the project limits (including temporary construction easements) but not within the permanent footprint of the proposed facilities (including lead, test, and mainline tracks). The duration of such impacts would vary, depending on the existing condition of the affected area. Where clearing affects low-growing vegetation (e.g., grasses, herbaceous species) or invasive species, the riparian functions of the disturbed areas would likely be restored within one growing season of clearing and replanting. Where invasive species are cleared and replaced with native species, riparian functions may be improved. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide pre-construction functions such as shade and LWD recruitment.

In addition to impacts on riparian vegetation, temporary impacts on stream habitats would occur if streams were diverted or placed in temporary pipes. Also, ground-disturbing work and equipment use in or near surface-flowing waters would present the risk of delivering sediment or contaminants (e.g., fuel, hydraulic fluids) to streams, temporarily degrading water quality. As discussed in Section 2.4.4, Analysis Assumptions, the estimated extent of areas that would be temporarily affected by project construction is based on mapping provided by the project design team.

The following sections outline the range of potential temporary construction impacts that could occur for each alternative. Actual impacts would depend on the selected alternative's final configuration and design, construction footprint and methods, BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices), and performance of post-construction restoration. Direct construction impacts would be identified and quantified during the final design and permitting of the Preferred Alternative. Although detailed construction limits have not yet been defined at this phase in the project design, potential project construction limits have been estimated (see Section 2.4.4, Analysis Assumptions). These impact areas are summarized in Table G3.4-2 and would be in addition to the long-term direct impacts.

4.1.3.1 Preferred Alternative

Most impacts to aquatic resources associated with the Preferred Alternative, including lead, test, and mainline tracks, would be long-term and are discussed in Section 4.1.2, Long-Term Impacts. Approximately 500 linear feet of East Fork Hylebos Tributary would fall within the temporary impact footprint (250 linear feet in the facility site and 250 feet along the mainline tracks; see Table G3.4-2). Impacts would include temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above. Site construction would temporarily affect approximately 1.4 acre of stream buffer habitat along East Fork Hylebos Tributary, and mainline track construction would affect approximately 2.2 acres.

Similar to permanent impacts, direct temporary impacts on West Fork Hylebos Tributary are difficult to quantify because the stream lacks a defined bed and bank in most of the study area. As with the analysis of permanent impacts, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. No parts of the line representing West Fork Hylebos Tributary south of S 336th Street fall within the temporary impact footprint of the Preferred Alternative. North of S 336th Street, approximately 50 linear feet of the mapped stream channel fall within the temporary impact footprint. Project construction is anticipated to have temporary impacts on the stream, such as temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above. During construction of frontage improvements along S 336th Street and installation of a replacement structure where the stream is crossed by the road, a small segment of the stream would likely be placed in a temporary bypass while construction is underway.

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Tributary. As with the analysis of permanent impacts, temporary impacts on the stream buffer in that area are identified for this analysis as the extent of temporary impacts on Wetland WFW-02 (approximately 2.7 acres). An additional 0.2 acre of this stream's buffer north of S 336th Street (i.e., outside of Wetland WFW-02) also fall within the temporary impact footprint.

The temporary impact footprint of the 55 mph Design Option at the northern end of the mainline tracks would overlap approximately 100 linear feet more of East Fork Hylebos Tributary than would the 40 mph Alignment (Table G3.4-2).

Table G3.4-2 Potential Temporary (Construction-Related) Impacts on Aquatic Resources

Alternative	Design Option	Project Element	Stream[1]	Stream Impact (linear feet)[2]	Total Stream Impact per Alternative	Stream Buffer Impact (acres)[3]	Total Stream Buffer Impact per Alternative (acres)
Preferred	40 mph Alignment	Site	East Fork Hylebos Tributary	250	550	1.4	3.8
			West Fork Hylebos Tributary[4]	50		2.9	
		Mainline[5]	East Fork Hylebos Tributary	250		2.2	
	55 mph Design Option	Site	East Fork Hylebos Tributary	250	650	1.4	7.2
			West Fork Hylebos Tributary[4]	50		2.9	
		Mainline[5]	East Fork Hylebos Tributary	350		2.9	
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	50	900	0.1	4.4
		Mainline[5]		850		4.3	
	55 mph Design Option and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	50	1,050	0.1	4.7
		Mainline[5]		1,000		4.6	
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	Site	East Fork Hylebos Tributary	50	1,050	0.1	5.1
		Mainline[5]		1,000		5.0	
	40 mph Alignment and I-5 Tail Track Alignment	Site	East Fork Hylebos Tributary	50	900	0.1	3.9
		Mainline[5]		850		3.8	
Midway Landfill	N/A	N/A	N/A	0	0	0	0

Notes:

(1) Both affected streams are Type F, per WAC 222-16-030.

(2) Includes the total length of surface-flowing stream within the construction-related impact footprint defined for this analysis.

(3) Values presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. Direct impacts on the stream are considered permanent and are discussed above. Temporary impacts on the stream buffer are calculated as on the affected area of Wetland WFW-02, plus the area of temporary impacts on the stream's buffer north of S 336th Street. See text for further discussion.

(5) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

4.1.3.2 South 344th Street Alternative

Mainline construction for the South 344th Street Alternative would temporarily affect between approximately 850 and 1,000 linear feet of East Fork Hylebos Tributary, depending on the design option (Table G3.4-2). Impacts would include temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above. Site construction would temporarily affect approximately 0.1 acre of stream buffer habitat along East Fork Hylebos Tributary, and mainline track construction would affect approximately 3.8 to 5.0 acres, depending on the design option. This alternative would have no temporary impacts on West Fork Hylebos Tributary.

As with the Preferred Alternative, the 40 mph Alignment at the northern end of the mainline tracks would have a smaller construction-related impact on the northern end of East Fork Hylebos Tributary, compared to the 55 mph Design Option (Table G3.4-2). The direct temporary impacts of the tail track design options on streams would be identical. The Enchanted Parkway alignment would affect approximately 0.4 acre more stream/wetland buffer along East Fork Hylebos Tributary than would the I-5 alignment (Table G3.4-2).

4.1.3.3 Midway Landfill Alternative

The Midway Landfill Alternative would have no construction-related impacts on aquatic resources.

4.2 Vegetation, Wildlife, and Wildlife Habitat

Construction and operation of OMF South could adversely affect vegetation and terrestrial wildlife. Analyses in this subsection address the potential long-term and construction-related impacts of each alternative on vegetation, wildlife, and wildlife habitat. All the project alternatives are near existing highways and commercial, institutional, or industrial areas and have relatively disturbed habitats compared to less-developed sites in rural areas. Despite the overall matrix of sparse ecosystem resources in the study area, remnant patches of natural vegetation may provide travel corridors or islands of habitat, allowing some wildlife populations to persist in the urban landscape. Actual impacts would depend on final alternative selection and design, construction footprint and methods, BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices), and performance of post-construction restoration, including revegetation of disturbed areas and mitigation measures for areas protected under local critical areas ordinances.

As discussed in Section 3.2.3, Species and Habitats of Concern, no ESA-listed or state-listed plant or wildlife species are known or expected to be present in the study area. Similarly, WDFW (2022) does not identify any documented occurrences of state priority species in the study area. Forested areas, however, may provide suitable habitat for some priority species. Reductions in the amount of the forested cover type could have adverse effects on those species.

The only priority habitats known or expected to be present in the study area are mature forests, wetlands, and riparian areas. Potential impacts on mature forests are discussed in the following subsections. Potential impacts on wetlands are analyzed in Section 4.3, Wetlands. Potential impacts on riparian areas are analyzed in Section 4.1, Aquatic Species and Habitat.

4.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to vegetation, wildlife, and wildlife habitat from construction or operation of OMF South would not occur. However, for the purposes of this technical report, the No-Build Alternative assumes that by the design year 2042, all planned Sound Transit 3 projects, including FWLE and TDLE, are built along with the other public and private projects planned within the study area. TDLE overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Section 4.5, Cumulative Impacts.

4.2.2 Long-Term Impacts

Potential direct long-term impacts would occur where project construction converts vegetation or other wildlife habitat features to project facilities (including lead, test, and mainline tracks). Noise, light, and human activity associated with the operation of OMF South may also have long-term impacts on wildlife. These potential effects are described in greater detail below. Impacts associated with each alternative are discussed in the subsections that follow.

Vegetation Removal and Habitat Alteration

Any of the project alternatives would affect vegetation and wildlife, including species of concern, through the loss or degradation of habitat. Existing vegetation in the project footprint would be removed and replaced with tracks, buildings, parking lots, and other impervious surfaces. Table G3.4-3 presents a comparison of the project alternatives’ potential impacts on vegetation in the study area, based on the amount of each land cover type in the permanent impact footprint. The geographic distribution and configuration of impact areas are depicted in Figures G3.4-7 through G3.4-12.

As discussed in Section 2.4.4, Analysis Assumptions, The impact values and areas in the table and figures represent conservative estimates of the impacts of the alternatives. Not all areas within the project footprint would be converted to structures or hard surfaces. Actual anticipated impacts would be determined when an alternative is selected to be built and the project design is sufficiently advanced to undergo permitting review.

The impacts of project operation on vegetation and wildlife habitat would vary, depending on the affected land cover type. In much of the study area (e.g., in areas classified as the Commercial or Residential land cover types), the replacement of existing impervious surfaces and structures would constitute a minimal change in ecological functions such as the capacity to support wildlife.

The severity of impacts would be greater where cover types dominated by native or structurally complex vegetation (i.e., the mature native forest, other native forest, or wetland/stream cover types) are affected. Removing trees, snags, and understory vegetation would eliminate nesting and foraging sites for birds, roosting sites for bats, and hiding cover for small mammals. Alternatives that affect a greater area of such habitat types would have a higher likelihood of adverse effects on vegetation and wildlife.

The severity of impacts would also depend on the type of structure. Construction of the OMF site and at-grade segments of mainline tracks would mean the permanent removal of nearly all vegetation within the permanent impact footprint (although some vegetation would be allowed to grow in landscaped portions of the OMF site). In contrast, establishment and growth of vegetation would be possible underneath elevated structures that are high enough above the ground (generally 15 to 20 feet). Trees and other tall vegetation would not be allowed to grow near track segments, and vegetation that does grow underneath elevated structures would be limited by the reduced availability of sunlight and rainfall.

Table G3.4-3 Potential Long-Term Impacts on Vegetation

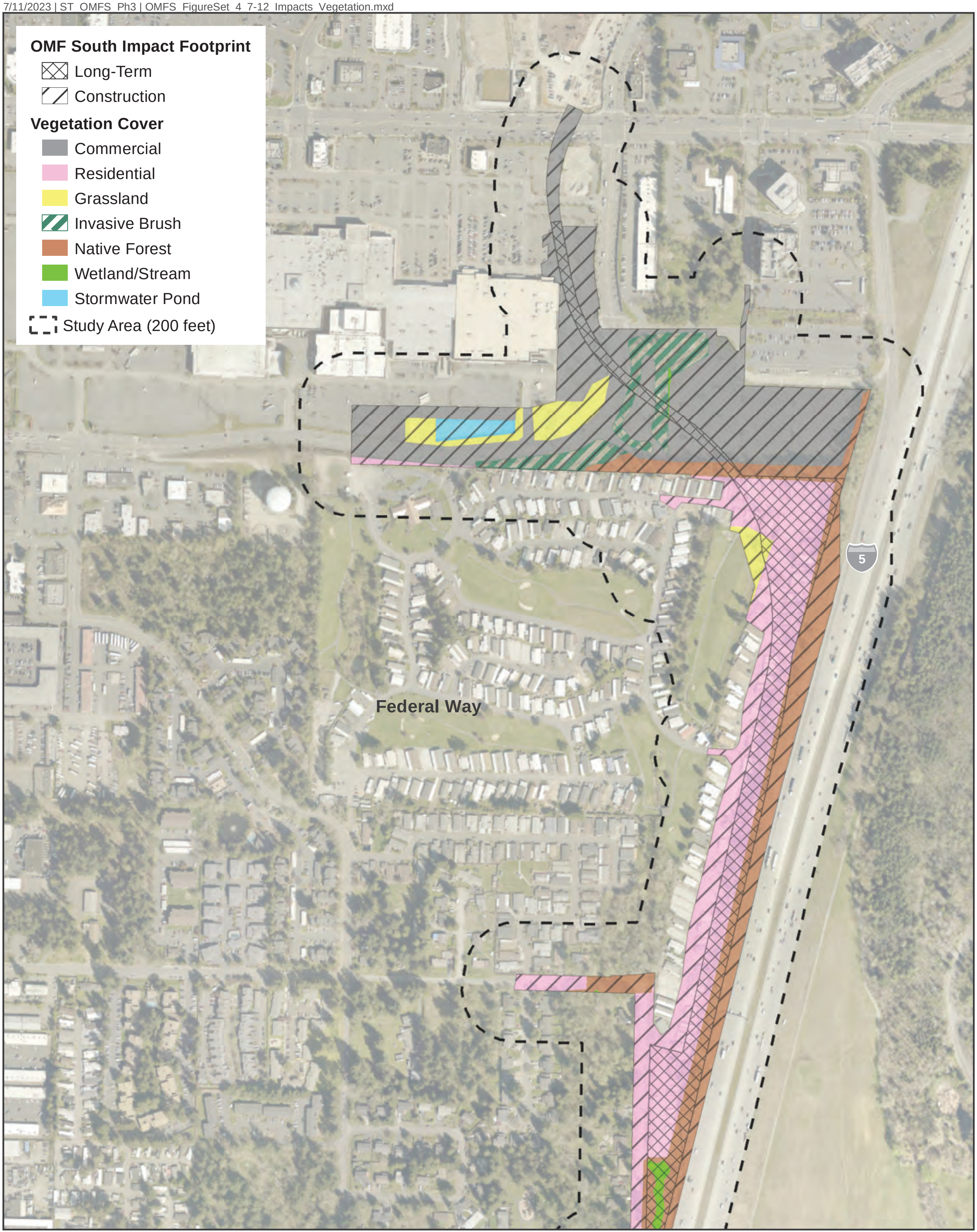
Alternative	Design Option	Land Cover Type									
		Commercial	**Residential**	**Grassland**	**Invasive Brush**	**Non native Forest**	**Mature Native Forest**	**Other Native Forest**	**Wetland/Stream**	**Stormwater Pond**	**Total(1)**
OMF Site Impacts (acres)											
Preferred	N/A	34	4	4	3	1	11	4	5	1	**68**
South 344th Street	N/A	38	7	4	5	<0.5	6	6	2	2	**70**
Midway Landfill	N/A	9	1	57	1	1	0	4	0	5	**78**
Mainline Impacts (acres)[e]											
Preferred	40 mph Alignment	2	7	<0.5	1	0	3	3	2	<0.5	**18**
	55 mph Design Option	1	8	<0.5	1	0	3	3	2	<0.5	**20**
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	2	7	<0.5	2	0	4	6	2	1	**24**
	55 mph Design Option and I-5 Tail Track Alignment	2	8	1	2	0	4	7	2	1	**26**
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	2	8	<0.5	2	0	4	6	2	1	**25**
	40 mph Alignment and I-5 Tail Track Alignment	2	7	<0.5	2	0	4	7	2	1	**24**
Midway Landfill[3]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

Notes:

(1) The total values for some rows do not equal the sum of the values in the row due to rounding errors.

(2) If neither the Preferred nor South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

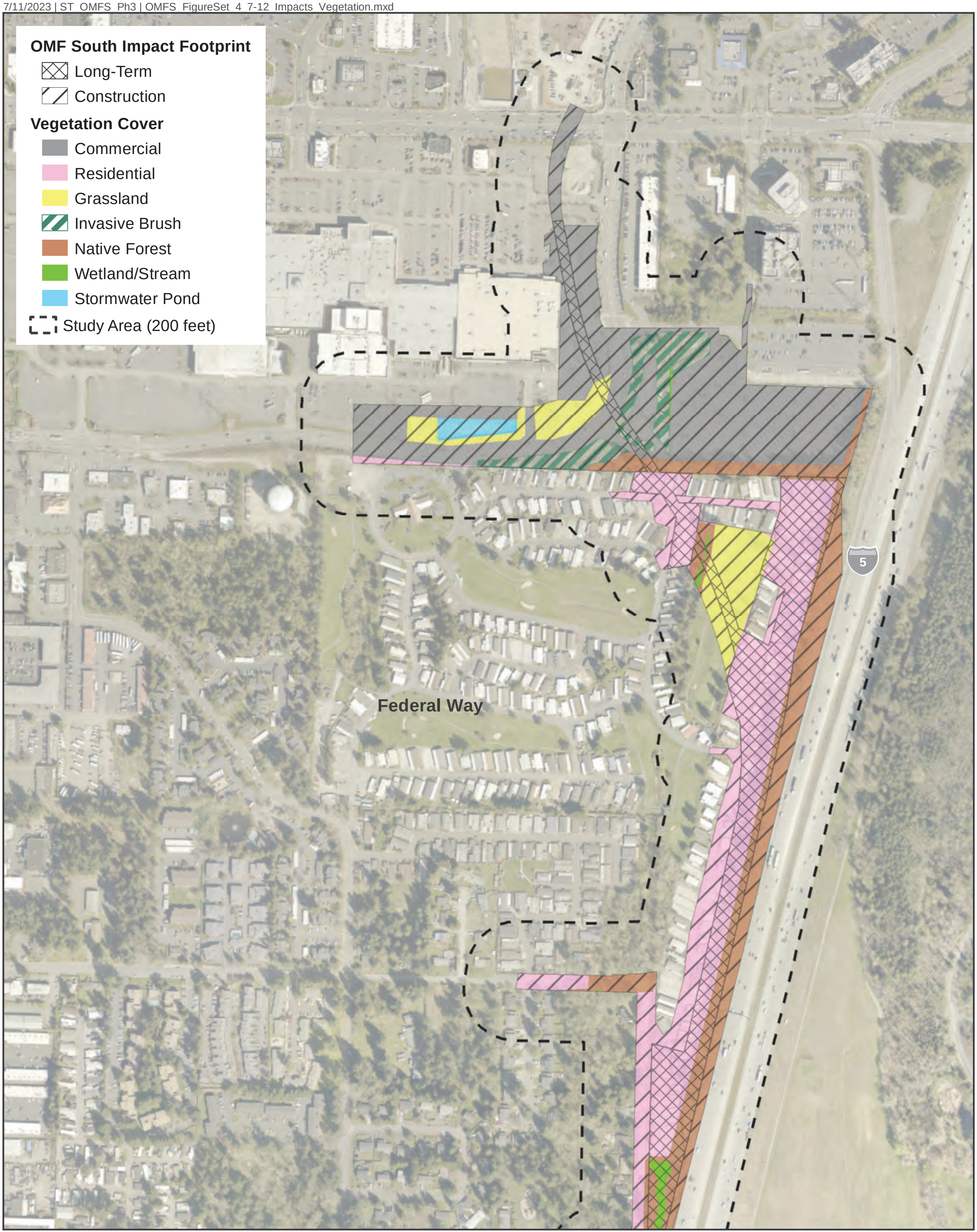
(3) The Midway Landfill Alternative would not include any mainline or test track construction.


OMF South Impact Footprint
Long-Term
Construction
Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
Federal Way
5

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

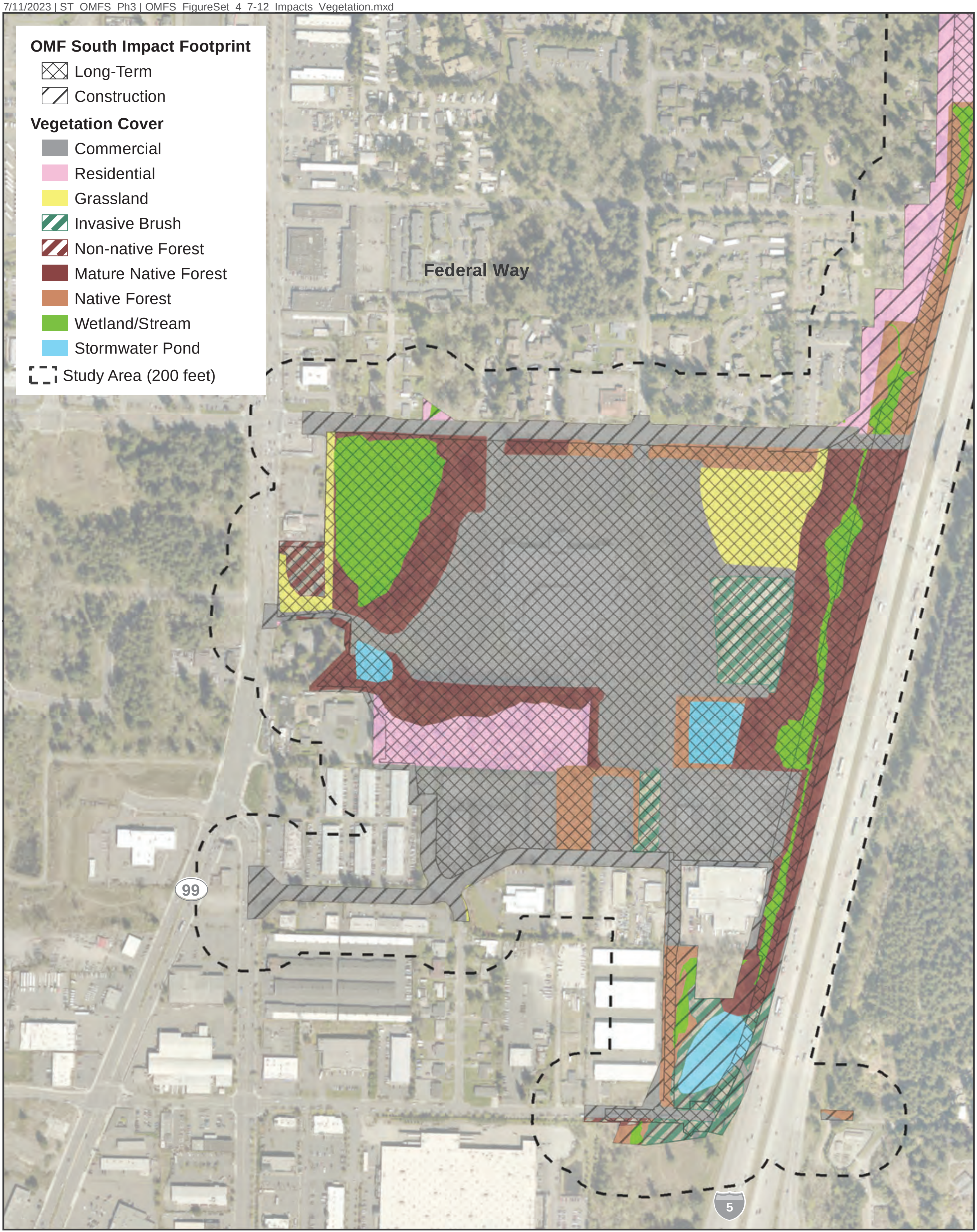
N
0
500
1,000 Feet

FIGURE G3.4-7
Impacts to Vegetation Cover
Mainline Track
40 mph Alignment
OMF South


OMF South Impact Footprint
☒ Long-Term
▨ Construction
Vegetation Cover
■ Commercial
■ Residential
■ Grassland
▨ Invasive Brush
■ Native Forest
■ Wetland/Stream
■ Stormwater Pond
⬚ Study Area (200 feet)
Federal Way
5
N
0
500
1,000 Feet

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

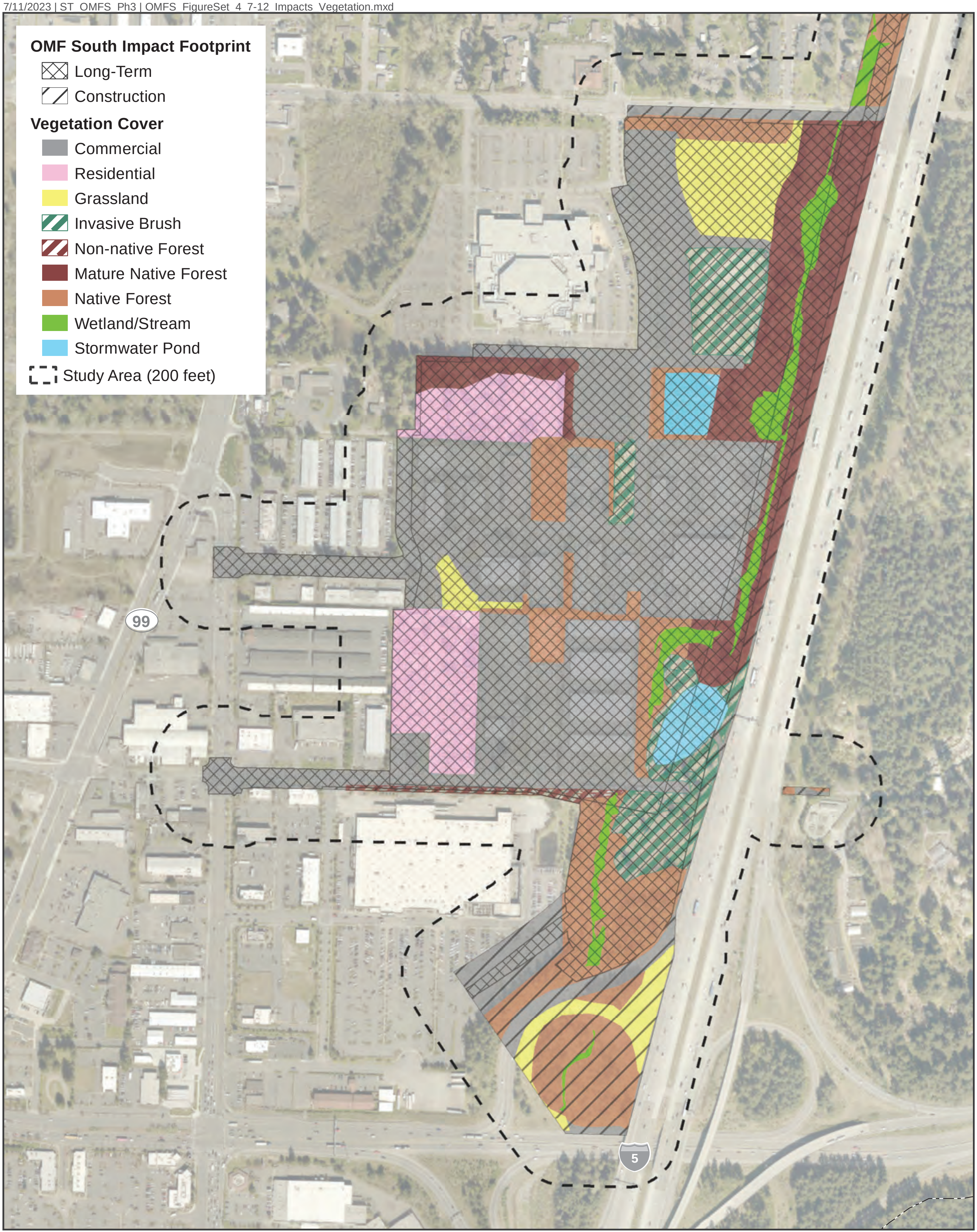
FIGURE G3.4-8
Impacts to Vegetation Cover
Mainline Track
55 mph Design Option
OMF South


OMF South Impact Footprint
☒ Long-Term
▨ Construction
Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Non-native Forest
Mature Native Forest
Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
Federal Way
99
5
N
0
500
1,000 Feet

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

FIGURE G3.4-9
Impacts to Vegetation Cover
Preferred Alternative

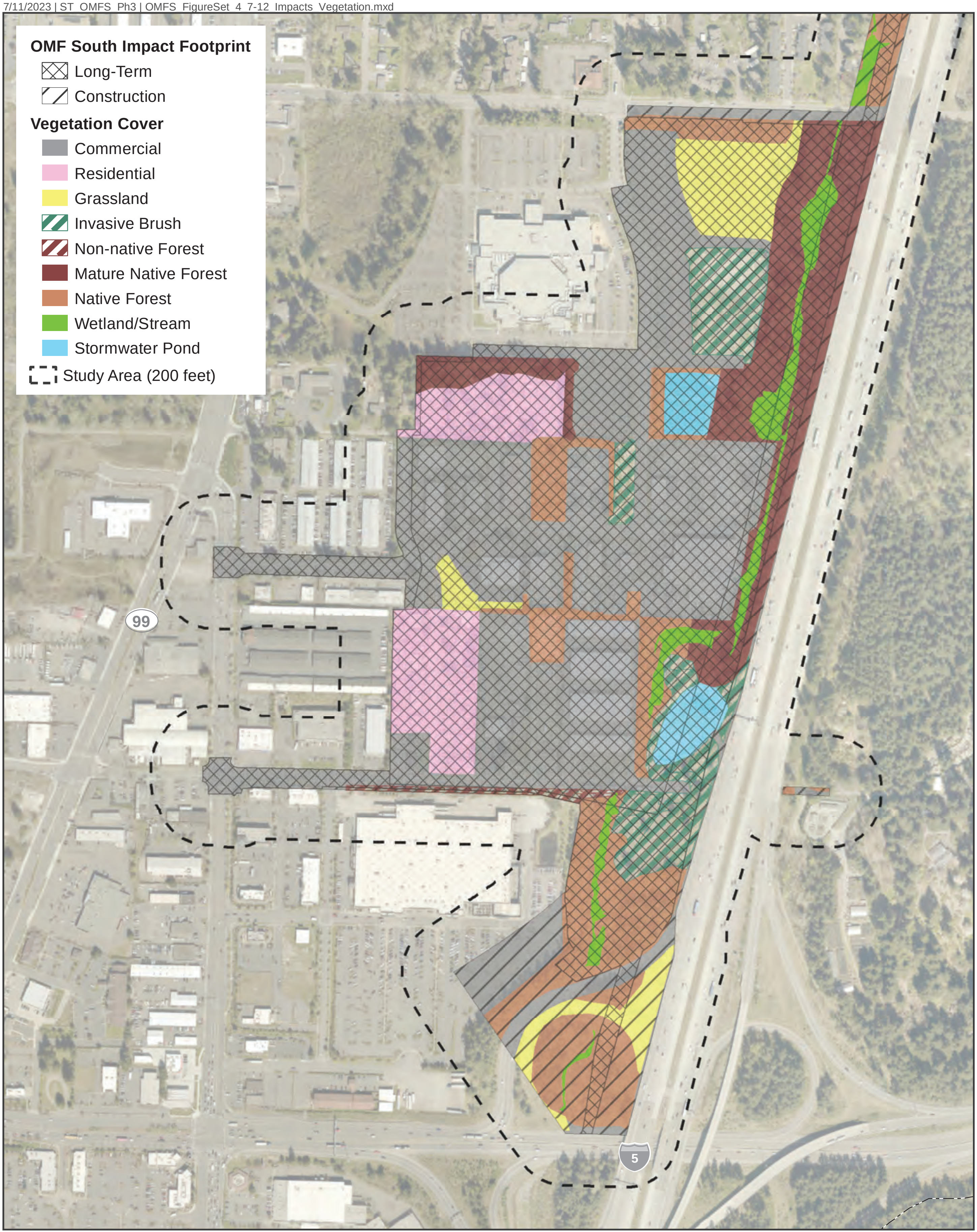
7/11/2023 | ST_OMFS_Ph3 | OMFS_FigureSet_4_7-12_Impacts_Vegetation.mxd


OMF South Impact Footprint
▨ Long-Term
▨ Construction
Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Non-native Forest
Mature Native Forest
Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
99
5

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G3.4-10
Impacts to Vegetation Cover
South 344th Street Alternative
Enchanted Parkway Alignment
OMF South

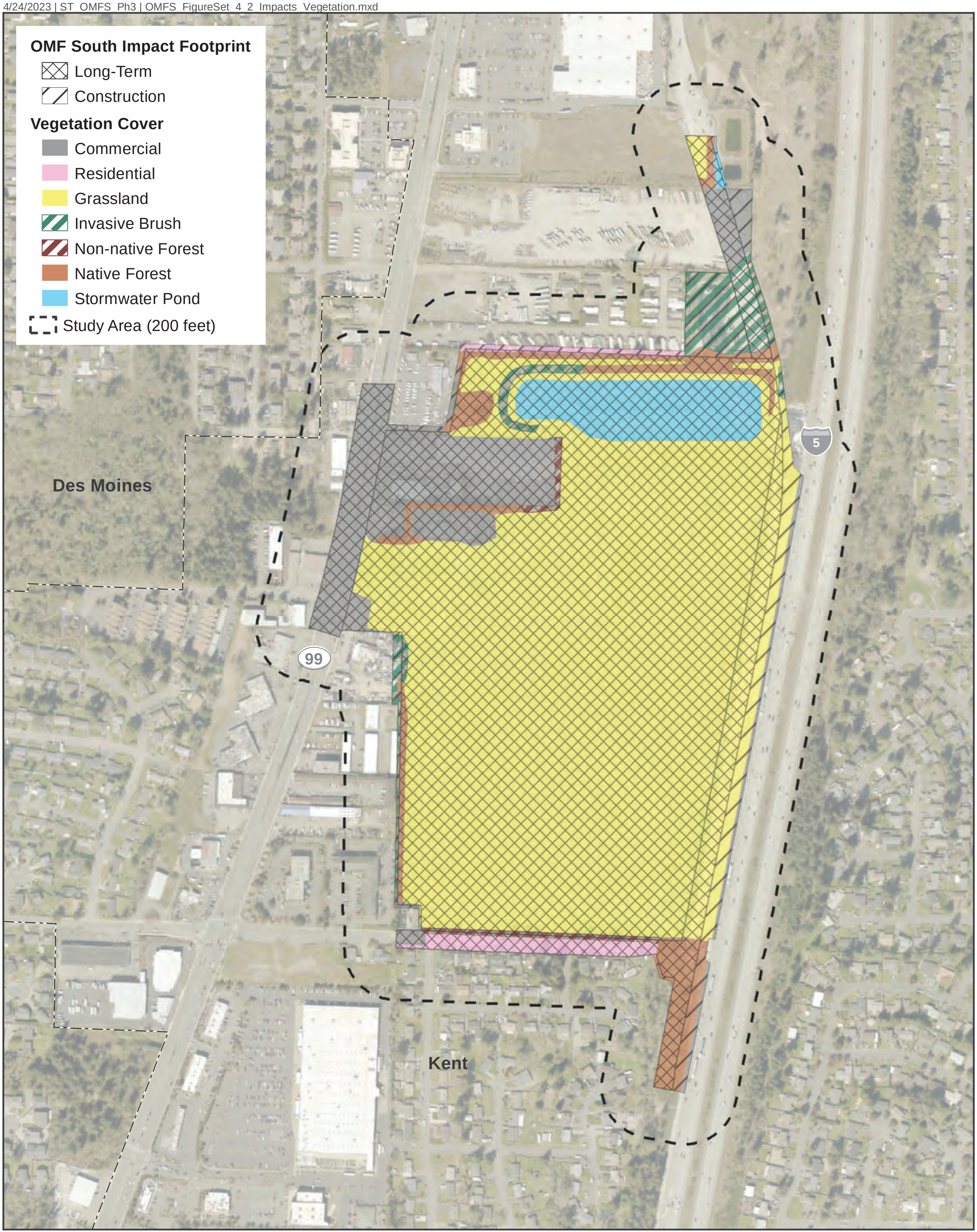

OMF South Impact Footprint
Long-Term
Construction
Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Non-native Forest
Mature Native Forest
Native Forest
Wetland/Stream
Stormwater Pond
Study Area (200 feet)
99
5

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G3.4-11
Impacts to Vegetation Cover
South 344th Street Alternative
I-5 Alignment
OMF South


OMF South Impact Footprint
Long-Term
Construction
Vegetation Cover
Commercial
Residential
Grassland
Invasive Brush
Non-native Forest
Native Forest
Stormwater Pond
Study Area (200 feet)
Des Moines
99
5
Kent

Data Sources: Valtus (2017); WDFW; King County; Cities of Des Moines,Federal Way, Kent (2019).

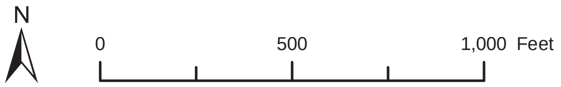

N
0
500
1,000 Feet

FIGURE G3.4-12
Impacts to Vegetation Cover
Midway Landfill Alternative

Noise, Light, and Human Disturbance

Operation of OMF South would entail moderate to high levels of human activity and associated noise and light. Notably, all three project alternatives are adjacent to I-5 and are in developed areas with relatively high levels of human activity. In addition to the noise, light, and vehicle traffic on the highway, regular human activity associated with residential, commercial, institutional, and industrial development is a common feature of the landscape throughout the study area. Wildlife that use habitats in or near the project alternatives are regularly exposed to human activity, noise, and light.

The extent of project-related impacts is based on changes in activity levels. The intensity of each alternative’s effects would depend on existing activity patterns and lighting regimes at the site under consideration; these differences are described in the discussions of individual alternatives, below. The potential for adverse effects would be greatest where facilities are constructed near important habitat areas, including forests, wetlands, and riparian areas.

Noise and human activity have been demonstrated to displace wildlife from occupied habitats and to disrupt normal behaviors (e.g., territorial singing of songbirds, mating and alarm calls of amphibians and small mammals, and foraging activities of raptors). Artificial night lighting can adversely affect wildlife by disrupting foraging behavior, circadian rhythms, and dispersal movements (including migration). Potential adverse effects associated with artificial lighting would be minimized through compliance with applicable local lighting standards and BMPs, such as screening and directing lights away from the night sky and nearby residential and natural areas.

If activity or noise levels at the maintenance facility noticeably exceed current conditions, affected animals may be displaced from otherwise suitable habitat, potentially leading to competition with animals that occupy suitable habitat at other sites with less disturbance. Such competition may produce increased stress and decreased reproductive success for affected individuals. Adverse behavioral responses to increased night lighting may have similar consequences. Animals displaced from areas of suitable habitat may be exposed to an elevated risk of predation or vehicle collisions while they are seeking new areas of suitable habitat. Based on the limited amount of area that would be affected under any of the alternatives, such effects would not be expected to measurably reduce the regional populations of any wildlife species. None of the project alternatives is within 0.25 mile of a known breeding area or other sensitive site for any wildlife species of concern.

4.2.2.1 Preferred Alternative

The extent of this alternative’s effects on the mature native forest, other native forest, and wetland/ stream cover types would be greater than the Midway Landfill Alternative and approximately equal to the South 344th Street Alternative. Under this alternative (with either design option), construction and operation of the facility, including lead, test, and mainline tracks, would result in permanent impacts on approximately 14 acres of mature native forest, 7 acres of other native forest, and 7 acres of the wetland/stream cover type (Table G3.4-3). Most impacts (11 of 14 acres) on the mature native forest cover type would be associated with the facility site rather than the mainline tracks. Approximately 5 acres of mature native forest habitat surrounding Wetland WFW-02 would fall within the permanent impact area of the facility, as would approximately 6 acres along the eastern edge of the facility. Approximately 3 acres of mature native forest habitat east of the facility would fall within the permanent impact area of the mainline tracks. The mainline tracks in this area would be on an elevated guideway, generally 20 to 30 feet above ground level. The lowest clearance would be about 14 feet above ground level, at a location approximately 350 feet south of S 336th Street.

Compared to the South 344th Street Alternative, the Preferred Alternative would affect less of the forested wetland and riparian habitats associated with East Fork Hylebos Tributary. The impacts of 55 mph Design Option at the northern end of the mainline tracks would be essentially identical to those of the 40 mph Alignment (see Table G3.4-3).

Based on the prevalence of the Commercial and Residential cover types in the surrounding study area (see Table G3.3-7), OMF South operations at the Preferred Alternative site would probably result in a less noticeable increase in human activity and associated noise and light, compared to the Midway Landfill Alternative. By affecting more areas of complex and native cover types, however, this alternative would likely degrade or eliminate more areas that currently provide resting and hiding cover for wildlife. As such, the potential for long-term behavioral disruption or displacement from suitable habitats may be greater under this alternative than under the Midway Landfill Alternative.

4.2.2.2 South 344th Street Alternative

The extent of the South 344th Street Alternative's effects on native and complex habitats would be similar to but lower than that of the Preferred Alternative. Differences between these two alternatives arise primarily from the exclusion of Wetland WFW-02 and surrounding forested areas from the impact area of the South 344th Street Alternative. Compared to the Preferred Alternative, this alternative would affect fewer acres of the mature native forest (10 acres, compared to 14) and wetland/stream (3 acres, compared to 7) cover types. This alternative would affect 5 to 6 more acres of other native forest than the Preferred Alternative, depending on the tail track design option. Similar to the Preferred Alternative, most of the impacts on mature native forest would be associated with the facility site, not the mainline tracks (Table G3.4-3).

The impacts of the 55 mph Design Option for the curve at the northern end of the mainline tracks would be essentially identical to those of the 40 mph Alignment (see Table G3.4-3). At the southern end of the facility, the design options for the tail tracks would have essentially identical impacts on the mature native forest and wetland/stream cover types, while the I-5 alignment would have slightly more impacts on other native forest, compared to the Enchanted Parkway alignment (see Table G3.4-3).

Based on the smaller extent of impacts on complex and native cover types (and the similar degree of existing development in the study area), this alternative would likely have a lower potential to disturb wildlife over the long term, compared to the Preferred Alternative.

4.2.2.3 Midway Landfill Alternative

Compared to the other project alternatives, the Midway Landfill Alternative would have minimal effects on native or complex habitats (i.e., the mature native forest, other native forest, and wetland/stream cover types). Most of the permanently affected area consists of the grassland cover type. Only 4 acres of other native forest would be affected, and no mature native forest or wetland/stream would be affected (Table G3.4-3), primarily because these cover types are not abundant at the Midway Landfill Alternative site (Table G3.3-6).

OMF South operations at the Midway Landfill site would result in a greater increase in human activity and associated noise and light, compared to the other build alternatives. This is because most of the site is currently fenced to limit access to the landfill. In contrast, the Preferred and South 344th Street alternative sites are surrounded by commercial and residential areas with relatively high levels of human activity under current conditions. Compared to the other two alternatives, however, the Midway Landfill Alternative would have a lower potential for adverse effects on wildlife, because it would affect fewer acres of structurally complex habitat types.

4.2.3 Construction Impacts

Construction-related impacts include temporary loss or degradation of terrestrial habitats, as well as disturbance due to construction-related noise, light, and human activity. Clearing for project construction would also increase the risk of contributing to the spread of noxious or invasive weed species. As discussed in Section 2.4.4, Analysis Assumptions, the estimated extent of areas that would be temporarily affected by project construction is based on mapping provided by the project design team.

Noxious weeds and invasive plants rapidly colonize disturbed sites, such as construction areas, preventing native species from becoming reestablished following ground disturbance. Noxious weeds and invasive plants also spread into undisturbed areas and provide poor habitat or forage for wildlife. Several of the BMPs that would be implemented during project construction are intended to avoid, reduce, and control new infestations of noxious weeds (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices). These BMPs would likely reduce but may not eliminate the potential for noxious weeds and invasive plants to colonize sites disturbed by construction. The risk of colonization would be proportional to the amount of area temporarily disturbed by construction: an alternative with a greater extent of ground disturbance would pose a higher risk of contributing to the establishment or spread of noxious weeds and invasive plants.

In disturbed areas, any of the project alternatives would provide the opportunity to, at least temporarily, reduce invasive species, such as Himalayan blackberry, through vegetation removal. In some areas, noxious weeds may be eradicated because cover types dominated by invasive species (e.g., Commercial, Invasive Brush) would be converted to maintenance facilities, landscaping, and other areas where invasive species would not be able to grow. In areas where invasive species are replaced with native species, construction-related impacts may result in improved habitat function.

The duration of temporary impacts would vary depending on the type of vegetation that is affected. Impacts on grasses and areas dominated by fast-growing invasive species would generally be short-lived, with functions typically returning to pre-impact levels within one growing season. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs require several years or decades to achieve the size and stature necessary to provide pre-impact functions, such as canopy habitat.

The following sections outline the range of potential temporary construction impacts that could occur for each alternative. These impact areas are summarized in Table G3.4-4 and would be in addition to the long-term direct impacts described in Section 4.2.2, Long-Term Impacts. Actual impacts would depend on the final configuration and design of the Preferred Alternative, construction footprint and methods, BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices), and performance of post-construction restoration. Direct construction impacts would be identified and quantified during the final design and permitting of the Preferred Alternative.

Table G3.4-4 Potential Temporary (Construction-Related) Impacts on Vegetation

Alternative	Design Option	Land Cover Type									
		Commercial	Residential	Grassland	Invasive Brush	Non native Forest	Mature Native Forest	Other Native Forest	Wetland/Stream	Stormwater Pond	Total[1]
OMF Site Impacts (acres)											
Preferred	N/A	8	2	<0.5	1	<0.5	<0.5	1	<0.5	1	**13**
South 344th Street	N/A	1	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	0	**1**
Midway Landfill	N/A	1	<0.5	2	2	0	0	1	0	<0.5	**7**
Mainline Impacts (acres)[2]											
Preferred	40 mph Alignment	13	6	2	3	0	2	6	<0.5	1	**33**
	50 mph Design Option	13	6	3	3	0	2	6	<0.5	1	**34**
South 344th Street	40 mph Alignment and Enchanted Parkway Tail Track Alignment	16	6	3	3	0	2	11	<0.5	1	**42**
	55 mph Design Option and I-5 Tail Track Alignment	17	6	5	3	0	2	10	<0.5	1	**42**
	55 mph Design Option and Enchanted Parkway Tail Track Alignment	16	6	5	3	0	2	11	<0.5	1	**43**
	40 mph Alignment and I-5 Tail Track Alignment	16	6	3	3	0	2	10	<0.5	1	**41**
Midway Landfill[3]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

Notes:

(1) The total values for some rows do not equal the sum of the values in the row due to rounding errors.

(2) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(3) The Midway Landfill Alternative would not include any mainline or test track construction.

4.2.3.1 Preferred Alternative

The temporary impact footprint for this alternative includes a large amount of clearing at the northern end of the mainline tracks to accommodate staging, stockpiling, and other construction activities (Figure G3.4-7 and G3.4-8). Most of the affected area would consist of the commercial or residential cover types (Table G3.4-4).

The extent of temporary, construction-related impacts on the other native forest cover type would be less than that of the South 344th Street Alternative and greater than the Midway Landfill Alternative (Table G3.4-4). Nearly all temporary impacts on vegetation would be associated with construction of the mainline tracks, not the facility site. The associated potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction would thus be slightly lower than that of the South 344th Street Alternative. The temporary impacts of the Preferred Alternative and the South 344th Street Alternative on the mature native forest and wetland/stream cover types would be essentially identical. However, it may take several years for the forested vegetation communities and several decades for the mature forested communities to return to their preconstruction habitat function.

Based on the total extent of temporary, construction-related impacts, the risk of contributing to the establishment and spread of noxious weeds and invasive plants under this alternative would be slightly greater than that of the South 344th Street Alternative and substantially greater than that of the Midway Landfill Alternative.

The 40 mph Alignment would have a slightly larger area of temporary impacts, compared to the 55 mph Design Option. This difference reflects areas at the northern end of the connecting track segment that would be affected permanently under the 55 mph Design Option but only temporarily under the TDLE 40 mph Alignment. As such, the 40 mph Alignment would have a slightly higher potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction, as well as a slightly higher risk of contributing to the establishment and spread of noxious weeds and invasive plants.

4.2.3.2 South 344th Street Alternative

Similar to the Preferred Alternative, the temporary impact footprint for this alternative includes a large amount of clearing at the northern end of the mainline tracks to accommodate staging, stockpiling, and other construction activities. In addition, the temporary impact footprint for this alternative extends farther south than that of the Preferred Alternative, affecting areas around the I-5/SR 18 interchange (see Figure G3.4-10 and Figure G3.4-11). As a result, the total extent of temporary, construction-related impacts under the South 344th Street Alternative would be greater than either of the other build alternatives. As with the Preferred Alternative, most of the affected area would consist of the commercial or residential cover types (Table G3.4-4).

The extent of temporary, construction-related impacts on the other native forest cover type would be greater than that of the Preferred Alternative (Table G3.4-4), resulting in a greater temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction. The temporary impacts of the South 344th Street Alternative and the Preferred Alternative on the mature native forest and wetland/stream cover types would be essentially equivalent.

The total extent of temporary, construction-related impacts – and the associated risk of contributing to the establishment and spread of noxious weeds and invasive plants – would be slightly less than that of the Preferred Alternative (Table G3.4-4).

The differences between the 40 mph Alignment and the 55 mph Design Option would be as described for the Preferred Alternative. At the southern end of the facility, the design options for the tail tracks would have essentially identical temporary impacts on the mature native forest and wetland/stream cover types, while the Enchanted Parkway alignment would have slightly more impacts on other native forest, compared to the I-5 alignment (see Table G3.4-4).

4.2.3.3 Midway Landfill Alternative

The extent of temporary, construction-related impacts would be substantially smaller under the Midway Landfill Alternative than under the other build alternatives (Table G3.4-4). Also, much less of the other native forest cover type (and no mature native forest or wetland/stream) is within the temporary impact area of this alternative, compared to the other two project alternatives. As such, this alternative would have the lowest potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction. Based on the small size of the temporary disturbance area, this alternative would have the lowest risk of contributing to the establishment and spread of noxious weeds and invasive plants.

4.3 Wetlands

Analyses in this subsection address the potential long-term and temporary (i.e., construction-related) impacts of each alternative on wetlands and wetland buffers. Actual impacts would depend on the location and final design of the project the Sound Transit Board of Directors selects to build, the construction footprint and methods, the BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices), and the performance of post-construction restoration.

To the extent that impacts cannot be avoided or minimized during the design process or reduced through BMPs, Sound Transit would implement additional measures to address adverse effects and provide compensatory mitigation measures where adverse effects are unavoidable. Sound Transit has committed to achieving no net loss of ecosystem function on a project-wide basis (Sound Transit 2007). As discussed in Section 5.3, Compensatory Mitigation, compensatory mitigation would be implemented in accordance with applicable federal, state, and local requirements and guidelines.

4.3.1 No-Build Alternative

Under the No-Build Alternative, impacts to wetlands from construction or operation of OMF South would not occur. However, for the purposes of this technical report, the No-Build Alternative assumes that by the design year 2042, all planned Sound Transit 3 projects, including FWLE and TDLE, are built along with the other public and private projects planned within the study area. TDLE overlaps with the OMF South Preferred and South 344th Street alternatives. If TDLE is constructed as proposed, the mainline track associated with these OMF alternatives would be built later in time. Impacts associated with construction of the mainline track are addressed within the build alternatives impacts discussion below. All other TDLE-related impacts are addressed in Section 4.5, Cumulative Impacts.

Construction of FWLE will temporarily affect the buffer of Wetland WL 148.67L in the Midway Landfill Alternative study area. Neither this wetland nor its buffer would be affected by any of the OMF South build alternatives.

4.3.2 Long-Term Impacts

Under any of the project alternatives, direct long-term impacts on wetland resources would occur where permanent features such as project facilities (including lead, test, and mainline tracks) overlap wetlands or wetland buffers.

Filling, excavating, or clearing within wetlands or wetland buffers would diminish wetland functions through the loss of area, changes to surface or subsurface water flows, or long-term changes to vegetation. Project actions that may entail such impacts include construction of buildings, roadways, mainline or lead tracks (including support columns), train storage areas, retaining walls, parking areas, and stormwater facilities.

Not all wetlands underneath elevated structures (e.g., lead, test, and mainline tracks) would be permanently filled. However, trees and other tall vegetation would not be allowed to grow near track segments. This would result in the permanent conversion from trees and tall shrubs to short-statured shrubs and herbaceous vegetation. In addition, the long-term presence of structures above vegetation would reduce the amount of sunlight and precipitation the plants receive, potentially making these areas more sparsely vegetated. Also, the interception of precipitation by overhead structures could have the potential for long-term impacts on wetland hydrology. For any given wetland, the severity of those impacts would depend on the proportion of the wetland that is affected, as well as the extent to which precipitation contributes to wetland hydrology at that site.

For these reasons, comparisons of the impacts of the alternatives are based on the overlap between any project features (including elevated structures) and wetlands or wetland buffers. In some cases (for example, where the impact area of an alternative would overlap a substantial proportion of a wetland), impacts that do not encompass an entire wetland may degrade wetland functions to such an extent that the entire wetland would be considered a loss. Such determinations would be based on professional judgment. If one of the action alternatives is selected, determinations of wetland losses would be part of the process of applying for permits and determining mitigation needs. Wetland impact areas are summarized in Table G3.4-5 and are depicted in Figures G3.4-1 through G3.4-6. Wetland buffer impacts are summarized in Table G3.4-6. Impacts associated with each alternative, including tabular summaries of impacts on individual wetlands, are discussed in the subsections that follow.

As discussed in Section 2.4.4, Analysis Assumptions, the impact values and areas in the table and figures represent conservative estimates of the impacts of the alternatives. Not all areas within the project footprint would be converted to structures or hard surfaces. Actual anticipated impacts will be determined when an alternative is selected to be built and the project design is sufficiently advanced to undergo permitting review.

Table G3.4-5 Potential Long-Term Wetland Impacts (acres)

Wetland Rating[1]	Alternative		
	Preferred	South 344th Street	Midway Landfill
OMF Site Impacts			
Category II Wetlands	1.8	0	0
Category III Wetlands	0.9	1.4	0
Total Site Impacts	*2.7*	*1.4*	*0*
Mainline Impacts[2, 3]			
Category III Wetlands	1.6	1.5	N/A[4]
Category IV Wetlands	<0.1	<0.1	N/A[4]
Total Mainline Impacts	*1.6*	*1.5*	*N/A[4]*
Total Impacts			
Total Impacts	***4.3***	***3.0***	***0***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) Under either the Preferred Alternative or the South 344th Street Alternative, the impacts of the design options for the curve at the northern end of the mainline tracks would differ by 0.01 acre. Similarly, the impacts to wetlands of the tail track design options for the South 344th Street Alternative would differ by 0.01 acre. See text for details.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built later in time if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) The Midway Landfill Alternative would not include any mainline or test track construction.

Table G3.4-6 Potential Long-Term Wetland Buffer Impacts

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1]	Affected Wetland Buffers
OMF Site Impacts			
Preferred		7.8	WFW-01, WFW-02, WFW-03, WFW-04, WFW-15
South 344th Street		6.3	WFW-01, WFW-03, WFW-04, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-18
Midway Landfill		0	N/A
Mainline Impacts[2]			
Preferred	With 40 mph Alignment	4.7	WFW-01, WFW-03, WFW-04, WFW-06, WFW-11, WFW-13, WFW-15, WFW-32
	With 55 mph Design Option	5.1	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15
South 344th Street	With 40 mph Alignment and Enchanted Parkway Tail Track Alignment	7.0	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-32
	With 55 mph Design Option and I-5 Tail Track Alignment	7.2	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17,
	With 55 mph Design Option and Enchanted Parkway Tail Track Alignment	7.2	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17
	With 40 mph Alignment and I-5 Tail Track Alignment	7.0	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-32

Notes:

(1) Impact numbers presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream buffers; therefore, this table likely overestimates the extent of buffer impact areas. Stream areas, defined by the OHWL, are excluded from wetland buffer areas.

(2) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built if TDLE is constructed as proposed. TDLE is currently under environmental review.

4.3.2.1 Preferred Alternative

The Preferred Alternative, including the mainline and test tracks, would have the greatest extent of long-term impacts on wetlands and wetland buffers among the project alternatives (Tables G3.4-5 and G3.4-6, Figures G3.4-1 through G3.4-3). Impacts on individual wetlands are shown in Table G3.4-7.

A large portion of the total wetland impact area (nearly 40 percent) would occur in Wetland WFW-02, a Category II forested wetland that is associated with West Fork Hylebos Tributary and an associated in-line stormwater facility in the northwestern portion of the proposed OMF South footprint. The extension of 18th Place S and the construction of a bike/pedestrian pathway to meet local code requirements would place fill within the wetland boundary and construct retaining walls in the eastern portion of the wetland. In addition, frontage improvements along S 336th Street could place fill in the northern portion of the wetland. These impacts would reduce wetland habitat, water quality, and hydrologic functions, as well as reducing wetland buffer functions. To minimize impacts to the wetland and its buffer, the roadway would be supported by a retaining wall. As discussed in Section 5.1.1, Avoidance and Minimization During Design Development, Sound Transit is exploring options to further avoid and minimize impacts on wetlands during the design development process, to the extent feasible.

Table G3.4-7 Potential Long-Term Impacts of the Preferred Alternative on Wetlands (acres)

Wetland ID	Wetland Rating[1]	OMF Site Impacts	Mainline Impacts[2]
WFW-01	III	0.9	0.6
WFW-02	II	1.8	0
WFW-03	III	0	0.3
WFW-04	III	<0.05	0
WFW-06	IV	0	<0.05
WFW-07[3]	III	0	<0.05
WFW-11	III	0	0.3
WFW-13	IV	0	<0.05
WFW-15	III	0	0.2
WFW-32[4]	IV	0	<0.05
TOTAL		**2.7**	**1.6**

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Table G3.3-8 for information about the size and rating of individual wetlands.

(2) Impacts for the mainline design options would differ slightly (notes #3 and #4 below). See text for details.

(3) Wetland WFW-07 would only be impacted by the 55 mph Design Option.

(4) Wetland WFW-32 would only be impacted by the 40 mph Alignment.

Most of the other wetlands that would be impacted by the Preferred Alternative are riverine wetlands associated with East Fork Hylebos Tributary (Wetlands WFW-01, WFW-03, WFW-07, and WFW-15). The largest of these is Wetland WFW-01, which lies entirely within the permanent impact footprint. A small portion (less than 0.05 acre) of Wetland WFW-07 would be intersected by the 55 mph Design Option for the curve at the northern end of the mainline track; the 40 mph Alignment would avoid long-term impacts on that wetland and its buffer altogether.

Wetlands east and adjacent to the site may be affected by lead tracks. With the possible exception of support columns for the lead tracks, no permanent structures would likely be placed within any of these wetlands, or within Wetland WFW-03, which would be affected by the southern tail tracks. Project related impacts would primarily be associated with vegetation clearing and the interception of sunlight and precipitation by overhead structures.

This alternative would have long-term impacts on the buffers of all the impacted wetlands identified in Table G3.4-7 (Table G3.4-6).

4.3.2.2 South 344th Street Alternative

The extent of long-term direct impacts on wetlands under the South 344th Street Alternative, would be less (3.0 acres) than under the Preferred Alternative (4.1 acres), primarily because the facility site would not impact Wetland WFW-02 (Table G3.4-5; impacts of this alternative on individual wetlands are shown in Table G3.4-8). The overall impacts of the mainline tracks on wetlands would be similar in scale to those of the Preferred Alternative but with some differences in impacts on individual wetlands. In addition to avoiding impacts on Wetland WFW-02, the South 344th Street Alternative would affect less of Wetland WFW-15 than would the Preferred Alternative. Conversely, the long-term impact footprint of this alternative would include three wetlands (WFW-05, WFW-17, and WFW-18) that would not be impacted by the Preferred Alternative. Wetlands WFW-01 and WFW-03 may be affected by lead tracks.

Table G3.4-8 Potential Long-Term Impacts of the South 344th Street Alternative on Wetlands (acres)

Wetland ID	Wetland Rating[1]	OMF Site Impacts	Mainline Impacts[2]
WFW-01	III	0.9	0.6
WFW-03	III	0	0.3
WFW-04	III	0.5	<0.05
WFW-05	III	0	0.1
WFW-06	IV	0	<0.05
WFW-07[3]	III	0	<0.05
WFW-11	III	0	0.3
WFW-13	IV	0	<0.05
WFW-15	III	0	<0.05
WFW-17	III	0	<0.05
WFW-18	III	<0.05	0
WFW-32[4]	IV	0	<0.05
Total Impacts		**1.4**	**1.6**

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Table G3.3-8 for information about the size and rating of individual wetlands.

(2) Impacts for the mainline design options would differ slightly (notes #3 and #4 below). The tail track design options for this alternative would have identical impacts on wetlands. See text for details.

(3) Wetland WFW-07 would only be impacted by the 55 mph Design Option.

(4) Wetland WFW-32 would only be impacted by the 40 mph Alignment.

This alternative would have permanent impacts on the buffers of all the wetlands identified in Table G3.4-8 (see Table G3.4-6).

The direct long-term impacts of the design options on wetlands would be essentially identical. As under the Preferred Alternative, the 40 mph Alignment would avoid long-term impacts on Wetland WFW-07 and its buffer, and the 55 mph Design Option would affect less than 0.05 acre of that wetland. Neither of the tail track options would have any direct impacts on wetlands, and their impacts on wetland buffers would be essentially identical (see Figures G3.4-4 and G3.4-5).

4.3.2.3 Midway Landfill Alternative

The Midway Landfill Alternative would have no long-term impacts on wetlands because there are no regulated wetlands or wetland buffers within the temporary or permanent impact footprints of this alternative (see Section 3.3.1.2, Midway Landfill Alternative).

4.3.3 Construction Impacts

Potential project construction limits have been estimated at this phase in the project design (see Section 2.4.4, Analysis Assumptions). Temporarily impacted wetlands and wetland buffers are shown in Figures G3.4-1 through G3.4-5 and summarized in Tables G3.4-9 and G3.4-10. Temporary impacts would be in addition to the long-term direct impacts described in Section 4.3.2.

Table G3.4-9 Potential Temporary (Construction-Related) Impacts on Wetlands

Wetland Rating[1]	Alternative		
	Preferred	**South 344th Street**	**Midway Landfill**
OMF Site Impacts			
Category II Wetlands	2.7	0	0
Category III Wetlands	0.3	0	0
Category IV Wetlands	<0.05	0	0
Total Site Impacts	*3.0*	*0*	*0*
Mainline Impacts[2, 3]			
Category III Wetlands	<0.05	0.3	N/A
Category IV Wetlands	<0.05	<0.05	N/A
Total Mainline Impacts	*0.1*	*0.3*	*N/A*[4]
Total Impacts			
Total Impacts	***3.0 - 3.1***[2]	***0.3***	***0***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) Under either the Preferred Alternative or the South 344th Street Alternative, the impacts of the design options for the curve at the northern end of the mainline tracks would differ by less than 0.05 acre. For the Preferred Alternative, this difference causes the total impact area to round to 3.1 acres or 3.2 acres, depending on the design option. See text for details. The tail track design options for the South 344th Street Alternative would have identical impacts on wetlands.

(3) If neither the Preferred nor the South 344th Street alternative is selected, the mainline could be built if TDLE is constructed as proposed. TDLE is currently under environmental review.

(4) The Midway Landfill Alternative would not include any mainline or test track construction.

Table G3.4-10 Potential Temporary (Construction-Related) Impacts on Wetland Buffers

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1]	Affected Wetland Buffers
OMF Site Impacts			
Preferred		1.7	WFW-02, WFW-04, WFW-14, WFW-15, WFW-18, WFW-33
South 344th Street		0	N/A
Midway Landfill		0	N/A
Mainline Impacts[2]			
Preferred	With 40 mph Alignment	3.5	WFW-01, WFW-03, WFW-04, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-32
	With 55 mph Design Option	4.1	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-32
South 344th Street	With 40 mph Alignment and Enchanted Parkway Tail Track Alignment	3.9	WFW-01, WFW-03, WFW-05, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 55 mph Design Option and I-5 Tail Track Alignment	4.6	WFW-01, WFW-03, WFW-05, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 55 mph Design Option and Enchanted Parkway Tail Track Alignment	4.6	WFW-01, WFW-03, WFW-05, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32
	With 40 mph Alignment and I-5 Tail Track Alignment	4.0	WFW-01, WFW-03, WFW-05, WFW-06, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-22, WFW-32

Notes:

(1) Values presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream buffers. Stream areas, defined by the OHWL, are excluded from wetland buffer areas.

(2) If neither the Preferred nor the South 344th Street alternative is constructed, the mainline could be built if TDLE is constructed as proposed. TDLE is currently under environmental review.

Temporary, construction-related impacts on wetland resources would occur where wetlands or wetland buffers are affected by clearing and ground-disturbing work but are restored following construction. Such areas are within the project limits (including temporary construction easements) but not within the permanent footprint of the proposed facilities (including lead, test, and mainline tracks). Temporary impacts may include temporary alteration of wetland area, soils, hydrology, and/or vegetation.

Temporary impacts on wetlands may result from the use of staging areas, temporary work areas, access roads, stream relocations, cofferdams, clearing, stockpiles, erosion and sediment controls, or other temporary structures necessary to complete construction of the permanent facilities. Construction-related dewatering may temporarily alter groundwater discharge to wetlands. Wetland and wetland buffer functions could also be impacted by soil compaction, accidental spills of hazardous substances, noise and other human-caused disturbances, sedimentation, and introduction of invasive species.

The duration of temporary impacts on wetlands would vary depending on the type of vegetation that is affected. For instance, temporary impacts on emergent wetlands are generally short-lived, with functions typically returning to pre-impact performance within one growing season. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide pre-construction functions such as canopy habitat.

The following sections outline the range of potential temporary construction impacts that could occur under each alternative. Actual impacts would depend on the final configuration and design of the Preferred Alternative, construction footprint and methods, BMPs implemented during construction (see Section 5.1.1, Avoidance and Minimization During Design Development, and Section 5.1.2, Construction Best Management Practices), and performance of post-construction restoration. Direct construction impacts would be identified and quantified during the final design and permitting of the Preferred Alternative.

4.3.3.1 Preferred Alternative

Overall, temporary (construction-related) impacts on wetlands under the Preferred Alternative would be greater than under the South 344th Street Alternative, primarily because this alternative would affect Wetland WFW-02 while the South 344th Street Alternative would not (Table G3.4-7, Table G3.4-11).

Table G3.4-11 Potential Temporary (Construction-Related) Impacts of the Preferred Alternative on Wetlands

Wetland ID	Wetland Rating[1]	OMF Site Impacts	Mainline Impacts[2]
WFW-02	II	2.7	0
WFW-04	III	0.3	<0.05
WFW-07[3]	III	0	<0.05
WFW-10 Unit A	III	0	<0.05
WFW-14	IV	<0.05	0
WFW-15	III	<0.05	0.1

Table G3.4-11 Potential Temporary (Construction-Related) Impacts of the Preferred Alternative on Wetlands (continued)

Wetland ID	Wetland Rating[1]	OMF Site Impacts	Mainline Impacts[2]
WFW-32[4]	IV	0	<0.05
WFW-33	II	<0.05	0
Total Impacts		**3.0**	**0.1**

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Table G3.3-8 for information about the size and rating of individual wetlands.

(2) Impacts for the mainline design options would differ slightly (notes #3 and #4 below). See text for details.

(3) Wetland WFW-07 would only be impacted by the 55 mph Design Option.

(4) Wetland WFW-32 would be impacted by both mainline design options, but impacts would be slightly greater for the 55 mph Design Option.

Almost all direct temporary impacts to wetlands would result from site construction at Wetland WFW-02 for the 18th Place S road extension. Direct temporary wetland impacts due to mainline track construction would be minimal in comparison. The difference between the impacts of the design options for the curve at the northern end of the mainline track would be similar to those described for long-term impacts: a small portion (less than 0.05 acre) of Wetland WFW-07 would be intersected by the 55 mph Design Option; the 40 mph Alignment would avoid temporary impacts on that wetland and its buffer altogether (Tables G3.4-10 and G3.4-11).

4.3.3.2 South 344th Street Alternative

The extent of temporary, construction-related impacts on wetlands under the South 344th Street Alternative would be substantially less than under the Preferred Alternative, primarily because this alternative would not impact Wetland WFW-02, and it would not have any temporary impacts on Wetland WFW-04. However, this alternative would have more temporary impacts on wetland buffers than the Preferred Alternative would (Table G3.4-10). Site construction would have no temporary impacts on wetlands or wetland buffers; all temporary impacts would be associated with mainline track construction (Table G3.4-12).

Table G3.4-12 Potential Temporary (Construction-Related) Impacts of the South 344th Street Alternative on Wetlands

Wetland ID	Wetland Rating[1]	OMF Site Impacts	Mainline Impacts[2]
WFW-07[3]	III	0	<0.05
WFW-10 Unit A	III	0	<0.05
WFW-15	III	0	0.3
WFW-32[4]	IV	0	<0.05
Total Impacts		**0**	**0.4**

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Appendix G3, Ecosystem Resources Technical Report, for information about the size and rating of individual wetlands.

(2) Impacts for the mainline design options would differ slightly (notes #3 and #4 below). See text for details.

(3) Wetland WFW-07 would only be impacted by the 55 mph Design Option.

(4) Wetland WFW-32 would be impacted by both mainline design options, but impacts would be slightly greater for the 55 mph Design Option.

As with the Preferred Alternative, the 40 mph Alignment at its northern end also avoids the buffer of Wetland WFW-07 and would have fewer construction-related impacts than 55 mph Design Option. At its southern end, both tail track options would not temporarily impact wetlands, but buffers of Wetland WFW-05 would receive some temporary impacts (Table G3.4-10). The temporary wetland buffer impacts of the 40 mph Alignment paired with either tail track alignment, I-5 or Enchanted Parkway Tail Tracks, would differ by 0.1 acre (see Table G3.4-10 and Figures G3.4-4 and G3.4-5). The temporary wetland buffer impacts of the 55 mph Design Option paired with either tail track alignment are identical. Overall, temporary construction impacts on wetland buffers are lower under the 40 mph Alignment, regardless of tail track alignment.

4.3.3.3 Midway Landfill Alternative

The Midway Landfill Alternative would have no temporary, construction-related impacts on wetlands because there are no regulated wetlands or wetland buffers within the temporary impact footprint of this alternative.

4.4 Indirect Impacts

Indirect impacts include those effects that are related to the project but not part of it, and that may occur separated by distance or time. Other sources of indirect effects may be related to changes in the pattern of land use, population density, or water quality in the areas affected by the project. Indirect impacts may also occur through the implementation of mitigation measures for other environmental impacts, or through supporting projects that are not yet defined or considered part of the project alternatives.

For aquatic species and habitat, indirect impacts would be minimal because the surrounding areas are already heavily developed. OMF South is not expected to interfere with future projects that may provide habitat improvements, such as road projects that may improve fish passage or projects that may enhance vegetated and wetland areas in the project corridor. OMF South would be designed to ensure that it would not preclude future culvert replacement(s) by WSDOT to provide fish passage. Facilities that provide water quality treatment could minimize long-term indirect impacts on water quality in streams that provide habitat for fish sensitive to the toxic effects of contaminants in stormwater runoff. However, as discussed in the analysis of long-term impacts, treated water discharged from such facilities and untreated water that bypasses those facilities during major storm events may contain contaminants that can harm fish and other aquatic life.

Long-term indirect impacts on vegetation, wildlife, and wildlife habitat could include habitat loss or increased disturbance due to changes in land use patterns near the OMF South site. Such impacts would be unlikely under any of the project alternatives, however, because all three site alternatives are located in highly developed commercial, institutional, and/or industrial areas.

Indirect impacts from OMF South may result in long-term wetland degradation from stormwater discharges and alterations in wetland hydrology. Impacts to wetland hydrology would be minimized through the use of stormwater management facilities that meet the standards established by local, state, and federal agencies with regulatory authority. Facilities that provide water quality treatment could minimize long-term indirect impacts on water quality in wetlands. However, as discussed in the analysis of long-term impacts, treated water discharged from such facilities and untreated water that bypasses those facilities during major storm events may contain contaminants that can harm fish and other aquatic life.

4.5 Cumulative Impacts

Past actions have greatly changed the ecological landscape in the study area and vicinity, and ongoing and reasonably foreseeable future actions could contribute to additional cumulative impacts. To address the effects of past development, restoration programs and projects (e.g., aquatic and terrestrial habitat improvement projects, culvert replacement projects to eliminate barriers to fish passage barriers) are being planned and implemented throughout the region. The potential for any of the project alternatives to result in adverse cumulative impacts would be related to the direct impacts of that alternative. In other words, a project alternative with a greater extent and/or intensity of adverse impacts on ecosystem resources would have a greater risk of adverse cumulative impacts.

Permitted impacts for FWLE are 1.25 acres of wetland, 4.9 acres of wetland buffer, and 0.24 acre of riparian forest buffer (Sound Transit 2023). In addition, the Final EIS for FWLE identified impacts on 35 acres of forested habitat (Sound Transit 2016a). That EIS also analyzed impacts associated with the relocation of approximately 1,000 linear feet of stream channel (Bingaman Creek, which will be rerouted to meander around the columns supporting the elevated mainline tracks). These impacts have been mitigated through permitting process with regulatory agencies and local jurisdictions. The Federal Transit Administration (FTA) determined that FWLE will not impact fish passage in Bingaman Creek or elsewhere (FTA 2017); the project was designed to allow WSDOT to implement fish passage improvements on Bingaman Creek in the future, if necessary. In addition, by complying with WSDOT’s and local jurisdictions’ rules concerning tree replacement and the maintenance of visual quality, FWLE is expected to increase the amount of vegetated area over the long term.

Other reasonably foreseeable future projects that could adversely affect ecosystem resources in the study area include TDLE, Federal Way’s City Center Access project, Creekside Commons Townhomes development WSDOT’s SR 509 Completion project, and WSDOT’s I-5/SR 161/SR 18 Triangle project (this project was suspended in 2023, with no date set for resumption). All these projects are largely on developed or partially developed parcels. Nevertheless, possible short-term and long-term impacts of these projects include loss or degradation of vegetation, wildlife habitat, streams, wetlands, and associated buffer areas. Impacts of TDLE would contribute to those of the Preferred Alternative or the South 344th Street Alternative. Similarly, impacts of the Federal Way City Center Access project would contribute to those associated with construction of the mainline tracks north of the of the Preferred Alternative or the South 344th Street Alternative. The SR 509 Completion project area extends along I-5 as far south as the Midway Landfill Alternative, but the only proposed project element near the Midway Landfill site is an auxiliary lane on southbound I-5. Construction of an auxiliary lane would be unlikely to adversely affect ecosystem resources at or near the Midway Landfill Alternative.

Coupled with the impacts of the past, present, and future projects described above, the impacts of the project alternatives could contribute cumulatively to reductions in the area and function of ecosystem resources in the study area. The potential for future projects to adversely affect ecosystem resources in the study area would be limited, however, by regulatory review and/or permitting processes under federal, state, and local regulations. These reviews and permitting processes require the implementation of measures to avoid or minimize impacts on ecosystem resources, as well as compensatory mitigation for unavoidable impacts on wetlands, streams, and their buffers.

5 MITIGATION MEASURES

Sound Transit's policy on ecosystem mitigation is to avoid impacts on environmentally sensitive resources and provide adequate mitigation to ensure no net loss of ecosystem function and acreage as a result of agency projects (Sound Transit 2007). The proposed project would mitigate impacts on ecosystem resources in accordance with the mitigation sequencing requirements established by SEPA, the Clean Water Act (CWA), and local critical areas ordinances. In this context, mitigation sequencing is defined as first avoiding, second minimizing, then rectifying, reducing, compensating, and monitoring environmental impacts (WAC 197-11-768). As described below, the project alternatives would first avoid or minimize potential impacts on ecosystems resources to the greatest degree possible, and Sound Transit is committed to providing compensatory mitigation when avoidance is not practicable.

Proposed mitigation measures would include specific goals and objectives and specify monitoring criteria. The measures would consider compensatory opportunities for advance mitigation, mitigation banks, and in-lieu fee programs. Proposed compensatory mitigation measures and location(s) would be developed so that reviewing agencies can confirm the likelihood of meeting all stated objectives. These measures would be finalized during permitting.

5.1 Avoidance and Minimization

The project alternatives incorporate the avoidance and minimization of impacts as a guiding principle during preliminary and final design. The build alternatives for the proposed project would avoid or minimize potential impacts on ecosystems resources whenever practicable. Sound Transit would comply with standard specifications, BMPs, and applicable federal, state, and local mitigation requirements during design, construction, and post-construction activities. Sound Transit would meet all regulatory requirements and continue to implement proactive avoidance and minimization measures related to these BMPs in adherence with federal, state, and local regulations.

These strategies, along with others designed to avoid or minimize effects on other resources, would be implemented to effectively minimize the potential impacts on sensitive ecosystem resources. Examples of additional strategies include minimizing vegetation clearing, restoring temporarily affected areas, and preparing and implementing a revegetation plan.

5.1.1 Avoidance and Minimization During Design Development

The development of the design for OMF South was strongly influenced by the presence and location of wetlands, habitat features, vegetation conditions, and potential presence of fish and wildlife. The design was intended to minimize impacts on ecosystem resources and was reconfigured in several areas to further reduce impacts on important environmental features. For example, the design of the Preferred Alternative anticipates the use of elevated structures for tracks near sensitive resources (e.g., streams, wetlands). Compared to at-grade tracks, elevated structures require less ground disturbance and permanent fill, reducing long-term impacts to ecosystem resources.

Most of the project has been located within heavily developed areas and/or along major road corridors (i.e., I-5, SR 99), thereby avoiding impacts on large patches of undisturbed habitat. To minimize impacts on remnant habitat patches, the project abuts these major roads with the minimum margin allowed under transportation safety and planning requirements.

Sound Transit has committed to minimizing the need to place existing streams in new culverts and has designed the OMF South alternatives to avoid new stream piping whenever possible. However, as discussed in Section 4.1.2, under the Preferred Alternative, frontage improvements along S 336th Street to meet city standards would necessitate the replacement culverts that convey West Fork Hylebos Tributary under that roadway. The replacement structure would be designed and installed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013), avoiding the potential for creation of barriers to fish passage. The existing culverts are identified as a partial barrier to fish passage.

Based on the interim design, the proposed replacement structure at this crossing would have a substantially larger hydraulic opening than the two pipes that currently convey the stream under the roadway. As such, the replacement structure would help restore the hydrological capacity at that crossing site, allowing sediment and organic debris to pass through and providing fish unhindered passage beneath the roadway. These benefits would be offset slightly by a reduction in the length of surface-flowing stream channel at this site: the replacement structure would be 3 feet longer than the existing, 86-foot-long pipes.

Another existing crossing structure would be replaced near the WSDOT stormwater facility north of S 344th Street. Under the Preferred Alternative, East Fork Hylebos Tributary would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long culvert. Under the South 344th Street Alternative, this culvert would be replaced with an approximately equal length of surface-flowing stream. Requirements to maintain emergency vehicle access might necessitate placing 60 feet of the daylighted channel in a new crossing structure, reducing the length of restored channel.

The project design for the Preferred Alternative was adjusted to avoid and minimize impacts on streams, riparian areas, wetlands, and forested areas, particularly along East Fork Hylebos Tributary. For example, the proposed design of the Preferred Alternative includes a retaining wall along the eastern boundary of the OMF South site and along the northwestern boundary of the site to minimize impacts on streams and associated wetlands in those areas. In addition, the site of the OMF facility under the Preferred Alternative was shifted west to widen the corridor available for stream restoration.

In addition, Sound Transit placed priority on minimizing impacts on West Fork Hylebos Tributary and Wetland WFW-02 in the northwestern corner of the Preferred Alternative OMF South site. The design team determined that it would not be possible to completely avoid impacts in that area without compromising operations at the OMF South site. Working with that constraint, the design team developed a site layout that would affect a smaller area of the wetland. Sound Transit is actively exploring options for further reductions of the project footprint in that area.

Relocation and realignment could include constructing a new stream channel along approximately the same alignment as the existing channel, or it could entail moving the channel to a new alignment several dozen feet from the existing channel. Relocated stream segments would include meanders and other features that enhance the availability and diversity of aquatic habitats. Finally, in some cases, restored, daylighted channels would be constructed for stream segments currently contained within culverts. Daylighting would allow increased interaction between the stream and associated riparian vegetation, resulting in beneficial effects associated with restoring natural processes, such as organic input and flow attenuation.

Vegetation clearing and related habitat impacts were avoided and minimized to the degree feasible by focusing design elements, particularly staging and lay-down areas, in locations that are already developed or heavily disturbed. Sound Transit would restrict clearing activities to outside the active bird nesting period, to the extent possible, to comply with the Migratory Bird

Treaty Act administered by USFWS. If avoidance scheduling is infeasible, Sound Transit would conduct pre-construction surveys to determine the presence or absence of nesting migratory birds to assist in complying with the Migratory Bird Treaty Act.

5.1.2 Construction Best Management Practices

Sound Transit has developed BMPs to avoid and minimize impacts during construction. Many of these BMPs are based on the conditions likely to be set forth in project permits. The following subsections identify BMPs that would be implemented for sensitive areas in general, as well as BMPs specifically targeting fish and aquatic habitats, including water quality.

5.1.2.1 General BMPs for All Sensitive Areas

Sound Transit or the construction contractor would delineate construction limits with fencing and signage to prevent non-permitted impacts on ecosystem resources such as wetlands, riparian vegetation, or sensitive upland habitats. The intent of the fencing and signage would be to prevent impacts on sensitive sites outside the construction limits. The construction limits would be clearly marked with high-visibility construction fencing or some other method of demarcation before clearing or ground-disturbing activities begin. Clearing and ground-disturbing activities outside the construction limits would not be allowed. Temporarily cleared vegetation would be restored after construction is complete. Site restoration would include replanting disturbed areas with appropriate native vegetation, as soon as practicable.

Sound Transit would also implement appropriate measures to minimize the risk of introduction and spread of noxious and invasive plant and animal species. To minimize the risk of harm to species protected under the Migratory Bird Treaty Act, Sound Transit would consult with staff from WDFW or USFWS about measures to conserve migratory birds and their nests.

Sound Transit or its construction contractor would develop a Temporary Erosion and Sediment Control (TESC) plan that would be implemented during construction. The TESC plan would identify measures for preventing sediment from soil or rock stockpiles, excavated materials, or excess soil materials being conveyed by high water or storm runoff into sensitive habitats, including stream channels, wetlands, and riparian areas outside the construction limits. The contractor would implement the plan before discharging or allowing runoff from the site. Monitoring requirements specified in the TESC would provide feedback to make sure that the erosion control practices are operating properly and effectively. In addition, BMPs would be implemented to limit soil compaction in sensitive areas.

5.1.2.2 Fish and Aquatic Habitat Protection

Construction activities within or below the OHWL of waterbodies in the study area would comply with the terms and conditions set forth in the HPA and other permits (such as the CWA Section 401 water quality certification) issued for the project, including provisions designed to avoid or minimize the potential for adverse effects on habitat in receiving waters. Such provisions may include restrictions on construction below the OHWL to minimize the risk of adverse effects on downstream fish during highly sensitive life history stages (e.g., spawning, rearing).

In accordance with typical requirements of an HPA, if LWD must be moved to allow the reasonable use of an over-water or in-water facility, the LWD would be relocated downstream, where it would continue to provide aquatic habitat function.

Any culverts installed in waters of the state would comply with the fish passage requirements specified in WAC 220-110-070 and would be designed using the stream simulation methodology outlined in WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). Any affected streambeds or stream banks adjacent to culverts would be permanently restored with plantings of native or approved woody and herbaceous species within one year of completion of each phase of construction. Bank protection, if required, would follow the guidelines set forth in Washington State's Integrated Streambank Protection Guidelines (Cramer et al. 2003).

Water quality protection would be addressed through compliance with the CWA Section 401 water quality certification and the National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit issued for the project. The goal of the permit is to reduce or eliminate stormwater pollution and other impacts on surface waters from construction sites. The project would also be required to develop a Stormwater Pollution Prevention Plan (SWPPP) that implements BMPs for identifying, reducing, eliminating, or preventing sediment and erosion problems on site. The SWPPP would include a TESC plan; spill prevention, control, and countermeasures plan; concrete containment and disposal plan; dewatering plan; and a fugitive dust plan.

Specific BMPs for avoiding or minimizing potential impacts on water quality include the following:

- Operating heavy equipment above the OHWL, except as specifically authorized under the HPA issued for the project.
- Covering temporarily stored materials with plastic or other impervious material during rain events to prevent sediments from being washed from the storage area to surface waters.
- Inspecting all temporary and permanent erosion and sedimentation control measures on a regular basis and maintaining and repairing them as needed to ensure continued performance of their intended function.
- Preventing the discharge of turbid water to streams and wetlands. Turbid wastewater may be routed to temporary or permanent detention facilities or to upland areas that provide adequate infiltration.
- Cleaning and inspecting all equipment to be used for construction activities before it arrives at the project site to ensure no potentially hazardous materials are exposed, no leaks are present, and the equipment is functioning properly. Should a leak be detected on heavy equipment used for the project, the equipment would be repaired before use. Construction equipment and vehicles would be maintained to prevent them from leaking fuel or lubricants.
- Preventing contact of uncured concrete and/or concrete byproducts with streams or water conveyed directly to streams during construction, in accordance with WAC 220-110-270(3). A concrete truck chute cleanout area or equally effective BMP would be established to properly contain wet concrete.

5.1.3 Design and Operation Best Management Practices

The project would install permanent stormwater runoff treatment and flow control facilities where needed according to the requirements of applicable stormwater and surface water design manuals. Where applicable and feasible, the project would incorporate stormwater conveyance and management facilities that promote infiltration. Sound Transit would design and construct permanent stormwater treatment facilities and flow-control measures to minimize impacts on stream water quality and flow.

The project would select, design, and install runoff treatment BMPs that are best suited to the site conditions and best capable of achieving the required levels of treatment (subject to negotiation with the local jurisdiction and/or Ecology). The project would not reroute existing drainage configurations to the extent that stormwater from one basin or subbasin is conveyed and discharged to another.

The project would implement integrated pest management techniques, in accordance with current Ecology water quality agreements, to minimize the impact on aquatic and terrestrial environments.

5.2 Rectifying and Reducing Impacts over Time

To the extent that impacts cannot be avoided or minimized through BMPs, Sound Transit would implement restoration measures to rectify temporary impacts and reduce their effects over time. Immediately following project construction, Sound Transit would begin restoring temporarily disturbed wetlands, streams, and buffer areas. The length of time that would be required for site restoration to effectively replace habitat functions would vary. To the extent feasible, temporarily disturbed wetlands, streams, and their buffers would be restored to preconstruction conditions, or better, and planted with appropriate native species when construction activities are finished. Sound Transit would conduct detailed site surveys to reestablish topography. Restoration would include soil amendment where needed and vegetation replacement. Upland forested vegetation disturbed within construction staging areas would be revegetated with native species generally within 1 year following construction. Invasive, nonnative vegetation would be removed permanently from temporarily affected areas to improve the overall habitat for wildlife. Ecological functions in other temporarily disturbed areas may not be restored for many years; these long-term temporary impacts would require compensatory mitigation.

Under the Preferred Alternative or the South 344th Street Alternative, construction of the OMF and associated elevated mainline and test tracks would necessitate the realignment of the stream channel for East Fork Hylebos Tributary. The new channel would be designed to maintain flows and water quality conditions. To the extent practicable within site constraints, the stream channel in this area would be reconfigured to include meanders and other in-stream features that enhance the availability and diversity of aquatic habitats. However, opportunities for rectification would be limited by the presence of the OMF site to the west and the mainline tracks to the east. In addition, the presence of support columns near the stream would constrain options for channel configuration.

5.3 Compensatory Mitigation

Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. For unavoidable long-term impacts on wetlands, streams, and their buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. These guidelines and regulatory standards include the Federal Compensatory Mitigation Rule (40 Code of Federal Regulations [CFR] § 230 and 33 CFR § 325 and 332); interagency guidance (Ecology et al. 2021 or as updated); and the applicable local critical areas ordinances. To achieve no net loss of wetland function and area, Sound Transit could use a combination of mitigation strategies, such as off-site compensatory mitigation within the Hylebos Creek watershed, mitigation bank, and/or in-lieu fee program. Where the project affects any fish-bearing streams or fish passage structures, Sound Transit would coordinate with the appropriate Tribes and agencies (e.g., WSDOT, WDFW) on mitigation concepts, restoration priorities and methods.

Compensatory mitigation would be provided for construction impacts lasting more than one growing season, and for permanent conversion of wetlands from one vegetation type to another (e.g., forested wetland to emergent or scrub-shrub wetland), as well as for indirect impacts on wetlands. Generally, compensation for long-term temporary impacts is one-quarter of the typical ratio for long-term permanent impacts and one-half for conversion of wetlands. Impacts to wetland buffers would generally be replaced at a minimum ratio of 1:1, using buffer enhancement. In areas where stream buffers and wetland buffers overlap, mitigation for impacts would be based on the local jurisdiction’s requirements for mitigating impacts either to wetland buffers or to stream buffers – whichever requirements are more stringent.

The 2008 Federal Compensatory Mitigation Rule established a preference for the use of approved wetland mitigation banks and in-lieu fee programs over the development of permittee-responsible mitigation sites (40 CFR § 230.93 and 33 CFR § 325 and 332). The study area is located within the service areas of one mitigation bank (the Port of Tacoma’s Upper Clear Creek mitigation bank, certified in June 2020) and one in-lieu fee program (the King County Mitigation Reserves Program).

Sound Transit would also comply with local ordinances regarding tree replacement ratios. Tree removal within the I-5 corridor would be mitigated according to the WSDOT Roadside Policy Manual.

To satisfy federal and state permitting authorities, Sound Transit plans to follow the federal mitigation hierarchy (Corps and EPA 2008), which prioritizes approved mitigation banks and in-lieu fee programs, where available. However, the city of Federal Way and the Puyallup Tribe of Indians prefer use of in-kind wetland mitigation within the same watershed.

5.3.1 Approved Mitigation Bank

The Port of Tacoma’s Upper Clear Creek mitigation bank was certified in June 2020 and could be available for use to offset project impacts in the Hylebos Creek watershed if credits are available at the time of permitting. The city of Federal Way’s updated critical areas ordinance allows for compensatory mitigation to be provided through a certified mitigation bank as an alternative method for mitigation. However, use of the bank must be approved by the city under its discretionary authority.

5.3.2 County In-Lieu Fee Programs (Mitigation Reserves Program)

King County has developed an in-lieu fee program to mitigate for wetland impacts. The King County In-Lieu Fee Program is called the Mitigation Reserves Program, which was approved by the Corps in March 2012 (King County 2011). The program includes service areas within the watersheds affected by OMF South (i.e., Green River and Central Puget Sound) that are in King County. The city of Federal Way’s updated critical areas ordinance allows for compensatory mitigation to be provided through a certified in-lieu fee program, if approved by the local jurisdiction.

5.3.3 Project-Specific Mitigation Developed by Sound Transit

Sound Transit will likely be required to mitigate for some portion of unavoidable impacts on wetlands through permittee-responsible, project-specific mitigation. Project-specific mitigation, if required, will be developed in accordance with the federal Final Compensatory Mitigation Rule (40 CFR Part 230) and joint guidance developed by Ecology, the Corps, and the EPA (Ecology et al. 2021 or as updated). This guidance supports the implementation of a watershed approach to selecting mitigation sites. This approach allows for a greater degree of flexibility in selecting mitigation sites and potentially greater value created for the watershed than use of on-site mitigation. Preliminary off-site mitigation areas have been identified during an initial screening process and are included in Attachment G3-8 of this report. These or other sites may be used for off-site wetland mitigation, which may involve city-owned parcels or require property acquisition in the Hylebos watershed. Sound Transit anticipates using this approach to determine the appropriate location, amount, and types of compensatory mitigation to compensate for the specific type and degree of functions affected by the project.

In cooperation with resource agencies and Tribes, Sound Transit would develop plans to mitigate the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis. To the extent possible, off-site compensatory mitigation sites would be identified and would compensate for lost values in-kind. It may be necessary to use several sites and mitigation approaches given the project size, the variety of impacts, complexity of identifying mitigation opportunities, and mitigation requirements.

The project would adhere to the mitigation requirements (such as mitigation ratios) specified by federal regulators, Tribes, state resource agencies, and the city of Federal Way. Impacts on streams would be mitigated through restoration actions on site and developed in collaboration with federal, state, and local regulators, and Tribal biologists.

6 REFERENCES

Anchor (Anchor QEA). 2019. SR 509 Completion – SR 509 Stage 1b Project Wetland Assessment Report. Prepared by Anchor QEA, July 2019. 339 pp.

Anderson, H.E., and S.F. Pearson. 2015. Streaked Horned Lark habitat characteristics. Center for Natural Lands Management and Washington Department of Fish and Wildlife.

Barnard, R.J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J.P. Klavas, D.C. Ponder, P.D. Smith, and P.D. Powers. 2013. Water crossings design guidelines. Washington Department of Fish and Wildlife, Olympia, WA.

Brinkman, M., D. Montgomery, S. Selinger, J.G.P. Miller, E. Stock, A.J. Alcaraz, J.K. Challis, L. Weber, D. Janz, M. Hecker, and S. Wiseman. 2022. Acute Toxicity of the Tire Rubber-Derived Chemical 6PP-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance. Environmental Science and Technology Letters 9(4):333–338.

Brinson, M.M. 1993. A Hydrogeomorphic Classification for Wetlands. Wetlands Research Program Technical Report WRP-DE-4. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

City of Federal Way. 2003. Christian Faith Center Draft Environmental Impact Statement. Prepared by Parametrix, Inc. November 2003.

City of Federal Way. 2016. City of Federal Way Critical Areas Map. Available at: https://www.cityoffederalway.com/sites/default/files/maps/sensitive_2016.pdf. Accessed November 6, 2020.

Corps (U.S. Army Corps of Engineers). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Corps and EPA. 2008. Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. Available at: https://www.epa.gov/sites/production/files/2015-08/documents/compensatory_mitigation_factsheet.pdf. Accessed November 6, 2020.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-70/31, U.S. Fish and Wildlife Service, Washington, DC.

Cramer, M., K. Bates, D. Miller, K. Boyd, L. Fotherby, P. Skidmore, and T. Hoitsma. 2003. Integrated Streambank Protection Guidelines. Co-published by the Washington Departments of Fish & Wildlife, Ecology, and Transportation. Olympia, WA.

EarthCorps. 2016. Hylebos Watershed Plan. July 2016. Seattle, WA. 62 pp.

eBird. 2022. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org. Accessed December 2022.

Ecology (Washington State Department of Ecology). 2023. Washington State Water Quality Assessment 303(d)/305(b) List. Available at: https://apps.ecology.wa.gov/waterqualityatlas/wqa/map. Accessed June 11, 2023.

Ecology (Washington State Department of Ecology), Corps (U.S. Army Corps of Engineers) Seattle District, and EPA (U.S. Environmental Protection Agency) Region 10. 2021. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 2). Washington State Department of Ecology Publication #21-06-003. Olympia, WA.

Ecology. 2022. 6PPD in road Runoff: Assessment and Mitigation Strategies. Report prepared for the Model Toxics Control Act Legislative Program. Publication 22-03-020.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, Environmental Laboratory, Department of the Army, Waterways Experiment Station, Vicksburg, MS.

EPA. 2000. Record of Decision, Midway Landfill, Kent, Washington. September 6, 2000. Available at: https://semspub.epa.gov/work/10/500010018.pdf.

FGDC (Federal Geographic Data Committee). 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC. Fischer, M. 1999. City of Federal Way final wetland inventory report. Prepared for K. McClung, Deputy Director of Community Development Services. July 19, 1999.

Fischer, R.A. and J.C. Fischenich. 2000. Design recommendations for riparian corridors and vegetated buffer strips. U.S. Army Engineer Research and Development Center, Vicksburg, MS. ERDC TN-EMRRP-SR-24.

French, B.F., D.H. Baldwin, J. Cameron, J. Prat, K. King, J.W. Davis, J.K. McIntyre, and N.L. Scholz. 2022. Urban Roadway Runoff Is Lethal to Juvenile Coho, Steelhead, and Chinook Salmonids, but Not Congeneric Sockeye. Environmental Science and Technology Letters 9:733–738.

FTA (Federal Transit Administration). 2017. Record of Decision, Federal Way Link Extension. March 2017. Seattle, WA.

Gresham, Doug. 2020. Personal communication of March 17, 2020. Wetland specialist, Washington State Department of Ecology, Bellevue, WA.

Grosboll, D. 2011. Taylor's Checkerspot (*Euphydryas editha taylori*) Oviposition Habitat Selection and Larval Hostplant Use in Washington State. Thesis submitted in partial fulfillment of the requirements for the degree Master of Environmental Studies at The Evergreen State College. June 2011.

Hallock, L. A., A. McMillan, and G. J. Wiles. 2017. Periodic Status Review for the Western Pond Turtle in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 19+v pp.

Hays, D.W., K.R. McAllister, S.A. Richardson and D.W. Stinson.1999. Washington State Recovery Plan for the Western Pond Turtle. Washington Department of Fish and Wildlife, Olympia, WA. 66 pp.

HDR. 2014. City of Federal Way Hylebos Creek fish use and habitat technical memorandum. December 2014.

Hendry, A. P., T. P. Quinn, and F. M. Utter. 1996. Genetic Evidence for the Persistence and Divergence of Native and Introduced Sockeye Salmon (*Oncorhynchus nerka*) within Lake Washington, Washington. Can. J. Fish. Aquatic Sci. 53:823–832.

Hruby, T., K. Harper, and S. Stanley. 2009. Selecting Wetland Mitigation Sites Using a watershed Approach. Olympia, WA: Washington State Department of Ecology. Publication #09-06-032.

Hruby, T. 2014. Washington State Wetland Rating System for Western Washington: 2014 Update. Washington State Department of Ecology Publication #14-06-029. Olympia, WA.

Hughes, J.M. 1999. Yellow-Billed Cuckoo (*Coccyzus americanus*). *In*: Poole, A. and F. Gill (editors). The Birds of North America, No. 148. The Birds of North America, Inc., Philadelphia, PA.

Johnson, D.H. and T.A. O’Neil (managing directors). 2001. Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press. Corvallis, OR.

Kemp, P.S. and J.G. Williams. 2008. Response of Migrating Chinook Salmon (*Oncorhynchus tshawytscha*) Smolts To In Stream Structure Associated with Culverts. River Research and Applications, 24(5), pp. 571–579.

Kerwin, J. 1999. Salmon Habitat Limiting Factors for the Puyallup River Basin (WRIA 10). Prepared by John Kerwin for the Washington Conservation Commission, Olympia, Washington. Included as Appendix E of Volume II, Puyallup River Plan as part of the Puget Sound Salmon Recovery Plan. Available at: http://www.psp.wa.gov/SR_map.php.

King County. 1990. Hylebos Creek and Lower Puget Sound Watershed, Current and Future Conditions Report. Prepared by King County Surface Water Management Division for the City of Federal Way in Cooperation with Pierce County, Cities of Des Moines, Fife, Kent, Milton, and Tacoma. July 1990. 28 pp.

King County. 1991. Executive Proposed Basin Plan for the Hylebos Creek and Lower Puget basins. Prepared by King County Surface Water Management. July 1991. 185 pp + appendices.

King County. 2011. King County Mitigation Reserves Program – In Lieu Fee Program Instrument. Prepared by King County Department of Natural Resources and Parks. October 13, 2011. Seattle, Washington. 171 pp.

King County. 2018. iMap Interactive Mapping Tool. Available at: https://gismaps.kingcounty.gov/iMap/. Accessed 2020.

King County. 2019. Aerial Imagery. Available at: https://gismaps.kingcounty.gov/arcgis/rest/services/BaseMaps/KingCo_Aerial_2019/MapServer. Accessed 2020.

Knutson, K. L., and V. L. Naef. 1997. Management Recommendations for Washington’s Priority Habitats: Riparian. Washington Department of Fish and Wildlife, Olympia, WA. 181 pp.

LeClair, L. 1999. Larry LeClair, Washington Department of Fish and Wildlife. Memorandum to John Kerwin, Washington Conservation Commission. Olympia, WA.

Lo, B.P, V.L Marlatt, X. Liao, S. Reger, C. Gallilee, A.R.S. Ross, and T.M. Brown. 2023. Acute Toxicity of 6PPD-Quinone to Early Life Stage Juvenile Chinook (*Oncorhynchus tshawytscha*) and Coho (*Oncorhynchus kisutch*) Salmon. Environmental Toxicology and Chemistry 4:815–822.

Marks, E. L., R.C. Ladley, B.E. Smith, A.G. Berger, T.G. Sebastian and K. Williamson. 2018. 2017–2018 Annual Salmon, Steelhead and Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2019. Puyallup Tribal Fisheries Annual Salmon, Steelhead and Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2018-2019. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2020. Puyallup Tribal Fisheries Annual Salmon, Steelhead and Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2019-2020. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E.L., R.C. Ladley, B.E. Smith, A.G. Berger and K. Williamson. 2021. Puyallup Tribal Fisheries Annual Salmon, Steelhead and Bull Trout Report: Puyallup/White River Watershed—Water Resource Inventory Area 10, 2020–2021. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E., R. Ladley, B. Smith, A. Berger, D. Campbell, J. Close and K. Williamson. 2022. Puyallup Tribal Fisheries Annual Salmon, Steelhead And Bull Trout Report: Puyallup/White River Watershed--Water Resource Inventory Area 10, 2021–2022. Puyallup Tribal Fisheries, Puyallup, WA.

Marks, E., R. Ladley, B. Smith, A. Berger, D. Campbell, J. Close, and K. Williamson. 2023. Puyallup Tribal Fisheries Annual Salmon, Steelhead and Bull Trout Report: Puyallup/White River Watershed--Water Resource Inventory Area 10, 2022–2023. Puyallup Tribal Fisheries, Puyallup, WA.

Meador, J.P., F.C. Sommers, G.M. Ylitalo, and C.A. Sloan. 2006. Altered Growth and Related Physiological Responses in Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) from dietary exposure to polycyclic aromatic hydrocarbons (PAHs). Canadian Journal of fisheries and Aquatic Sciences. 63: 2364–2376.

Martin, D. J., M. E. Robinson, and R. A. Grotefendt. 1998. The Effectiveness of riparian Buffer Zones for Protection of Salmonid Habitat in Alaska Coastal Streams. Alaska Forest Association, Ketchikan, AK. 85 pp.

McDade, M. H., F. J. Swanson, W. A. McKee, J. F. Franklin, and J. Van Sickle. 1990. Source Distances for Coarse Woody Debris Entering Small Streams in western Oregon and Washington. Canadian Journal of Forest Research. Volume 20, pp. 326–330.

McKinley, M. 1997. Large woody debris source distances for western Washington Cascade streams. Unpublished report. Undergraduate senior research project, College of Forest Resources, University of Washington, Seattle, WA. 36 pp.

Murphy, M. L. and K. V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. North American Journal of Fisheries Management. Volume 9(4), pp. 427–436.

NMFS (National Marine Fisheries Service). 2021. List of ESA-listed Species under the Jurisdiction of the National Marine Fisheries Service. Available at: https://www.fisheries.noaa.gov/species-directory/threatened-endangered?title=&species_category=any&species_status=any&regions=1000001126&items_per_page=all&sort=. Accessed January 13, 2021.

NRCS (Natural Resources Conservation Service). 2022. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed December 2022.

NWIFC (Northwest Indian Fisheries Commission). 2023. Statewide Integrated Fish Distribution (SWIFD) Web Map. Available at: https://geo.nwifc.org/SWIFD/. Accessed February 2023.

Opalski, Daniel D. 2010. Second Five-Year Review Report for Midway Landfill Superfund Site. Report, United States Environmental Protection Agency, Region 10. Richland, Washington. 111 pp.

Opperman, H., K.M. Cassidy, T. Aversa, E.S. Hunn, and B. Senturia. 2006. Sound to Sage: Breeding Bird Atlas of Island, King, Kitsap, and Kittitas Counties, Washington. Published at http://www.soundtosage.org by the Seattle Audubon Society. Version 1.1, September 2006.

Platts, W.S., W.F. Megahan, and G.W. Minshall. 1983. Methods for Evaluating Stream, Riparian, and Biotic Conditions. General Technical Report INT-138, U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Sandahl, J.F., D. Baldwin, J.J. Jenkins, and N.L. Scholz. 2007. A Sensory System at the Interface between Urban Stormwater Runoff and Salmon Survival. Environmental Science and Technology. 2007(41):2998–3004.

Seattle Audubon Society. 2022. Birdweb: Seattle Audubon's Guide to the Birds of Washington State. Available at: http://birdweb.org/Birdweb/. Accessed December 2022.

Sound Transit (Central Puget Sound Regional Transit Authority). 2007. Establishing a Sustainability Initiative. https://www.soundtransit.org/sites/default/files/documents/pdf/about/environment/executiveorderno1_sustainability.pdf.

Sound Transit (Central Puget Sound Regional Transit Authority). 2016a. Federal Way Link Extension Final Environmental Impact Statement Appendix G2: Ecosystems Technical Report. Prepared by Prepared by HDR Engineering, Inc., and CH2M HILL. November 2016.

Sound Transit (Central Puget Sound Regional Transit Authority). 2016b. Sound Transit 3: The Regional Transit System Plan for Central Puget Sound.

Sound Transit (Central Puget Sound Regional Transit Authority). 2016c. Sound Transit Stream Habitat Assessment Guidelines.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019a. OMF South Scoping Summary Report. May 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019b. Technical Memorandum: OMF South Environment and community Resources for Alternatives Development. Prepared by HDR Engineering, Inc., and Parametrix, Inc. August 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019c. Tacoma Dome Link Extension Pre-Screening and Level 1 Alternatives Evaluation Report. Prepared by HDR Engineering, Inc., and Parametrix, Inc. February 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019d. Tacoma Dome Link Extension Level 2 Alternatives Evaluation Report. Prepared by HDR Engineering, Inc., and Parametrix, Inc. August 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019e. Tacoma Dome Link Extension Scoping Summary Report. May 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019f. Sustainability Plan – 2019 Update. January 2019. https://www.soundtransit.org/sites/default/files/documents/2019-sustainability-plan.pdf.

Sound Transit (Central Puget Sound Regional Transit Authority). 2019g. Operations and Maintenance Facility South Environmental Methodology Report. October 2019.

Sound Transit (Central Puget Sound Regional Transit Authority). 2023. Memorandum from Becki Kniveton, Sound Transit, to Samantha Stanford, U.S. Army Corps of Engineers, and Doug Gresham, Washington State Department of Ecology, 2022 JARPA, Federal Way Link Extension, NWS-2013-687. Revised February 16, 2023.

Stinson, D.W. 2005. Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot. Washington Department of Fish and Wildlife, Olympia, WA. 129+ xii pp.

StreamNet. 2021. Fish Distribution - All Species Combined. Spatial data set, updated April 2021. Available at: https://www.streamnet.org/home/data-maps/sn-mapper/. Accessed December 2022.

Tian, Z., and 28 others. 2021. A Ubiquitous Tire Rubber-Derived Chemical Induces Acute Mortality in Coho Salmon. Science 371(6525):185–189.

Tong, Kristina. 2019. Personal communication of October 30, 2019. Section Chief, U.S. Army Corps of Engineers.

USFWS (U.S. Fish and Wildlife Service). 2022a. National Wetlands Inventory (NWI) website. Available at: https://www.fws.gov/program/national-wetlands-inventory. Accessed December 2022.

USFWS. 2022b. Information for Planning and Consultation (IPaC) List of ESA-listed species and critical habitats. Obtained 2022.

USGS (U.S. Geological Survey). 2020. Poverty Bay and Des Moines quadrangles, Washington [maps]. 1:24,000. 7.5 Minute Series. Available at: https://www.usgs.gov/products/maps/topo-maps. Accessed 2020.

Varanasi, U., E. Casillas, M.R. Arkoosh, T. Hom, D.A. Misitano, D.W. Brown, S.L. Chan, T.K. Collier, B.B. McCain, and J.E. Stein. 1993. Contaminant Exposure and Associated Biological Effects in Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) from Urban and Nonurban Estuaries of Puget Sound. NOAA Technical Memorandum NMFS-NWFSC-8. NMFS NFSC Seattle, WA. April 1993. 69 pp.

Washington Trout. 2003. Water Type Survey Results South King County May/June 2003. Available at: http://www.moonlitgeo.com/legacy_maps/kcpuget/map.html?tile=22N04E21NW&bw=false&culvert=true&habitat=true&fish=true&chanmod=true&stream=true&topo=false&streamid=true&ortho=true&road=false.

WDFW (Washington Department of Fish and Wildlife). 2008. Priority Habitats and Species list. Updated March 2022. Olympia, WA. 292 pp.

WDFW (Washington Department of Fish and Wildlife). 2019. Fish Passage Inventory, Assessment, and Prioritization Manual. Olympia, WA.

WDFW (Washington Department of Fish and Wildlife). 2022. PHS on the Web: An interactive map of WDFW priority habitats and species information for project review. Available at: http://apps.wdfw.wa.gov/phsontheweb/.

WDFW (Washington Department of Fish and Wildlife). 2023. WDFW Fish Passage and Diversion Screening Inventory Database. Available at: https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html.

WDFW (Washington Department of Fish and Wildlife) and WWTT (Western Washington Treaty Indian Tribes). 1994. Salmon and Steelhead Stock Inventory (SASSI). Appendix 1 South Puget Sound Stocks. Olympia, WA.

WDNR (Washington Department of Natural Resources). 2019. Washington Natural Heritage Program geographic information system data set. Data current as of July 26, 2019. Obtained October 22, 2019.

WDNR. 2020. DNR Water Type Maps. Available at: https://www.dnr.wa.gov/forest-practices-water-typing. Accessed 2020.

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A Catalog of Washington Streams And Salmon Utilization, Volume 1, Puget Sound. Washington Department of Fisheries, Olympia, WA.

WSDOT (Washington State Department of Transportation) and FHWA (Federal Highway Administration). 2009. I-5, SR 161/SR 18 Interchange Improvements Final Phase 1 Hydraulics Report. 32pp + appendices.

WSDOT. 2020. WSDOT Fish Passage Inventory. Available at: https://wsdot.wa.gov/data/tools/geoportal/?config=fish-passage-barriers. Accessed 2020.

Operations and Maintenance Facility South

ATTACHMENT G3-1

Wetland Delineation Methodology

Federal Transit Administration

SOUNDTRANSIT

1. WETLAND IDENTIFICATION AND DELINEATION

Parametrix biologists used the methods specified in the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the indicators described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (U.S. Army Corps of Engineers [Corps] 2010) to delineate on-site wetlands.

Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. An area must meet these three criteria or exhibit at least one positive field indicator of wetland vegetation, soils, and hydrology to be considered a wetland. Wetland determination data forms from the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Corps 2010) were recorded for each wetland.

1.1 Vegetation

During the field investigations, the biologists observed the dominant plant species and recorded each on data forms for each sample plot. They evaluated dominant plants and their wetland indicator status to determine whether the vegetation was hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be Facultative, Facultative Wetland, or Obligate, based on the plant indicator status category assigned to each plant species by the Corps (Lichvar et al. 2016).

Scientific and common plant names follow currently accepted nomenclature. Most names are consistent with Flora of the Pacific Northwest (Hitchcock and Cronquist, 2nd Edition 2018), Plants of the Pacific Northwest Coast (Pojar and MacKinnon 2004), and the U.S. Department of Agriculture (USDA) PLANTS Database (USDA 2020). However, scientific names listed in the 2016 National Wetland Plant List (Lichvar et al. 2016) were used as the final authority in preparing determination forms and determining species indicator status.

1.2 Soils

Generally, an area must have hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper layers. Biological activities in saturated soil result in reduced oxygen concentrations that create a preponderance of organisms using anaerobic processes for metabolism. Over time, anaerobic biological processes produce certain color patterns in mineral soils and/or enhance accumulation of organic soils (e.g., peat), which are used as field indicators of hydric soil. Typically, low-chroma colors are formed in the soil matrix. Bright-colored redoximorphic features form within the matrix under a fluctuating water table. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface. Soils were examined by excavating sample plots to a depth of 16 inches or more, wherever feasible, to observe soil profiles, colors, and textures. Munsell® color charts (Munsell® Color 2015) were used to describe soil colors and the Field Book for Describing and Sampling Soils (Schoenebergerm et al. 2012) was used to describe the soil texture class.

1.3 Hydrology

The study area was examined for evidence of hydrology. An area is considered to have wetland hydrology when soils are ponded or saturated consecutively for 12.5 percent of the growing season (Environmental Laboratory 1987). The growing season generally occurs from late February (February 27) to late November (November 21) (based on SeaTac Airport weather station climate data). Therefore, ponding or saturation must be present for approximately 33 consecutive days within the growing season. Wetland hydrology is determined by the identification of specific indicators described in the regional supplement (Corps 2010). The observation of one primary indicator or two secondary indicators is a positive indication of wetland hydrology. The project is located in Major Land Use Area 2, within Land Resource Region A (Corps 2010; NRCS 2006). Within these regions, primary and secondary indicators of hydrology are described by group and comprise:

- Group A (Observation of Surface Water or Saturated Soils): Surface inundation, high water table, and saturated soils
- Group B (Evidence of Recent Saturation): Water marks, sediment and drift deposits, algal mats, iron deposits, surface soil cracks, inundation visible on aerial imagery, sparsely vegetated concave surfaces, salt crusts, and aquatic invertebrates. *Secondary*: Water-stained leaves and drainage patterns
- Group C (Evidence of Current or Recent Soil Saturation): Hydrogen sulfide odor, oxidized rhizospheres along living roots, presence of reduced iron, and recent iron reduction in tilled soils. *Secondary*: Dry-season water table and saturation evident on aerial imagery.
- Group D (Evidence from Other Site Conditions or Data): Stunted or stressed plants. *Secondary*: geomorphic position, shallow aquitard, vegetation Facultative-neutral test, raised ant mounds, and frost-heave hummocks

Operations and Maintenance Facility South

ATTACHMENT G3-2

Stream Habitat Assessment Guidelines

Federal Transit Administration

SOUNDTRANSIT

SOUNDTRANSIT

STREAM HABITAT ASSESSMENT GUIDELINES

January 2016

Table of Contents

1. Introduction………………………………………………………………………………………… 1

2. Using the Stream Assessment Flowcharts……………………………………………………… 2

2.1 Phase 1 Projects…………………………………………………………………………………… 3
2.2 Phase 2 Projects…………………………………………………………………………………… 5

3. Data Collection for Key Aquatic Habitat Elements……………………………………………… 8

3.1 Riparian Vegetation……………………………………………………………………………… 8
  3.1.1 Background Information…………………………………………………………………… 8
  3.1.2 Track A Information………………………………………………………………………… 10
  3.1.3 Track B Information………………………………………………………………………… 10
  3.1.4 Track C Information………………………………………………………………………… 10
3.2 Physical In-Stream Habitat ……………………………………………………………………… 11
  3.2.1 Background Information…………………………………………………………………… 11
  3.2.2 Track A Information………………………………………………………………………… 12
  3.2.3 Track B Information………………………………………………………………………… 12
  3.2.4 Track C Information………………………………………………………………………… 12
3.3 Biological Connectivity …………………………………………………………………………… 14
  3.3.1 Background Information …………………………………………………………………… 15
  3.3.2 Track A Information ………………………………………………………………………… 15
  3.3.3 Track B Information ………………………………………………………………………… 15
  3.3.4 Track C Information ………………………………………………………………………… 16
3.4 Water Quality and Quantity ……………………………………………………………………… 16
  3.4.1 Background Information …………………………………………………………………… 16
  3.4.2 Track A Information ………………………………………………………………………… 16
  3.4.3 Track B and C Information ………………………………………………………………… 16
3.5 Fish Presence, Fish Habitat Use, and Stream Typing ………………………………………… 17
  3.5.1 Background Information …………………………………………………………………… 17
  3.5.2 Track A Information ………………………………………………………………………… 17
  3.5.3 Track B Information ………………………………………………………………………… 18
  3.5.4 Track C Information ………………………………………………………………………… 19

4. Considerations and Limitations ………………………………………………………………… 19

References ………………………………………………………………………………………………… 21

SOUND TRANSIT STREAM HABITAT ASSESSMENT GUIDELINES

1. Introduction

Sound Transit projects often intersect with and affect streams. To comply with local, state, and federal rules and regulations, Sound Transit assesses stream conditions, determines stream impacts that will occur as a result of a project, and mitigates those impacts as appropriate. The analytical methodologies used and level of detail needed to meet these requirements depends on a variety of factors including: 1) the stage of project development and complexity of the project, 2) the extent to which Sound Transit has property access to streams, and 3) the magnitude of impact. Less detailed information is typically collected during planning and early design stages such as during SEPA/NEPA environmental review and preliminary engineering because rights-of-entry are not granted onto privately owned properties, thus restricting access to streams. Also, at this stage, multiple alternative alignments may be under consideration, making more labor-intensive field investigations less feasible from the standpoint of cost and time. At later stages of project development, once the project to be built is selected or final design is underway, more detailed analyses may be appropriate depending on access, the magnitude of potential impacts, and the types of environmental permits that may be necessary to construct the project.

Various methodologies exist on how to approach stream assessments in Washington and no one methodology is required, or is applicable to all projects or to all stages of project development. In addition, Native American tribes with fishing rights often request specific information about the effects of a project on both existing fish use and potential fish use of a stream. In this context, Sound Transit seeks to achieve greater consistency in how it approaches the assessment of streams at various stages of project development and under various conditions. The purpose of this document is to establish general guidelines for applying various stream assessment methods to Sound Transit projects based on the most commonly used methodologies in Washington. The information presented herein is for guidance only and is based on some of the most common scenarios encountered on Sound Transit projects. Sound Transit recognizes that other scenarios are possible and that professional judgment will be necessary when considering the best approach for specific projects. Proper application of professional judgment may reduce the collection of extraneous information, and reduce project effort and expense. The intent of these guidelines is to provide some level of consistency in Sound Transit's approach to assessing streams so that local, state, and federal regulators generally know what to expect during project reviews.

For the purposes of this document, project development is categorized into two phases: the initial environmental review and preliminary engineering phase (Phase 1) and the permitting/final design phase (Phase 2). These are further described below:

- **Phase 1 Projects** – Planning stage that includes environmental review under SEPA/NEPA and conceptual and preliminary design. At this stage, various alignments or sites may initially be under consideration, and Sound Transit may or may not have rights-of-entry to the properties being evaluated. In general, objectives at this stage of project development are to:

1) Identify streams within the study area
2) Characterize in-stream and riparian conditions (including fish use and barriers to fish use of the stream) based on readily available information and visual observations as possible
3) Determine potential impacts to streams for the alternative(s) under consideration during the environmental review process, and
4) Identify conceptual-level mitigation opportunities for impacts to streams (aquatic and riparian habitats).

Phase 1 projects may include Endangered Species Act consultation, with the overall objective of being able to make and support accurate effect determinations for federally listed aquatic species potentially occurring in affected streams. Phase 1 of Sound Transit's project development culminates with completion of the NEPA/SEPA environmental review process and Sound Transit's selection of a specific project alternative to build.

- **Phase 2 Projects** – Final project design stage that includes environmental permitting and detailed mitigation to address project-related impacts to streams. At this stage, full access is typically available for the project. The overall objective is to secure necessary environmental permits/approvals including but not limited to local critical areas permits, a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW), a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (Corps), and a 401 Water Quality Certification or Coastal Zone Management Consistency Determination from the Washington State Department of Ecology (Ecology).

Section 2 of this guidance document, **Using the Stream Assessment Flowcharts**, helps guide the reader in determining the appropriate level of data collection during the two project phases described above. To do this, a flowchart has been created for Phase 1 and Phase 2 projects, taking into account various project variables. The flowcharts and overview of how to use them are provided in Section 2. The flowcharts in Section 2 are supported by additional tools and more detailed information on various methodologies described in **Section 3 - Data Collection for Key Aquatic Habitat Elements**. Both Section 2 and Section 3 are organized around five stream features, referred to as Key Aquatic Habitat Elements and described below.

General recommendations for the appropriate use of these guidelines, as well as a discussion of their limitations, are provided in **Section 4 - Considerations and Limitations**.

2. Using the Stream Assessment Flowcharts

The flowcharts should be used to determine the appropriate data needs and level of field assessment that will be required for a project. Working through the flowcharts with site specific information will require the collection of qualitative and/or quantitative information on various Key Aquatic Habitat Elements. These elements are the key habitats and stream features that may be impacted by a project and are directly related to ecological functions that support a stream ecosystem. The Key Aquatic Habitat Elements are:

- ***riparian vegetation,***
- ***physical in-stream habitat,***
- ***biological connectivity,***

- ***water quality and quantity, and***
- ***fish presence, fish habitat use, and stream typing***.

Information would be gathered during site visits or collected using specific survey techniques. The various "levels" of data collection for each Key Aquatic Habitat Element have been classified into one of three categories, or "Tracks". Tracks A, B, and C represent an increasing level of detail for data collection and generally correlate to the phase of the project, the extent to which access is available, and/or the magnitude of stream impact.

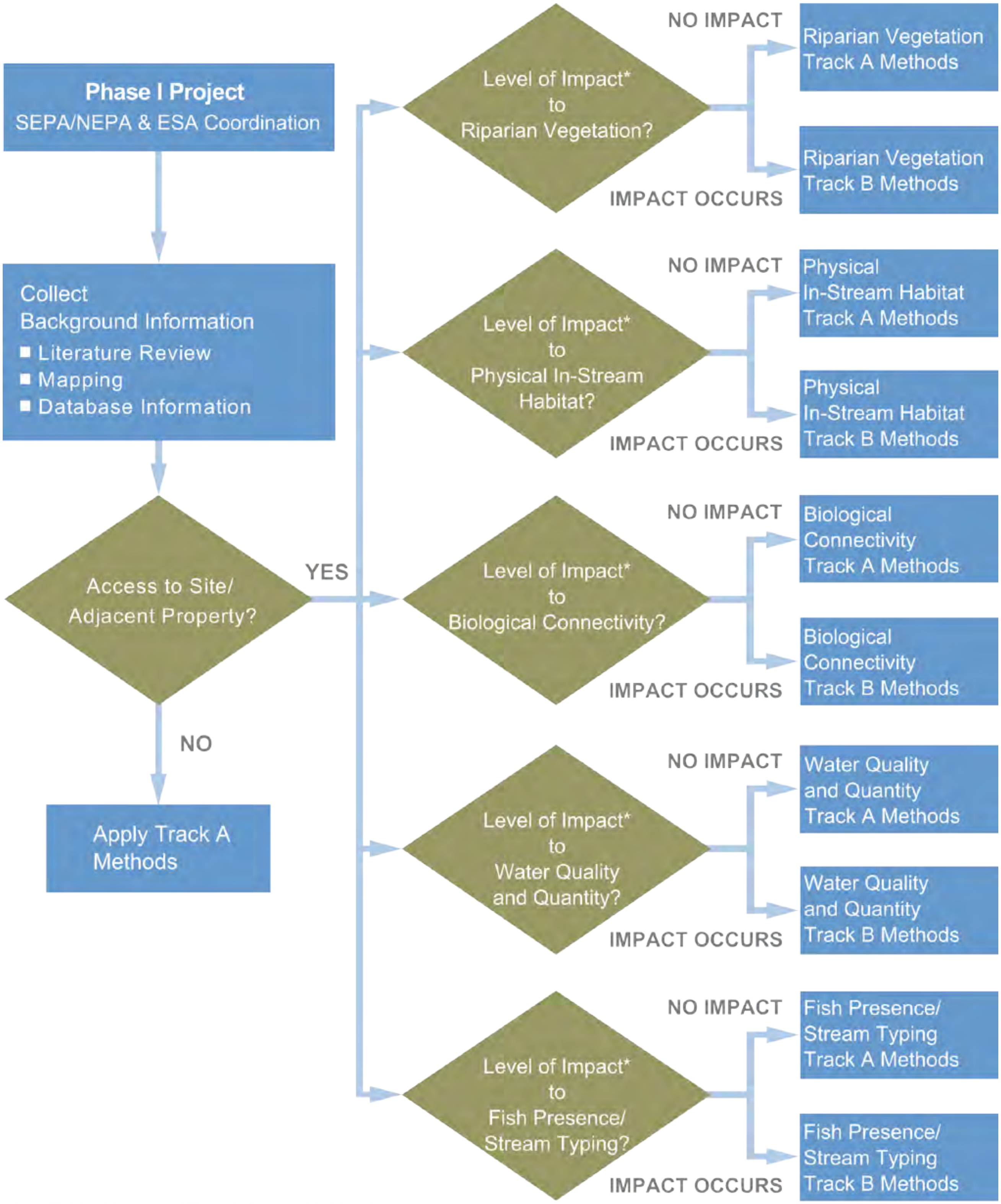
2.1 Phase I Projects

Figure 1 on page 4 is the stream assessment flowchart for planning-level projects. It shows the general process to follow when considering potential stream impacts associated with Phase 1 projects. For all Phase 1 projects that include stream habitats, regardless of access or impact level, the first step is to collect background information on each of the Key Aquatic Habitat Elements associated with each stream in the study area. To help guide these efforts, see **Section 3 – Data Collection for Key Aquatic Habitat Elements**. Section 3 includes more detailed information on specific data sources to consult when collecting this information. The information gathered will help form the basis of the *Existing Conditions* or *Affected Environment* section of the environmental document being prepared for the project.

After collecting background information, some level of data should also be collected in the field. The data collected and the stream assessment methods used will vary for Phase 1 projects depending on 1) whether or not impacts are anticipated impact, and 2) whether or not the project team has right-of-entry to parcels that contain streams.

If access is limited, Track A Methods should be used for each Key Aquatic Habitat Element to the extent feasible. Areas where access to streams is not limited include existing Sound Transit right-of-way, WSDOT right-of-way, or other publicly-owned rights-of-way such as parks. In these areas, the project team should consider the anticipated level of impact to each Key Aquatic Habitat Element. The level of analysis required for a given Key Aquatic Habitat Element should be commensurate with the potential for impacts at a given site. In order to appropriately size the analysis, the flowchart requires consideration of whether or not impacts are expected to occur within the stream environment, looking in turn at each of the Key Aquatic Habitat Elements. For Phase 1 projects, a simple determination of either "Impact" or "No Impact" should be made for each Key Aquatic Habitat Element as presented in Table 1 (see page 5). The results of this analysis will help determine the level of data collection and analysis appropriate for each ecological function. If impacts are anticipated, the project study team should coordinate with Sound Transit environmental staff before initiating Track B data collection efforts as the data may already have been gathered by others or a shift in the project footprint may occur that negates the need to do more detailed surveys.

Depending on the outcomes from using the stream assessment flowchart for Phase 1 projects, various levels of data collection (either Track A or Track B) will need to be conducted. For information on specific stream habitat assessment methods to use under Track A or Track B, refer to **Section 3 – Data Collection for Key Aquatic Habitat Elements.** Tables 3 and 4 in that section outline pertinent assessment methods for each Key Aquatic Habitat Element, including detailed information on specific analysis metrics and survey methods that may be appropriate under Tracks A and B.


Phase I Project
SEPA/NEPA & ESA Coordination
Collect
Background Information
■ Literature Review
■ Mapping
■ Database Information
Access to Site/
Adjacent Property?
YES
NO
Apply Track A
Methods
Level of Impact*
to
Riparian Vegetation?
NO IMPACT
IMPACT OCCURS
Riparian Vegetation
Track A Methods
Riparian Vegetation
Track B Methods
Level of Impact*
to
Physical In-Stream
Habitat?
NO IMPACT
IMPACT OCCURS
Physical
In-Stream Habitat
Track A Methods
Physical
In-Stream Habitat
Track B Methods
Level of Impact*
to
Biological Connectivity?
NO IMPACT
IMPACT OCCURS
Biological
Connectivity
Track A Methods
Biological
Connectivity
Track B Methods
Level of Impact*
to
Water Quality
and Quantity?
NO IMPACT
IMPACT OCCURS
Water Quality
and Quantity
Track A Methods
Water Quality
and Quantity
Track B Methods
Level of Impact*
to
Fish Presence/
Stream Typing?
NO IMPACT
IMPACT OCCURS
Fish Presence/
Stream Typing
Track A Methods
Fish Presence/
Stream Typing
Track B Methods

*See Table 1 in *Sound Transit Stream Habitat Assessment Guidelines* document to assess level of impact

Figure 1
Stream Assessment Flowchart for Sound Transit Phase 1 Projects

Table 1 Impact Classification for Phase I Projects Based on Impacts to Key Aquatic Habitats

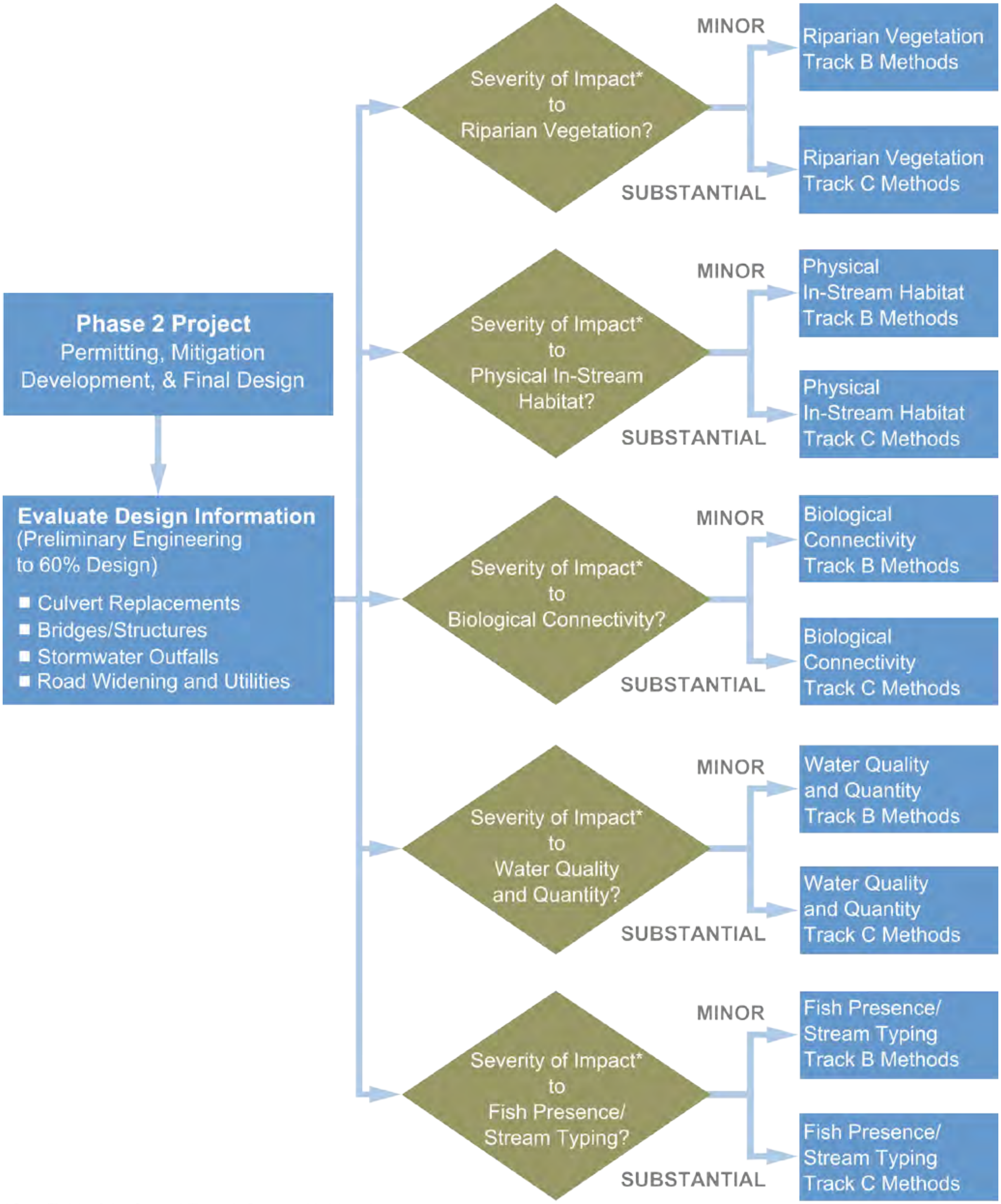
Key Aquatic Habitat Element	Impact Classification	
	No Impact	**Impact**
Riparian Vegetation	No clearing within riparian zone	Clearing riparian vegetation, OR Removing significant trees[1]
Physical In-Stream Habitat	No in-water work or disturbance to bed and streambank below OHWM[2]	Working in-water involving bank hardening, OR Installing fish habitat features (e.g., LWD[3] or boulders), OR Altering substrate
Biological Connectivity	No installation, removal, or alteration of culverts, bridges, weirs, or other potential passage barriers	Replacing or installing culverts, weirs, or bridges in non-fish bearing waters
Water Quality and Quantity	No new stormwater discharges or increases in impervious surface	Adding new stormwater discharges or increasing impervious surface
Fish Presence, Fish Habitat Use, and Stream Typing	No in-water or riparian impacts	In-water or riparian impacts occur

[1] Significant trees should be defined using the local jurisdiction's Critical Areas and/or Urban Forestry code sections. If significant trees are not defined by local code, assume significant trees are those trees 6-inches or greater dbh (diameter breast height).
[2] OHWM – ordinary high watermark
[3] LWD – large woody debris

2.2 Phase 2 Projects

Figure 2 on page 6 is the stream assessment flowchart for projects in final design. It shows the general process to follow when assessing streams in greater detail for Phase 2 projects that involve stream impacts. For Phase 2 projects, access to all riparian areas is assumed for purposes of conducting field work using either Track B or Track C methods. In the unusual event that access to all parcels is not available during Phase 2, Track A methods should be used to the extent feasible.

Using more detailed project design drawings, the level of data collection for Phase 2 projects will vary depending on the severity of impacts to Key Aquatic Habitat Elements. For each stream impact area, impacts should be classified as either a "Minor Impact" or "Substantial Impact". Table 2 on page 7 should be utilized to help classify potential Phase 2 project impacts on each Key Aquatic Habitat Element, based on specific project activities and quantification of expected impacts to each habitat element. However, it should be noted that the criteria may be adjusted based on the relative severity of project impacts within each project area. The project study team should coordinate with Sound Transit environmental staff to confirm the impact classification and intended data collection track before initiating data collection, as some or all of the data may already have been gathered by others, or a shift in alignment may occur that negates the need to do more detailed survey.


Phase 2 Project
Permitting, Mitigation Development, & Final Design
Evaluate Design Information
(Preliminary Engineering to 60% Design)
Culvert Replacements
Bridges/Structures
Stormwater Outfalls
Road Widening and Utilities
Severity of Impact* to Riparian Vegetation?
MINOR
SUBSTANTIAL
Riparian Vegetation Track B Methods
Riparian Vegetation Track C Methods
Severity of Impact* to Physical In-Stream Habitat?
MINOR
SUBSTANTIAL
Physical In-Stream Habitat Track B Methods
Physical In-Stream Habitat Track C Methods
Severity of Impact* to Biological Connectivity?
MINOR
SUBSTANTIAL
Biological Connectivity Track B Methods
Biological Connectivity Track C Methods
Severity of Impact* to Water Quality and Quantity?
MINOR
SUBSTANTIAL
Water Quality and Quantity Track B Methods
Water Quality and Quantity Track C Methods
Severity of Impact* to Fish Presence/ Stream Typing?
MINOR
SUBSTANTIAL
Fish Presence/ Stream Typing Track B Methods
Fish Presence/ Stream Typing Track C Methods

*See Table 2 in *Sound Transit Stream Habitat Assessment* Guidelines document to assess level of impact

Figure 2
Stream Assessment Flowchart for Sound Transit Phase 2 Projects

Table 2 Impact Classification for Phase 2 Projects Based on Impacts to Key Aquatic Habitats

Key Aquatic Habitat Element	Impact Classification	
	Minor Impact	**Substantial Impact**
Riparian Vegetation	Clearing less than 5,000 square feet of riparian vegetation, OR Removing 1 to 5 significant trees[a]	Clearing riparian vegetation in amounts exceeding minor impacts[1]
Physical In-Stream Habitat	In-water work involving bank hardening of <20 linear feet, OR Installing fish habitat features (e.g., LWD[2] or boulders), OR Altering substrate < 100 square feet	In-water work exceeding thresholds for minor impacts, OR stream straightening (meander loss) OR Site will be used as a compensatory mitigation site
Biological Connectivity	Replacing or installing culverts or weirs in non-fish bearing waters	Replacing or installing culverts, fishways, or weirs in fish-bearing waters
Water Quality and Quantity	Adding new stormwater discharges or increasing impervious surface where all stormwater is treated and detained and no 303(d) listed or TMDL[3] reaches	Adding new stormwater discharges or increasing impervious surfaces where discharge to 303(d)/TMDL[3] reach occurs, OR where full treatment and detention does not occur
Fish Presence, Fish Habitat Use, and Stream Typing	Minor impacts to one or more key aquatic habitats listed above	Substantial impacts to physical habitat or riparian vegetation aquatic habitat elements, OR project involves any changes (negative or positive) in fish passage conditions, OR where stream diversions/fish removal activities occur

[1] Significant trees should be defined using the local jurisdiction's Critical Areas and/or Urban Forestry code sections. If significant trees are not defined by local code, assume significant trees are those trees 6-inches or greater dbh (diameter breast height).
[2] LWD – large woody debris
[3] TMDL – total maximum daily load

Depending on the outcomes from using the stream assessment flowchart for Phase2 projects, various levels of data collection (either Track B or Track C) will need to be conducted for each Key Aquatic Habitat Element as appropriate. For information on specific stream habitat assessment methods to use under Track B or Track C, refer to **Section 3 - Data Collection for Key Aquatic Habitat Elements.** Tables 3 and 4 in that section outline pertinent assessment methods for each Key Aquatic Habitat Element, including detailed information on specific analysis metrics and survey methods that may be appropriate under Tracks B and C.

3. Data Collection For Key Aquatic Habitat Elements

Once the user has taken their Phase 1 or Phase 2 project through the appropriate flowchart in Section 2, Section 3 should be consulted to obtain more detailed information on specific data sources and stream assessment methodologies. Table 3 summarizes the recommended data to be collected for streams during all stages of project development. This includes background information, which should be collected in all cases, as well as field data collection for Tracks A, B, and C, which will depend on the anticipated level of impact to each Key Aquatic Habitat Element. The information in Table 3 is organized by Key Aquatic Habitat Element. Collection and assessment techniques for each Key Aquatic Habitat Element are described in more detail below. These data needs and assessment procedures have been selected to be generally applicable over the wide range of project types and permitting scenarios encountered by Sound Transit. During project development, the recommendations provided below may need to be adjusted based on project-specific input from regulatory agencies and Tribal entities.

3.1 Riparian Vegetation

For detailed information on specific riparian habitat assessment techniques and methods, see the *Oregon Riparian Assessment Framework* (Clarke, 2004) or Winward (2000). A common method for estimating canopy coverage is presented in (Daubenmire, 1959).

3.1.1 Background Information

1) Review existing literature –Reports or data sources that may contain information for reach or sub-basin scale riparian conditions include:

- The Washington State Conservation Commission Limiting Factors Analysis, organized by Water Resource Inventory area (http://scc.wa.gov/directory/ or http://www.eopugetsound.org/articles/water-resource-inventory-areas-puget-sound)
- Information on rare plants distribution from the Washington Department of Natural Resources Natural Heritage Program Database at: http://www.dnr.wa.gov/ResearchScience/HowTo/ConservationRestoration/Pages/amp_nh_data_instructions.aspx
- Local watershed analysis or stream assessment reports
- Local Shoreline Master Program Inventory reports Shoreline Master Program Inventory reports http://www.ecy.wa.gov/programs/sea/shorelines/smp/citizen.html

2) Review aerial photographs and any available site photos.

- Google Earth – also view past riparian conditions using historic photos on site
- Bing Maps – Birds Eye View feature is useful for assessing riparian conditions
- Digital or hardcopy orthophotos

3) Based on the results of steps 1) and 2) above, summarize the following:

- General vegetation type (forested, shrub, herbaceous, none (bare earth/built)),
- Tree canopy type (deciduous, coniferous, or mixed)
- Approximate density of vegetation types (dense or sparse),
- Approximate width of buffer on each streambank at project site (based on aerial photos), and
- Estimated average riparian buffer width upstream and downstream of project site.

Table 3. Overview of Data Collection Needs For Key Aquatic Habitat Elements

Key Aquatic Habitat Element[1]	Background Information[2]	Track A[3] – Limited Site Access or No Impact	Track B – Site Access and Minor Impacts	Track C – Site Access and Substantial Impacts OR Site to be Used as Compensatory Mitigation
Riparian Vegetation	1) Review existing literature 2) Review aerial photographs and existing site photos 3) Characterization should include: - vegetation type (i.e., forested, shrub, herbaceous, built, coniferous, deciduous, genus and species if possible), - relative vegetation densities	1) Site visit with qualitative description of riparian conditions: - vegetation type, height, and relative density - width/length of riparian zone - presence of overhanging or fallen vegetation/stream cover - presence of invasive plant species (estimate percent cover if possible)	1) Collect qualitative and quantitative field data from riparian zone including: - approximate height for each vegetation layer - approximate tree/shrub densities - identify invasive species and observed snags/dead and down trees - width, length, and area of functioning riparian zone - stream banks vegetation type, height, and density - percent vegetation that covers the stream - qualitative evaluation of known limiting riparian factors such LWD[3] or shade limitations	Collect Track B data, supplemented by tree counts, GPS survey, or professional land survey within forested riparian impact area to include: - tree species - tree diameters - estimated tree heights - locations of snags/dead and down
Physical In-Stream Habitat	1) Review existing literature 2) Review aerial photographs, topographic maps and site photos 3) Characterization should include: - stream width - dominant in-stream sediment - LWD[4] presence - channel morphology - streambank condition	1) Site visit to qualitatively assess the following through visual observations: - stream width - LWD presence - general channel morphology - general bank condition - dominant stream substrate - relative amount of instream cover and refuge **ALSO SEE TABLE 4 FOR MORE DETAILS**	1) Site visit to quantitatively assess the following conditions within, upstream, and downstream of project site: - wetted and OHWM[5] stream width - LWD size, location, and type - channel morphology - pool, riffle, run, glide - bank condition - stability/armoring - stream substrate - dominant/subdominant and particle distribution **ALSO SEE TABLE 4 FOR MORE DETAILS**	Same as Track B, but specific habitat impacts or intended use for mitigation may require: 1) Track B data collection over a wider area 2) GPS/professional survey of habitat elements delineated in Track B, or 3) detailed quantitative analysis of habitat elements (e.g., bulk substrate analysis, micro-channel morphology) **ALSO SEE TABLE 4 FOR MORE DETAILS**
Biological Connectivity	1) Review existing literature on existing fish passage conditions/barriers and check the WDFW Fish Passage Barrier Map 2) If no barriers are recorded online, Track B/C methods may be required regardless of impact level 3) Review aerial photographs to identify potential barriers at site, upstream, or downstream 4) Review topographic maps and watershed analyses	1) Site visit to qualitatively assess the following information on man-made fish passage structures: - type/material of structure - approximate size/configuration of structure - condition of structure (i.e. wear, damage, etc.)	1) Site visit to quantitatively assess man-made structures: - relative inlet and outlet elevations - stream channel bankfull width 2) If necessary, conduct WDFW Level A Culvert analysis per WDFW (2009) to assess status as fish passage barrier. Check with WDFW prior to conducting the analysis; they may already have that information, particularly if the culvert is on WSDOT right-of-way	Same as Track B, but in some cases coordination with design team on conducting a WDFW Level B culvert analysis per WDFW (2009) may be necessary to accurately assess barrier status
Water Quality and Quantity	1) Review existing literature/databases for information on: - water quality/contaminants, - stream temperatures, - flow data - water quality/quantity limiting factors	1) Site visit with qualitative description of: - type/material of outfall/drainage structure - approximate size/configuration/condition of outfall/drainage structure - visual estimate of streamflow and stream velocity - stream temperature - presence of septic systems within the project area - Water source (stormwater, other?)	No additional effort	No additional effort
Fish Presence, Fish Habitat Use, and Stream Typing	1) Review existing literature/databases for information on: - fish presence and fish habitat use - stream typing - contributing basin area - natural/manmade barriers downstream	If result of background information does not provide complete or definitive results, conduct site visit and make preliminary determination based on WAC 222-16-031. Qualitatively assess the following: - stream width/OHWM, - flow conditions, - fish observations	If result of background information does not provide complete or definitive results proceed with one or more of the following options, as appropriate: 1) Request government/Tribal fish use/stream typing assistance 2) Utilize a qualified biologist to estimate fish presence/absence based on habitat conditions within, upstream, and downstream of site Conduct reconnaissance site visit to identify natural downstream barriers	Same as Track B, but in extraordinary circumstances, fish sampling by a qualified biologist may be appropriate[6]. Sampling techniques could potentially include: - snorkel surveys - minnow traps - electrofishing

[1] See text in Section 3 – Data Collection for Key Aquatic Habitat Elements for more specific information on each habitat element

[2] Background information should be compiled regardless of access situation or level of impacts

[3] If lack of access, the information for Track A should be collected in the field from adjacent publicly accessible properties or right of way to the extent possible/practical

[4] LWD – large woody debris

[5] OHWM – ordinary high water mark

[6] If information collected as part of Track A or Track B does not provide the required level of certainty on fish presence and stream typing, and no natural barrier exists downstream, generally assume fish presence and consult with ST environmental staff. These activities will require a Scientific Collection Permit from WDFW, and in accordance with WAC 220-20-045. Electrofishing, per requirements in WAC 220-20-045, should only be used to assess fish presence under extraordinary circumstances where such actions are pre-approved by ST (e.g., this information is tied to a permit condition or the information is crucial for design of a substantial design element such as road or culvert)

3.1.2 Track A Information

After collecting and synthesizing relevant background information on riparian vegetation conditions within the project area, conduct a reconnaissance-level site visit within existing Sound Transit or public right-of-way/easement areas. Provide qualitative description of riparian conditions including the following:

- Note buffer vegetation type – e.g., forested, shrub, herbaceous, none (bare earth/built). Identify shrub and/or tree species if possible, including any observed invasive species.
- Note relative buffer vegetation density (e.g., sparse, moderately dense, dense) and approximate height of each vegetation layer, particularly the tree layer
- Note observable width/length of riparian zone
- Note extent and type of overhanging vegetation and any observed any observed LWD originating in riparian zone. Estimate percent overhead cover in stream thalweg.
- Note and describe extent of vegetation overhanging stream channel, fallen vegetation
- Qualitative evaluation of potential limiting riparian factors such (LWD or shade limitations)

3.1.3 Track B Information

Collect similar information as listed in Track A; however site access will allow for on-site evaluation of the riparian condition based on qualitative and quantitative field data gathered from within the riparian zone.

- Identify shrub or tree species within the riparian zone, including any observed invasive species.
- Estimate or measure canopy cover and ground cover within the riparian zone (Daubenmire, 1959) for dominant species. If measuring, use plots or intercept along a measuring tape.
- Approximate average diameter (diameter breast height – DBH) of trees within riparian zone using representative measurements
- Width and length of functioning riparian zone and
- Riparian interaction with stream banks (e.g., overhanging vegetation, bank stabilization by roots),
- Measure average in-stream riparian cover in the stream thalweg using a densitometer (average riparian cover measured facing upstream, downstream, left bank, and right bank).
- Observations or qualitative evaluation of reach or basin scale limiting riparian factors (such as large-scale LWD or shade limitations).

3.1.4 Track C Information

If the project involves substantial impacts to the riparian corridor, particularly forested riparian areas, it may be necessary to supplement the data collection efforts from above with a more accurate tree survey conducted with GPS survey or professional land survey. Within forested buffer impact areas, detailed survey of the following parameters may be appropriate:

- Tree locations
- Tree species
- Tree diameters
- Estimated tree heights
- Locations of snags and dead/ down woody debris

3.2 Physical In-Stream Habitat

There are literally hundreds of formal assessment protocols prepared for the evaluation of stream environments and habitats. Assessment methods to assess physical in-stream habitat for Pacific Northwest streams are also numerous (e.g. Overton et al. 1997, Pleus and Schuett-Hames 1998, Barbour et al. 1999). In addition, several agencies in the region have developed their own protocols that use unique suites of channel features and channel feature definitions. These protocols generally address measurement of the same in-stream habitat parameters (e.g., woody debris, channel morphology, streambank condition) with varying levels of detail. In order to cover the range of data requirements for both Phase 1 and Phase 2 Sound Transit projects, the discussion of field methods (Tracks A, B and C) for an assessment of this Key Aquatic Habitat Element is focused on these in-stream habitat parameters. Table 4 on page 13 details the specific metrics/measurements that may be applicable for each parameter under Tracks A, B, and C, with recommendations for specific methods or protocols, where appropriate. Table 5 summarizes the methodological references noted in Table 4 for various in-stream habitat parameters.

In addition, other authors have compared and contrasted various protocols and assessments from a nation-wide perspective (Somerville, 2010), with a focus on those assessments prepared for application in the Pacific Northwest region (Johnson et al., 2001; Stolnack et al. 2005). These review documents are excellent sources to consult prior to undertaking a detailed physical habitat assessment, especially in cases where the assessment is focused on specific in-stream habitat parameters.

3.2.1 Background Information

1) Review existing literature on physical in-stream habitat conditions, including stream size (width), presence of LWD and complex habitat features, approximate stream gradient/channel morphology, stream substrate and sediment condition, and bank condition. Reports that may contain information reach or sub-basin scale physical conditions include:
    - The Washington State Conservation Commission Limiting Factors Analysis, organized by Water Resource Inventory area (http://scc.wa.gov/directory/ or http://www.eopugetsound.org/articles/water-resource-inventory-areas-puget-sound)
    - Salmon recovery plans – Puget Sound: http://www.psp.wa.gov/SR_map.php King County: http://www.kingcounty.gov/environment/animalsAndPlants/salmon-and-trout.aspx
    - Shoreline Master Program Inventory reports for local jurisdictions http://www.ecy.wa.gov/programs/sea/shorelines/smp/citizen.html
    - Williams et al. (1975)
    - Local watershed analysis or stream assessment reports

2) Review aerial photographs, topographic maps, and any available site photos.
    - Google Earth – also view past stream habitat conditions using historic photos on site
    - Bing Maps – Birds Eye View feature is useful for assessing some in-stream conditions
    - Digital or hardcopy orthophotos
    - Topographic maps (LIDAR data if available) to determine stream gradients. LIDAR data can be obtained from the Puget Sound LIDAR Consortium at http://pugetsoundlidar.ess.washington.edu/

3) Use the results of 1) and 2) above to describe the following in-stream habitat conditions at the site/stream reach to the extent feasible:
   - general horizontal and vertical channel form (stream gradient and channel morphology) including the presence and quality of pools and riffles and channel confinement/entrenchment
   - dominant in-stream substrates (cobble, gravel, fines, etc.) and general sediment transport dynamics (source, transport, or response reach),
   - presence/absence of LWD, or frequency of LWD (if available),
   - streambanks condition, including bank stability and presence of bank hardening/revetments

3.2.2 Track A Information

After collecting and synthesizing relevant background information on in-stream physical habitat conditions within the project area, conduct a site visit within existing Sound Transit or public right-of-way/easement areas. Provide qualitative descriptions, based on visual observations, of on-site in-stream habitat conditions as detailed in Table 4 on the following page. The primary Channel Geomorphological Units (CGU) used for the assessment will likely be limited to fast/slow habitat types, as the evaluation will be based on visual observations only.

3.2.3 Track B Information

Collect similar information as listed in Track A; however site access will allow for better evaluation of in-stream physical habitat conditions, based on qualitative and quantitative field data gathered from within the stream. Information on specific recommended measurements, including appropriate references, is presented in Table 4. The primary Channel Geomorphological Units (CGU) used for the assessment will likely include a moderate detail (pools, riffles, and runs/glides at a minimum). Pools may be further classified into the type of pool (e.g., lateral scour, medial scour, boulder-formed pocket pool).

3.2.4 Track C Information

If the project involves substantial impacts to in-stream habitat, particularly impacts to the stream bed, stream banks, or local hydraulics, or if the site is to be used for compensatory mitigation, it may be necessary to supplement the data collection efforts from above with more detailed measurements as listed in Table 4.

Table 4. Specific Metrics for Assessment of Physical In-Stream Habitat Parameters

Parameter	**Metric/Measurement**	**Track A – Limited Site Access and Low Impact**	**Track B – Site Access and Moderate Impacts**	**Track C– Site Access and Substantial Impacts OR Site to be Used as Compensatory Mitigation**
Channel Form and Profile	Macrohabitat - habitat type	Visual characterization of Channel Geomorphological Units (CGUs) into slow/fast water habitats.	Classify and measure macrohabitat unit length using classification including pools, riffles, runs, and/or glides. Depending on specific impacts, additional detail may be appropriate (Arend 1999).	Same as Track B. If substantial alteration of stream hydraulics, may be useful to classify and measure CGUs using detailed classification system (Arend 1999).
	Macrohabitat - pool characteristics	Visual observation of water depths of slow/fast water habitat approximate depth.	Measure maximum pool depths and residual pool depths. Classifying pools based on minimum functional pool width/depth (Pleus et al., 1999).	Same as Track B
	Stream Reach Classification	N/A	N/A	If substantial alteration of stream hydraulics, may be useful to use existing geomorphic classification system to classify project reach - Montgomery and Buffington (1998).
	Stream Slope	Estimate stream slope using topographic maps or LIDAR data if available.	Measure using clinometer or auto-level.	Same as Track B. If substantial alteration of stream hydraulics, may be useful to conduct longitudinal profile study.
	Stream Patterns	Visual observation of channel patterns (e.g., sinuous versus straight channel).	Visual observation of channel patterns (e.g., sinuous versus straight channel).	Same as Track B. If substantial alteration of stream hydraulics, may be useful to measure meander length, radius of curvature, sinuosity, and meander belt width.
	Confinement	Visual assessment of channel confinement and entrenchment.	Measure channel confinement/entrenchment. The entrenchment ratio is the ratio of the width of the flood-prone area to the surface width of the bankfull channel. The flood-prone area width is measured at the elevation that corresponds to twice the maximum depth of the bankfull channel.	Same as Track B. If substantial alteration of stream hydraulics, may be useful to survey complete stream cross-section.
	Channel Dimension/Shape	Visual estimation of bankfull width.	Measure average bankfull width and depth in project area.	Same as Track B. If substantial alteration of stream hydraulics, may be useful to survey complete stream cross-section.
Streambank Condition	Stability	Visual observation of nature and extent of unstable banks.	Measure extent of and location of unstable banks with type of instability (slide, slump, slough, etc.).	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
	Bank Hardening/Revetments	Visual observation of nature and extent of bank hardening/revetments.	Measure extent and location of bank hardening/revetments with type of hardening (riprap, earthen, structural, etc.).	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
Substrate/Sediment	Particle Frequency	Visual estimate of dominant and subdominant substrate over project area.	Visually estimate dominant and subdominant substrate within each CGU. Supplement data with pebble counts at representative pool tail outs (Bunte and Abt 2001).	Same as Track B. If substantial alteration of stream hydraulics, may be useful to use grid surface sampling or sub-surface volumetric sampling (Bunte and Abt 2001).
	Percentage of Fine Sediments/Embeddedness	Visual estimate of amount of surface fines in pools.	Visually estimate percentage of surface fines in each pool CGU. Estimate substrate embeddedness in riffles and pools.	Same as Track B. If substantial alteration of stream hydraulics, may be useful to use grid surface sampling or sub-surface volumetric sampling (Bunte and Abt 2001).
Large Woody Debris	LWD Presence, Frequency, and Location	Visual count of observed pieces of woody debris (>6 feet in length and 0.5 feet in diameter).	Measure location and presence of each piece of LWD (>6 feet in length and 0.5 feet in diameter) and debris jams. Relative position of LWD (thalweg center, thalweg edge, bankfull, bankfull edge).	Same as Track B. If substantial alteration of stream hydraulics or LWD composition, may be useful to measure additional parameters, including mapping/GPS of LWD orientation.
	Debris Jams	Visual observations of presence/absence of LWD jams, including approximate location and size of jam.	Measure location and orientation of each LWD jam, including number of pieces of debris in jam.	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
	LWD Size	Visual estimate of LWD size (length and width).	Measure LWD size (length and width) for each piece of LWD.	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
	Age and Type	Visual estimate of LWD age and composition (deciduous or coniferous).	Measure LWD species (coniferous, deciduous, or unknown) and LWD age class (Shuett-Hames et.al., 1999a).	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
Cover and Refuge	Pool quality	Visual observation of relative pool size, location, depth, and cover.	Assess pool quality using a Pool Quality Index (Platts et al. 1983).	Same as Track B
	Undercut banks	Visual observations of presence/absence of undercut banks.	Measure location and presence of undercut banks.	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
	Off-channel/side-channel habitat	Visual observations of presence/absence of off-channel/side-channel habitat, including associated wetlands. Indicate presence of beaver dams or beaver activity within project area.	Include side-channel habitat in channel form and profile, LWD, streambank condition, and sediment measurements. Measure location, area, and water depth of off-channel areas. Record features of beaver dams and associated habitat.	Same as Track B. If substantial specific impact to this habitat element or the element is crucial to a key design feature, may be useful to use GPS or PLS to survey location of features.
	In-stream cover/protection	Visual observation of aquatic macrophytes, habitat boulders, and other in-stream structures providing cover.	Measure location and presence of aquatic macrophytes, habitat boulders, and other in-stream structures providing cover.	Same as Track B

Table 5 below summarizes the methodologies Sound Transit recommends for assessing in-stream habitat parameters.

Table 5. Methodological References for Physical In-Stream Habitat Parameters

Metric/Measurement	**Methodology Reference**
Habitat Unit Classification and Measurement	Arend, K.K. 1999. Macrohabitat Identification. Pages 75-93 *in* M.B. Bain and N.J. Stevenson, editors. Aquatic habitat assessment; common methods. American Fisheries Society. Bethesda, Maryland.
Pool Characteristics • measurement of maximum pool depths and residual pool depths • classification of pools based on minimum functional pool width/depth	Pleus, A. E., D. Shuett-Hames, and L. Bullchild. 1999. TFW Monitoring Program method manual for the habitat unit survey. Prepared for the WA State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-003. DNR #105. June. 31 pp.
Stream Reach Classification	Montgomery DR, Buffington JM. 1998. Channel Processes, Classification and Response. *In* Naiman, R. and Bilby, R. (Eds) River Ecology and Management: Lessons from the Pacific Coastal Ecoregion, New York, NY: Springer-Verlag.
Sediment Characteristics • Particle Frequency • Percentage of Fine Sediments/Embeddedness	Bunte, K. and Abt. S.R. 2001. Sampling surface and subsurface particle size distributions in wadeable gravel and cobble bed streams for analyses in sediment transport, hydraulics and streambed monitoring. General Technical Report RMRS-GRT-74. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 428 pp.
Large Woody Debris • LWD Presence, Frequency, and Location • Location, orientation, and number of pieces in each LWD jam • LWD size (length and diameter) • LWD species and age class	Shuett-Hames, D., A. E. Pleus, J. Ward, M. Fox, and J. Light. 1999a. TFW Monitoring Program method manual for the large woody debris survey. Prepared for the Washington State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-004. DNR #106. March. 33 pp.
Pool Quality Index	Platts, W. S., W. F. Megahan, and G. W Minshall. 1983. Methods for evaluating stream, riparian, and biotic conditions. Gen. Tech. Rep. INT-138. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 70 p. http://www.fs.fed.us/rm/pubs_int/int_gtr138.pdf

3.3 Biological Connectivity

An analysis of biological connectivity and associated fish passage conditions may be a key element of Sound Transit projects, particularly for the creation, reconstruction, or removal of stream crossings (roads or bridges). Fish passage structures are regulated under the Washington State Hydraulic Code (WAC 220-110-170). Therefore, where such actions may occur, it is important to have early coordination with the project design team to determine and coordinate on overall project design and permitting needs.

Any definitive evaluation of fish passage conditions should be conducted using the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW, 2009). Likewise, design of stream crossings should utilize the standards and procedures in the WDFW *Water Crossing Design Guidelines* document (Barnard, et al. 2013).

3.3.1 Background Information

Review existing literature on biological connectivity and fish passage conditions, including the presence of any known or potential man-made or natural barriers to fish passage, including type, size, and location of such features. Data sources that may contain information reach or sub-basin scale biological connectivity and fish passage conditions include:

- WDFW Fish Passage Program: Data and Maps http://wdfw.wa.gov/conservation/habitat/fish_passage/data_maps.html
- WSDOT Fish Passage Reports http://www.wsdot.wa.gov/environment/biology/fp/fishpassage.htm#reports
- Topographic maps of stream for assessment of steep downstream reach gradients /natural barriers
- Local watershed analysis or stream assessment reports

3.3.2 Track A Information

After collecting and synthesizing relevant background information on biological connectivity habitat conditions within the project area, conduct a site visit within existing Sound Transit or public right-of-way/easement areas. Provide qualitative descriptions, based on visual observations, of biological connectivity habitat and fish passage conditions, including the following:

- Location and approximate dimensions of structures including length, width, and height
- Type of structures – Culvert, bridge, fishway, weir structure, etc.
- Material of structures - Concrete, stone/rip-rap, aluminum, PVC, etc. Note presence of culvert corrugation and liners
- Approximate size/configuration of structures – For culverts note type of structure (round, box, bottomless box, squash, arch, elliptical, etc.) and whether structure is countersunk
- Approximate condition of structure – Note any deterioration or damage to structure
- Presence of natural streambed material within culvert and estimate of percent of culvert opening affected by sedimentation
- Presence and relative extent of any backwater at culvert inlet
- Presence and height of any perch at culvert outlet
- Presence of any plunge pool at culvert outlet and estimated depth of pool

3.3.3 Track B Information

Collect similar information as listed in Track A, however site access will allow for better evaluation of connectivity and fish passage condition based on qualitative and quantitative field data gathered from within the stream. The use of the Level A Methodology and Field Form from WDFW (2009) is highly recommended for assessment purposes as it will ensure all essential information is captured. In addition to information collected in the Track A analysis on culvert shape, the following data should be recorded per WDFW (2009):

- Measure relative inlet and outlet elevations (preferable) or measured slope of culvert
- Measure culvert dimensions
- Measure stream channel width (bankfull width)
- Measure water surface drop at outfall
- Measure maximum plunge pool depth

3.3.4 Track C Information

If the project involves substantial impacts fish passage structures, particularly the alteration of an existing potential barrier and the Level A Analysis (WDFW, 2009) is not conclusive on barrier status (Level A does not provide conclusive barrier status in all cases), it may be necessary to coordinate with the design team to determine if a Level B analysis is required. This analysis is usually completed by a hydrologist, geomorphologist, or engineer and requires measurement of additional upstream and downstream parameters including channel width, depth, slope, and characterization of bed material. For specific methods, data requirements, and analysis tools, see WDFW (2009).

3.4 Water Quality and Quantity

3.4.1 Background Information

Review existing literature on water quality and flow conditions, including known impairments of water quality and temperature, and stream flow characteristics. Include any information on impairments or limiting factors from the literature or databases. Data sources that may contain information reach or sub-basin scale water quality and flow conditions include:

- Washington Streamflow Data - USGS
  Historic data = http://wa.water.usgs.gov/data/realtime/adr/interactive/
  Realtime data= http://waterdata.usgs.gov/wa/nwis/current?type=flow
- 303(d) list - Washington State Department of Ecology http://www.ecy.wa.gov/programs/wq/303d/
- King County Hydrologic Information Center
  http://green.kingcounty.gov/WLR/Waterres/hydrology/default.aspx
- Streams Water Quality Monitoring Data
  http://green.kingcounty.gov/WLR/Waterres/StreamsData/StreamList.aspx
- Local watershed analysis or stream assessment reports

3.4.2 Track A Information

After collecting and synthesizing relevant background information on water quality and quantity conditions within the project area, conduct a site visit within existing Sound Transit or public right-of-way/easement areas. Provide qualitative description of water quality and flow conditions including the following:

- Note any drainage outfalls, including type/size/location of structure, possible source and volume of outflow during time of site visit.
- Visually estimate streamflow (in cubic feet per second) and stream velocity (feet/second).

3.4.3 Track B and C Information

In almost all cases, the information gathered during the Background Information and Track A investigations will be sufficient to effectively characterize water quality and flow. However, in certain rare circumstances, additional site-specific water quality and flow measurements may be appropriate. As these circumstances are rare, and any such measurements should be tailored to specific project requirements (e.g., permit conditions), such additional measurements are not discussed in this document.

3.5 Fish Presence, Fish Habitat Use, and Stream Typing

There is a difference between fish presence and fish habitat use, and just because fish may not be present at a given time of the year does not mean that a particular stream or stream habitat is not used by fish. Fish presence may respond to seasonal use of a given stream or habitat type as well as a particular life stage of a given fish species. For these reasons, the general best approach is to assume fish habitat use wherever suitable fish habitat exists, and consult with Sound Transit environmental staff before collecting additional data on fish presence.

The determinations of fish habitat use, and the related element of stream typing, are key in determining the potential severity of project impacts, the width of regulated stream buffers, and the requirements for ensuring fish passage at crossing structures. Although for rivers and larger streams, extensive information exists on fish habitat use and stream type, this information is often times lacking for smaller first and second order tributary streams. The following methods utilize an extensive search of background information coupled with measurements of a stream's physical characteristics to evaluate the potential for fish habitat use based on the presence of suitable fish habitat.

3.5.1 Background Information

Review existing literature on fish habitat use and stream typing conditions, including any documented presence of fish species potentially or known to be present. It should also include documented or potentially present suitable fish habitat within the project area. Include any existing stream typing information from the literature or databases. Data sources that may contain information reach or sub-basin scale biological connectivity and fish passage conditions include:

- WDFW Priority Habitats and Species Online Mapper http://apps2.dfw.wa.gov/prodphsontheweb/viewer.aspx?auth=dchBC3QPoGho84hRndFNAyiX2awipVxGmK5mj/T0HbP429kXX73bzQ==
- WDFW SalmonScape Database http://apps.wdfw.wa.gov/salmonscape/
- DNR Water Typing Online Mapper http://www.dnr.wa.gov/businesspermits/topics/forestpracticesapplications/pages/fp_watertyping.aspx
- The Washington State Conservation Commission Limiting Factors Analysis, organized by Water Resource Inventory area (http://scc.wa.gov/directory/ or http://www.eopugetsound.org/articles/water-resource-inventory-areas-puget-sound)
- Wild Fish Conservancy Water Type Assessments and Interactive Maps http://wildfishconservancy.org/resources/maps
- Fish distribution in WRIA 8: http://www.govlink.org/watersheds/8/reports/fish-maps/default.aspx
- A Catalog of Washington Streams and Salmon Utilization (Williams et al., 1975)
- Local jurisdiction Critical/Sensitive Area maps
- Local watershed analysis or stream assessment reports

3.5.2 Track A Information

After collecting and synthesizing relevant background information on fish habitat use and stream typing within the project area, conduct a site visit within existing Sound Transit or public right-of-way/easement areas. Visually observe for the presence of fish. If the background information or visual observation does not clearly indicate fish use status of a particular stream, it may be difficult to determine fish use and therefore stream typing) at a site based upon the direct observation of salmonids. Due to poor visibility, low escapement levels, the existence of human-made barriers, or other factors, fish may not be observed during the field visit.

The Forest Practices Rule (WAC 222-16-031) is used to define water types. Based on the WAC, there are a number of methods to determine if a site has the potential to provide fish habitat. Satisfaction of one or more of the following criteria qualifies a water body as fish bearing or potential fish habitat:

- Watercourses shown by DNR as containing fish on DNR stream typing maps, the WDFW Priority Habitats and Species database, or the WDFW SalmonScape database.
- Watercourses with documented salmonid use determined by visual observation, electrofishing, or verification by local biologists.
- Estimate scour line width. Watercourses having average scour line widths (bankfull widths) in excess of 0.6 meters (2 feet) in Western Washington, provided the stream gradient is less than 20 percent.

Note that seasonally dry streams (ephemeral or intermittent) can provide fish habitat during periods of flow. When evaluating dry stream channels, consider the physical characteristics of the channel and proximity to known fish-bearing water. Also, consider the timing of fish presence for species in the area that may enter the habitat when flow is present. For example, chum salmon often use streams that may only flow for a few months out of the year; they will spawn in the channel during the fall when flow is present and fry will out-migrate in the spring immediately after emergence. In another example, off-channel rearing habitat and floodplain habitat may be used by juvenile salmonids during winter months, even though the channel is dry during the summer.

3.5.3 Track B Information

Better site access will allow for a more comprehensive analysis of evaluation of bankfull width, and greater opportunity to visually observe for fish presence. However, increased site access will not necessarily provide definitive results. If the result of background information and Track A does not provide complete or definitive results, the following options may be considered, as appropriate:

- Request fish use/stream typing assistance from WDFW, Tribal entities, or local government agencies. Assistance may consist of local knowledge of fish distribution or technical assistance with fish presence studies.

- Utilize a qualified fisheries biologist to estimate fish habitat use based on habitat conditions, within, upstream, and downstream of site, noting that absence of fish during a site investigation does not by itself confirm perennial absence.

- If background information indicates a potentially natural downstream fish barrier, conduct downstream reconnaissance to locate and assess natural barrier. Note that lack of fish access for anadromous species does not indicate absence of resident fish species (e.g., resident cutthroat trout or sculpin).

- Watercourses with documented salmonid use determined by visual observation, electrofishing, or verification by local biologists.

3.5.4 Track C Information

In extraordinary circumstances (e.g., this information is tied to a permit condition or the information is crucial for design of a substantial design element such as road or culvert), electrofishing, per the requirements in WAC 220-20-045 can be used to establish fish presence and stream typing. This pathway should only be used under careful consideration and in consultation with WDFW. Electrofishing, or other fish sampling methods, should be pre-approved by Sound Transit environmental staff and conducted by experienced fisheries biologists.

4. Considerations and Limitations

The purpose of this report, including associated flowcharts and tables, is to serve as a guide for assessing streams that are potentially affected by Sound Transit projects. Due to variation in the specific type and severity of project impacts, coupled with property access issues and the unique requirements of multiple regulatory agencies that are commonly involved, it is difficult to craft a "one size fits all" survey protocol. This difficulty is illustrated by an analysis of the stream assessment methods used by two large governmental agencies involved in transportation projects: the Washington State Department of Transportation and the King County Road Services Division. Neither of these agencies has specific stream assessment protocols for determining project impacts. This is also common for most local governments, as a sufficiently broad, detailed, and inclusive stream assessment survey protocol to cover all available project permitting and design needs would be inherently detailed. This in turn can lead to the potential collection of a substantial amount of information, extraneous to the needs of the project, resulting in an increase in project effort and expense.

Therefore, one should consider some project-specific elements prior to assessing streams. This will allow the user to specifically tailor the stream assessment methods in order to both "right size" the analysis methods and to ensure that information is collected in an efficient way that anticipates current and future information needs. These elements can be assessed by asking and answering the following project-specific questions:

- **Which specific habitat elements and sub-elements will be affected (e.g., in-stream substrate, stream banks, riparian zone width, etc.)?** Think carefully about the specific project impacts or mitigation needs and the information that should be collected to compare or assess these impacts or evaluate appropriate mitigation.

- **What project stage or stages is data from the stream assessment to be used -- programmatic planning, alternative comparison, initial permitting, project design, or mitigation design?** The stream assessment should be tailored to a level of detail that addressed the current project planning, design, or permitting phase and that will support the related documents and plans.

- **If the general purpose of the stream assessment is to help compare project options, is this comparison for programmatic options, many specific design alternatives, a small number of design alternatives, or is the purpose to compare a single alternative with a no-build option?** Based on the specific answer, the stream assessment should be tailored to allow for adequate analysis of impacts, without collecting extraneous information. Conversely, if only one site/alignment is being evaluated and access is not limited, collecting more detailed information early on may be beneficial in the long-term, especially if mitigation is necessary.

- **If the purpose of the stream assessment is to compare among a limited number of specific design options, do the alternatives impact stream habitats in similar manners and locations?** If impacts to streams from most or all of the alternatives will occur in the same geographic area(s), more robust initial stream assessment methods may be appropriate in order to minimize multiple assessments during the project lifecycle, thereby maximizing efficiency and limiting costs.

- **What is the project timeframe for alternative comparison, design, and permitting**? Expedited timeframes may require a more robust initial stream assessment method, in order to quickly advance design and permitting, or to avoid the risk of unexpected delay at a late stage of the project.

- **Are other project staff collecting similar or ancillary field data on stream conditions**? It is important to coordinate with other project staff on their data acquisition needs prior to selecting final assessment methods. For example, structural or civil engineers may be performing detailed hydraulic or hydrological analyses within the same stream reaches, and potentially eliminating the need for some channel morphology or sediment data collection during the stream assessment.

REFERENCES

Arend, K.K. 1999. Macrohabitat Identification. Pages 75-93 *in* M.B. Bain and N.J. Stevenson, editors. Aquatic habitat assessment; common methods. American Fisheries Society. Bethesda, Maryland.

Barnard, R. J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J. P. Klavas, D.C. Ponder, P.D. Smith, and P. D. Powers (2013), Water Crossings Design Guidelines, Washington Department of Fish and Wildlife, Olympia, Washington.

Bunte, K. and Abt. S.R. 2001. Sampling surface and subsurface particle size distributions in wadeable gravel and cobble bed streams for analyses in sediment transport, hydraulics and streambed monitoring. General Technical Report RMRS-GRT-74. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 428 pp.

Clarke, S., L. Dent, P. Measeles, T. Nierenberg and J. Runyon. 2004. Oregon Plan for Salmon and Watersheds: Oregon Riparian Assessment Framework. Oregon Watershed Enhancement Board (OWEB). Salem, Oregon.

Daubenmire, R. 1959. A canopy-coverage method of vegetational analysis. Northwest Science 33:43-64.

Johnson, D. H., N. Pittman, E. Wilder, J. A. Silver, R. W. Plotnikoff, B. C. Mason, K. K. Jones, P. Roger, T. A. O'Neil, C. Barrett. 2001. Inventory and Monitoring of Salmon Habitat in the Pacific Northwest - Directory and Synthesis of Protocols for Management/Research and Volunteers in Washington, Oregon, Idaho, Montana, and British Columbia. Washington Department of Fish and Wildlife, Olympia, Washington. 212 pp.

Montgomery DR, Buffington JM. 1998. Channel Processes, Classification and Response. *In* Naiman, R. and Bilby, R. (Eds) River Ecology and Management: Lessons from the Pacific Coastal Ecoregion, New York, NY: Springer-Verlag.

Platts, W. S., W. F. Megahan, and G. W Minshall. 1983. Methods for evaluating stream, riparian, and biotic conditions. Gen. Tech. Rep. INT-138. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 70 p.

Pleus, A. E., D. Shuett-Hames, and L. Bullchild. 1999. TFW Monitoring Program method manual for the habitat unit survey. Prepared for the WA State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-003. DNR #105. June. 31 pp.

Shuett-Hames, D., A. E. Pleus, J. Ward, M. Fox, and J. Light. 1999a. TFW Monitoring Program method manual for the large woody debris survey. Prepared for the Washington State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-004. DNR #106. March. 33 pp.

Somerville, D.E. 2010. Stream Assessment and Mitigation Protocols: A Review of Commonalities and Differences, May 4, 2010, Prepared for the U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds (Contract No. GS-00F- 0032M). Washington, D.C. Document No. EPA 843-S-12-003.

Stolnack, Scott A.; Bryant, Mason D.; Wissmar, Robert C. 2005. A review of protocols for monitoring streams and juvenile fish in forested regions of the Pacific Northwest. Gen. Tech. Rep. PNW-GTR-625. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 36 p.

Winward, Alma H. 2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRSGTR- 47. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p.

WDFW (Washington Department of Fish and Wildlife). 2009. Fish passage and surface water diversion screening assessment and prioritization manual. Habitat Program: Technical Applications (TAPPS) Division Olympia, WA.

Williams, R. W., R. M. Laramie, and J. J. Ames. 1975. A Catalog of Washington Streams and Salmon Utilization. Washington Department of Fisheries, Olympia, Washington

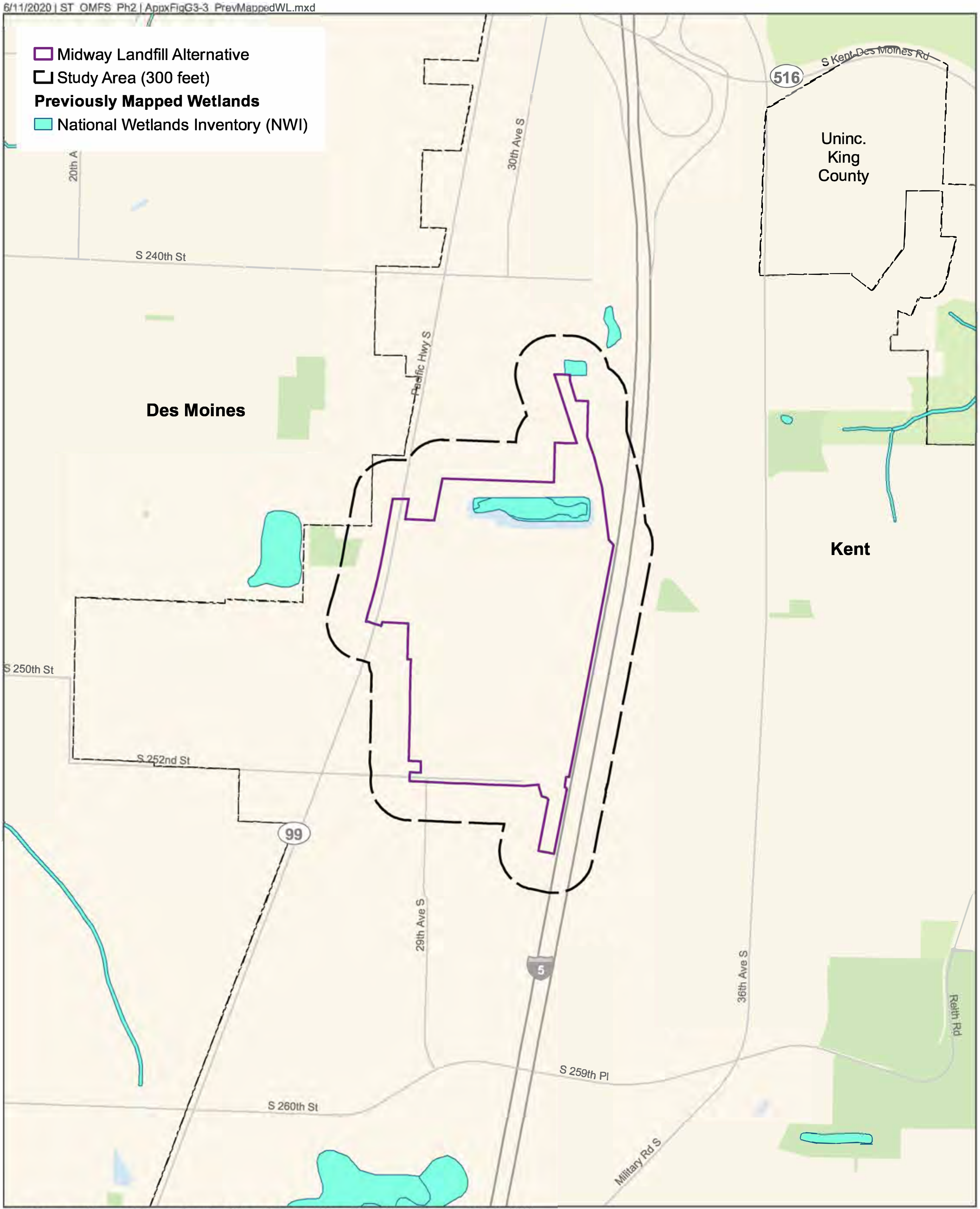
Operations and Maintenance Facility South

ATTACHMENT G3-3

Wetland and Stream Background Information

Federal Transit Administration

SOUNDTRANSIT



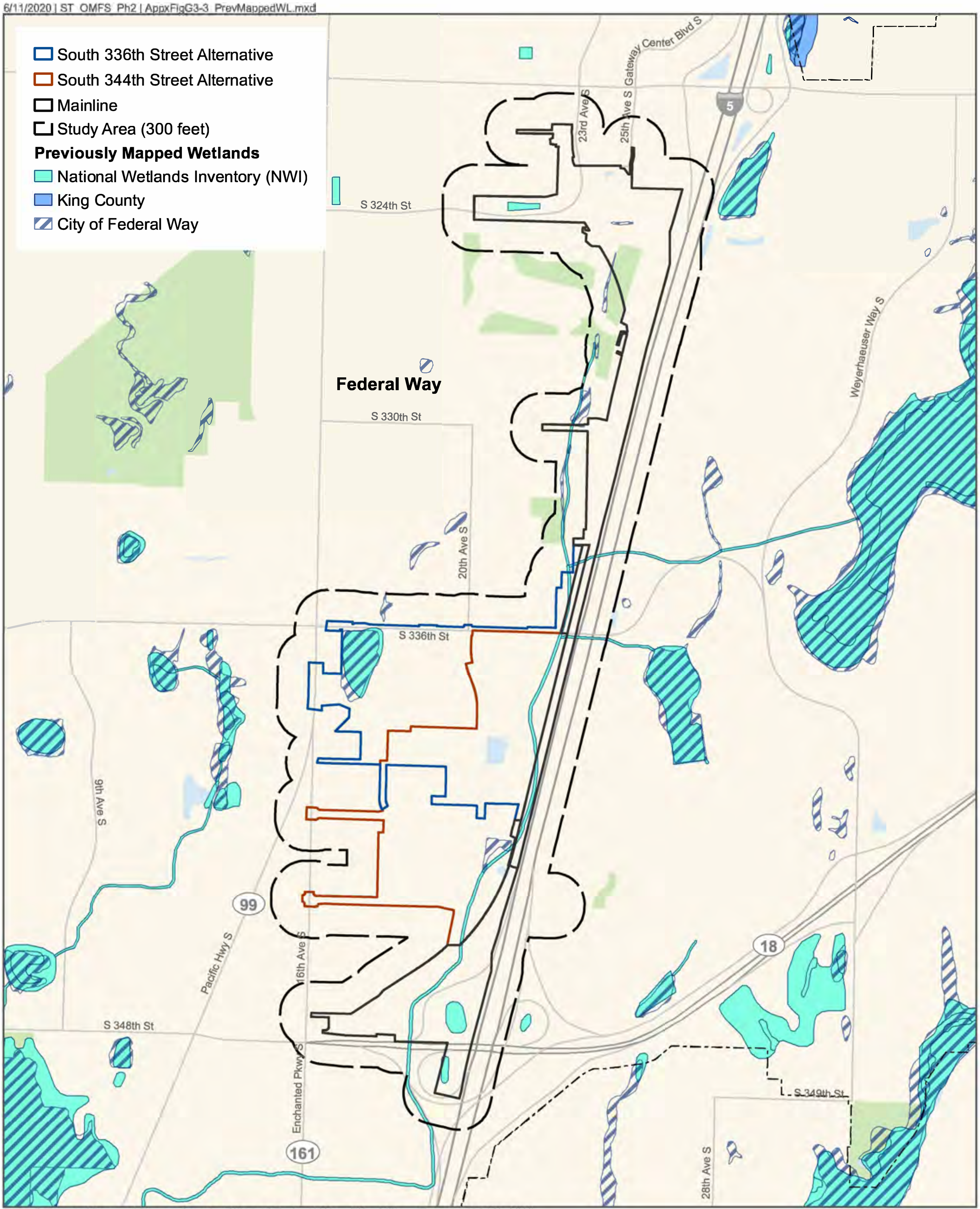
▭ Midway Landfill Alternative
▭ Study Area (300 feet)
Previously Mapped Wetlands
🟦 National Wetlands Inventory (NWI)
Des Moines
Kent
Uninc. King County
S Kent-Des Moines Rd
516
20th A
30th Ave S
S 240th St
Pacific Hwy S
S 250th St
S 252nd St
99
29th Ave S
5
36th Ave S
Reith Rd
S 259th Pl
S 260th St
Military Rd S

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019); NWI.

N
0
1,000
2,000 Feet

FIGURE G3-3.1
Previously Mapped Wetlands
Midway Landfill Alternative
OMF South

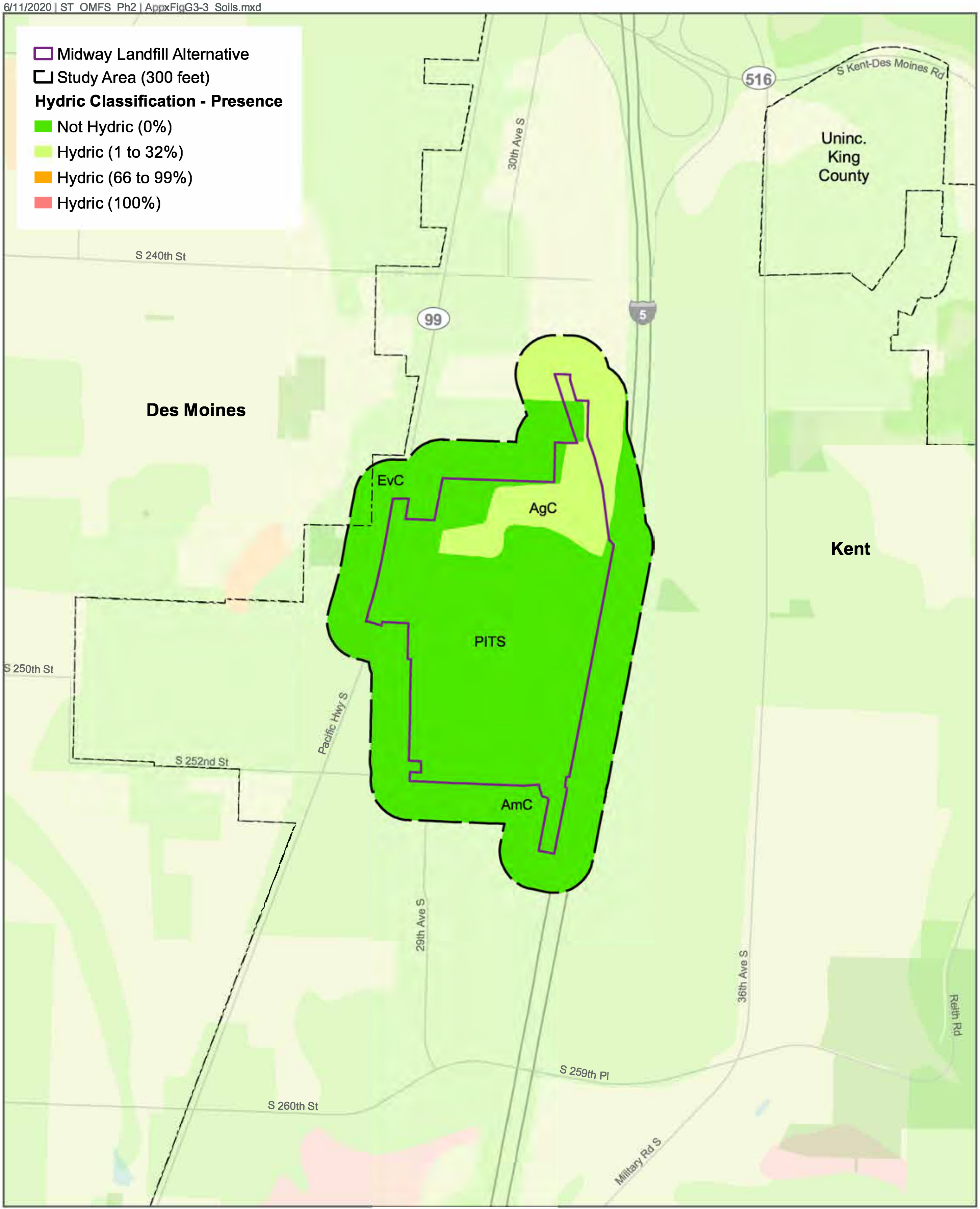
6/11/2020 | ST_OMFS_Ph2 | AppxFigG3-3_PrevMappedWL.mxd


South 336th Street Alternative
South 344th Street Alternative
Mainline
Study Area (300 feet)
Previously Mapped Wetlands
National Wetlands Inventory (NWI)
King County
City of Federal Way
Gateway Center Blvd S
5
23rd Ave S
25th Ave S
S 324th St
Federal Way
S 330th St
Weyerhaeuser Way S
20th Ave S
S 336th St
9th Ave S
99
Pacific Hwy S
16th Ave S
18
S 348th St
Enchanted Pkwy S
161
S 349th St
28th Ave S
N
0
1,000
2,000 Feet

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019); NWI.

FIGURE G3-3.2
Previously Mapped Wetlands
South 336th Street and South 344th Street Alternatives
OMF South

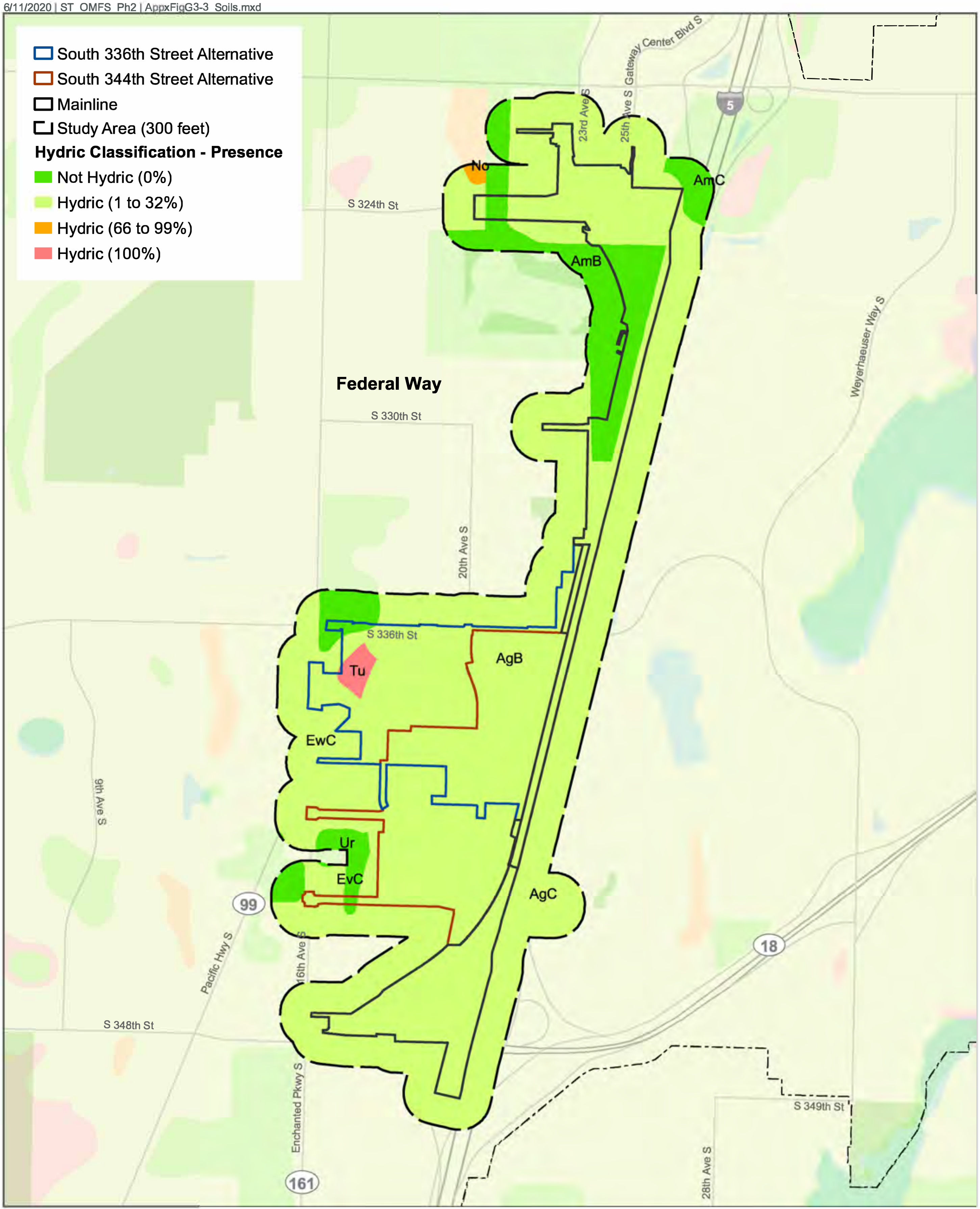
6/11/2020 | ST_OMFS_Ph2 | AppxFigG3-3_Soils.mxd


Midway Landfill Alternative
Study Area (300 feet)
Hydric Classification - Presence
🟩 Not Hydric (0%)
🟩 Hydric (1 to 32%)
🟧 Hydric (66 to 99%)
🟥 Hydric (100%)
516
S Kent-Des Moines Rd
30th Ave S
Uninc. King County
S 240th St
99
5
Des Moines
EvC
AgC
Kent
PITS
S 250th St
Pacific Hwy S
S 252nd St
AmC
29th Ave S
36th Ave S
Reith Rd
S 259th Pl
S 260th St
Military Rd S
N
0
1,000
2,000 Feet

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019); USDA NRCS.

FIGURE G3-3.3
Study Area Soils
Midway Landfill Alternative
OMF South

6/11/2020 | ST_OMFS_Ph2 | AppxFigG3-3_Soils.mxd


South 336th Street Alternative
South 344th Street Alternative
Mainline
Study Area (300 feet)
Hydric Classification - Presence
Not Hydric (0%)
Hydric (1 to 32%)
Hydric (66 to 99%)
Hydric (100%)
Federal Way
S 324th St
S 330th St
S 336th St
S 348th St
S 349th St
23rd Ave S
25th Ave S
Gateway Center Blvd S
Weyerhaeuser Way S
20th Ave S
9th Ave S
16th Ave S
28th Ave S
Pacific Hwy S
Enchanted Pkwy S
5
99
18
161
No
AmC
AmB
AgB
Tu
EwC
Ur
EvC
AgC

Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019); USDA NRCS.

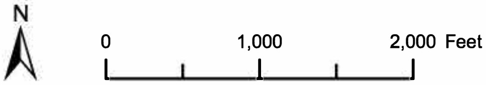
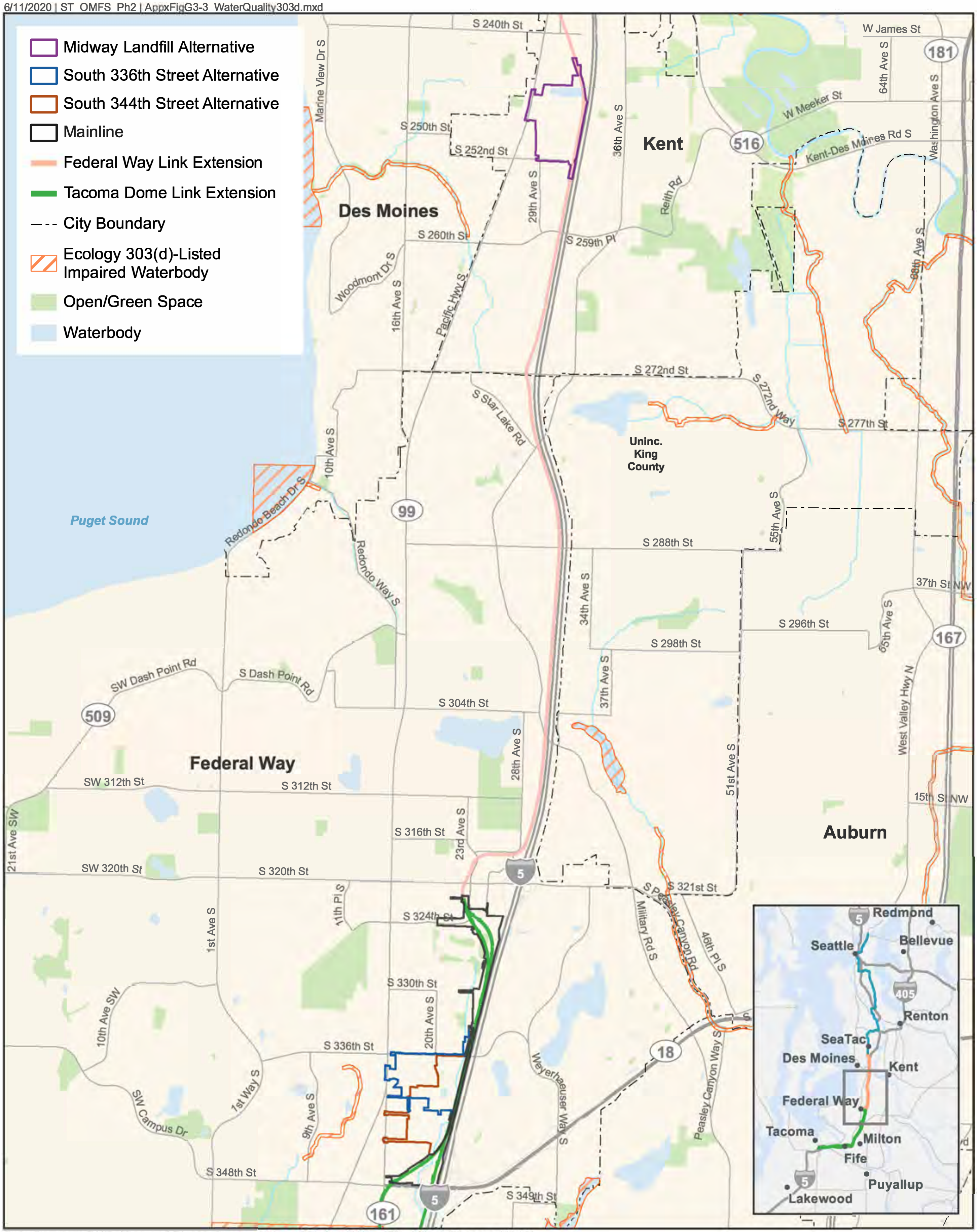

N
0
1,000
2,000 Feet

FIGURE G3-3.4

Study Area Soils

South 336th Street and South 344th Street Alternatives

OMF South


Midway Landfill Alternative
South 336th Street Alternative
South 344th Street Alternative
Mainline
Federal Way Link Extension
Tacoma Dome Link Extension
City Boundary
Ecology 303(d)-Listed Impaired Waterbody
Open/Green Space
Waterbody
Des Moines
Kent
Federal Way
Auburn
Uninc. King County
Puget Sound
S 240th St
W James St
Marine View Dr S
64th Ave S
Washington Ave S
W Meeker St
Kent-Des Moines Rd S
S 250th St
S 252nd St
36th Ave S
29th Ave S
Reith Rd
S 260th St
S 259th Pl
Woodmont Dr S
16th Ave S
Pacific Hwy S
68th Ave S
S 272nd St
S 272nd Way
S 277th St
S Star Lake Rd
10th Ave S
Redondo Beach Dr S
Redondo Way S
55th Ave S
S 288th St
34th Ave S
37th St NW
S 296th St
S 298th St
65th Ave S
SW Dash Point Rd
S Dash Point Rd
S 304th St
37th Ave S
West Valley Hwy N
28th Ave S
51st Ave S
SW 312th St
S 312th St
15th St NW
S 316th St
23rd Ave S
21st Ave SW
SW 320th St
S 320th St
S Peasley Canyon Rd
S 321st St
11th Pl S
S 324th St
1st Ave S
Military Rd S
46th Pl S
S 330th St
10th Ave SW
20th Ave S
S 336th St
Peasley Canyon Way S
Weyerhaeuser Way S
SW Campus Dr
1st Way S
9th Ave S
S 348th St
S 349th St
181
516
99
167
509
5
18
161
Redmond
Seattle
Bellevue
405
Renton
SeaTac
Des Moines
Kent
Federal Way
Tacoma
Milton
Fife
Puyallup
Lakewood

Data Sources: DNR, King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 1 2 Miles

FIGURE G3-3.5
Ecology 303(d) Listings
OMF South Alternatives

OMF South

Operations and Maintenance Facility South

ATTACHMENT G3-4

Wetland Data Determination Forms

Federal Transit Administration

SOUNDTRANSIT

Table G3.4-1 Wetland Determination Sample Points

Sample Point	Wetland Determination (wetland/upland)	USFWS Wetland Classification	Vegetation	Soils	Hydrology	Report Notes
SP WFW 1-1	Wetland	PFO	Dominance Test	A12	Secondary: D2, D5	
SP WFW 1-2	Wetland	PFO	Dominance Test	A12	Secondary: D2, D5	
SP WFW 1-3	Upland	n/a	none	none	none	
SP WFW 1-4	Wetland	PEM	Dominance Test	other	Secondary: D2, D5	Hydric Soils rationale: Sample plot nearly meets indicator for F6, Redox Dark Surface. Dark surface layers may have redox that is difficult to see. Given presence of hydrophytic vegetation and geomorphic position below OHWM of East Fork Hylebos Creek, soil is likely seasonally flooded for 14 or more consecutive days during the growing season, and therefore hydric soils presumed to exist.
SP WFW 1-5	Upland	n/a	none	none	none	
SP WFW 1-6	Wetland	PFO	Dominance Test	F6	Primary: B1 Secondary: B9, D2	
SP WFW 1-7	Upland	n/a	none	none	none	
SP WFW 1-8	Wetland	PFO	Dominance Test	Other	Primary: B1 Secondary: D5	Hydric Soils rationale: Sample plot nearly meets redox dark surface. Given presence of water marks in the area and presence of hydrophytic vegetation, it is assumed that the area is inundated for 14 or more consecutive days during growing season and therefore hyric soil is present.
SP WFW 2-1	Wetland	PFO	Rapid Test for Hydrophytic Vegetation	A1	Primary: A1, A2, A3, B1 Secondary: D5	
SP WFW 2-2	Upland	n/a	Dominance Test	none	none	
SP WFW 2-3	Wetland	PFO	Dominance Test	A4, A12	Primary: A2, A3, C1	
SP WFW 2-4	Upland	n/a	none	none	none	
SP WFW 3-1	Wetland	PSS	Dominance Test	F6	Primary: A2, A3	
SP WFW 3-2	Upland	n/a	Dominance Test	none	none	
SP WFW 4-1	Wetland	PSS	Dominance Test	F6	Primary: A2, A3 Secondary: D5	
SP WFW 4-2	Upland	n/a	Dominance Test	none	none	
SP WFW 5-1	Wetland	PFO	Dominance Test	A12	Primary: A1, A2, A3	
SP WFW 5-2	Upland	n/a	none	none	none	
SP WFW 6-1	Wetland	PSS	Dominance Test	F6	Primary: A1, A2, A3	
SP WFW 6-2	Upland	n/a	none	none	none	
WFW-07-SP1	Wetland	PEM	Dominance Test	Other	Primary: A2, A3 Secondary: D2, D5	Hydric Soil Rationale: Soils appear to be a fluvial entisol with an aquic moisture regime. Hydric soils supported by hydrophytic vegetation and strong hydrology indicators.
WFW-07-SP2	Upland	n/a	Dominance Test	none	none	
WFW-07-SP3	Wetland	PSS	Dominance Test	A11, F3	Primary: A3, B2, B3 Secondary: D2, D5	
WFW-07-SP4	Upland	n/a	none	none	none	

Table G3.4-1 Wetland Determination Sample Points (continued)

Sample Point	Wetland Determination (wetland/upland)	USFWS Wetland Classification	Vegetation	Soils	Hydrology	Report Notes
WFW-08-SP1	Wetland	PSS	Dominance Test	Other	Primary: A1, A2, A3, B1 Secondary: D2, D5	Hydric Soil Rationale: Stream has been heavily modified, evidenced by quarry spalls at 4.5 inches below ground surface, and appears to be used as a constructed stormwater facility. Soil appears to be a fluvial entisol with aquic moisture regime. Supported by strong hydrophytic vegetation, geomorphic position on stream bench, significant organics in soils, and strong wetland hydrology indicators
WFW-08-SP2	Upland	n/a	none	none	none	
WFW-08-SP3	Wetland	PEM	Dominance Test	Other	Primary: A2, A3, B1 Secondary: D2, D5	Hydric Soil Rationale: Stream has been heavily modified, evidenced by quarry spalls at 7 inches below ground surface, and appears to be used as a constructed stormwater facility. Soil appears to be a fluvial entisol with aquic moisture regime. Supported by strong hydrophytic vegetation, geomorphic position on stream bench, and strong wetland hydrology indicators.
WFW-09-SP1	Wetland	PSS	Dominance Test	A11 and F3	Primary: A2, A3, C3 Secondary: D2, D5	
WFW-09-SP2	Upland	n/a	Dominance Test	none	Secondary: D5	
WFW-10-SP01	Wetland	PFO	Dominance Test	Other	Primary: A2, A3 Secondary: D2, D5	Hydric Soil Rationale: Soils appear to be a fluvial entisol with an aquic moisture regime. Hydric soils supported by hydrophytic vegetation and strong hydrology indicators.
WFW-10-SP10	Upland	n/a	None	none	none	
WFW-10-SP11	Upland	n/a	none	none	none	
WFW-10-SP12	Wetland	PFO	Dominance Test	Other	Primary: A2, A3 Secondary: D2, D5	Hydric Soil Rationale: Soils appear to be a fluvial entisol with an aquic moisture regime. Hydric soils supported by strong hydrophytic vegetation and strong hydrology indicators.
WFW-10-SP13	Wetland	PFO	Dominance Test	F6	A2, A3	
WFW-10-SP02	Upland	n/a	Dominance Test	none	none	
WFW-10-SP03	Wetland	PFO	Dominance Test	A4, A11	Primary: A2, A3 Secondary: D2	
WFW-10-SP04	Upland	n/a	none	none	none	
WFW-10-SP05	Wetland	PFO	Dominance Test	F6	Primary: A3 Secondary: D2	
WFW-10-SP06	Upland	n/a	Dominance Test	none	none	

Table G3.4-1 Wetland Determination Sample Points (continued)

Sample Point	Wetland Determination (wetland/upland)	USFWS Wetland Classification	Vegetation	Soils	Hydrology	Report Notes
WFW-10-SP07	Wetland	PFO	Dominance Test	F6	Primary: A2, A3 Secondary: D5	
WFW-10-SP08	Upland	n/a	Dominance Test	none	Secondary: D5	
WFW-10-SP09	Wetland	PFO	Dominance Test	A11	Primary: A3	
WFW-11-SP1	Wetland	PFO	Dominance Test	A11, F3	Primary: A2, A3 Secondary: D2, D5	
WFW-11-SP2	Upland	n/a	none	none	none	
WFW-11-SP3	Wetland	PEM	Dominance Test	F6	Primary: A2, A3 Secondary: D5	
WFW-11-SP4	Upland	n/a	Dominance Test	none	none	
WFW-12-SP1	Wetland	PEM	Dominance Test	other	Primary: A2, A3, B1 Secondary: D2, D5	Hydric Soil Rationale: Sample point is approximately 2m from wetted stream and is within the floodplain. The stream has been highly modified. Soils are a fluvial entisol with aquic moisture regime. Soils have high organic content that may also mask redox. Supported by strong hydrophytic vegetation and wetland hydrology
WFW-12-SP2	Upland	n/a	Dominance Test	none	none	
WFW-13-SP1	Wetland	PSS	Dominance Test	A11, F3	Primary: A3, B8 Secondary: D2	
WFW-13-SP2	Upland	n/a	none	none	none	
WFW-14-SP1	Wetland	PEM	Dominance Test	F3	Primary: C3 Secondary: D2	
WFW-14-SP2	Upland	n/a	Dominance Test	none	none	
WFW-14-SP3	Upland	n/a	Dominance Test	none	none	
WFW-15-SP1	Wetland	PFO	Dominance Test	A11	A3	
WFW-15-SP2	Upland	n/a	none	none	none	
WFW-15-SP3	Wetland	PFO	Dominance Test	F6	Primary: A2, A3 Secondary: D2, D5	
WFW-15-SP4	Upland	n/a	none	none	none	
WFW-15-SP5	Wetland	PFO	Dominance Test	F6	Primary: A2, A3 Secondary: D2	
WFW-16-SP1	Wetland	PEM	Dominance Test	A11, F3	Primary: A3 Secondary: B10, D5	
WFW-16-SP2	Upland	n/a	none	A11, F3	none	
WFW-16-SP3	Wetland	PSS	Dominance Test	A11, F3	Primary: A2, A3 Secondary: D5	
WFW-16-SP4	Upland	n/a	Dominance Test	A11, F3	none	
SP WFW 17-1	Wetland	PFO	Dominance Test	A11	Primary: A2, A3	
SP WFW 17-2	Upland	n/a	Dominance Test	none	Primary: A2, A3	
SP WFW 18-1	Wetland	PFO	Dominance Test	F3	Primary: A1, A2, A3 Secondary: D5	
SP WFW 18-2	Upland	n/a	Dominance Test	none	Primary: A2, A3	

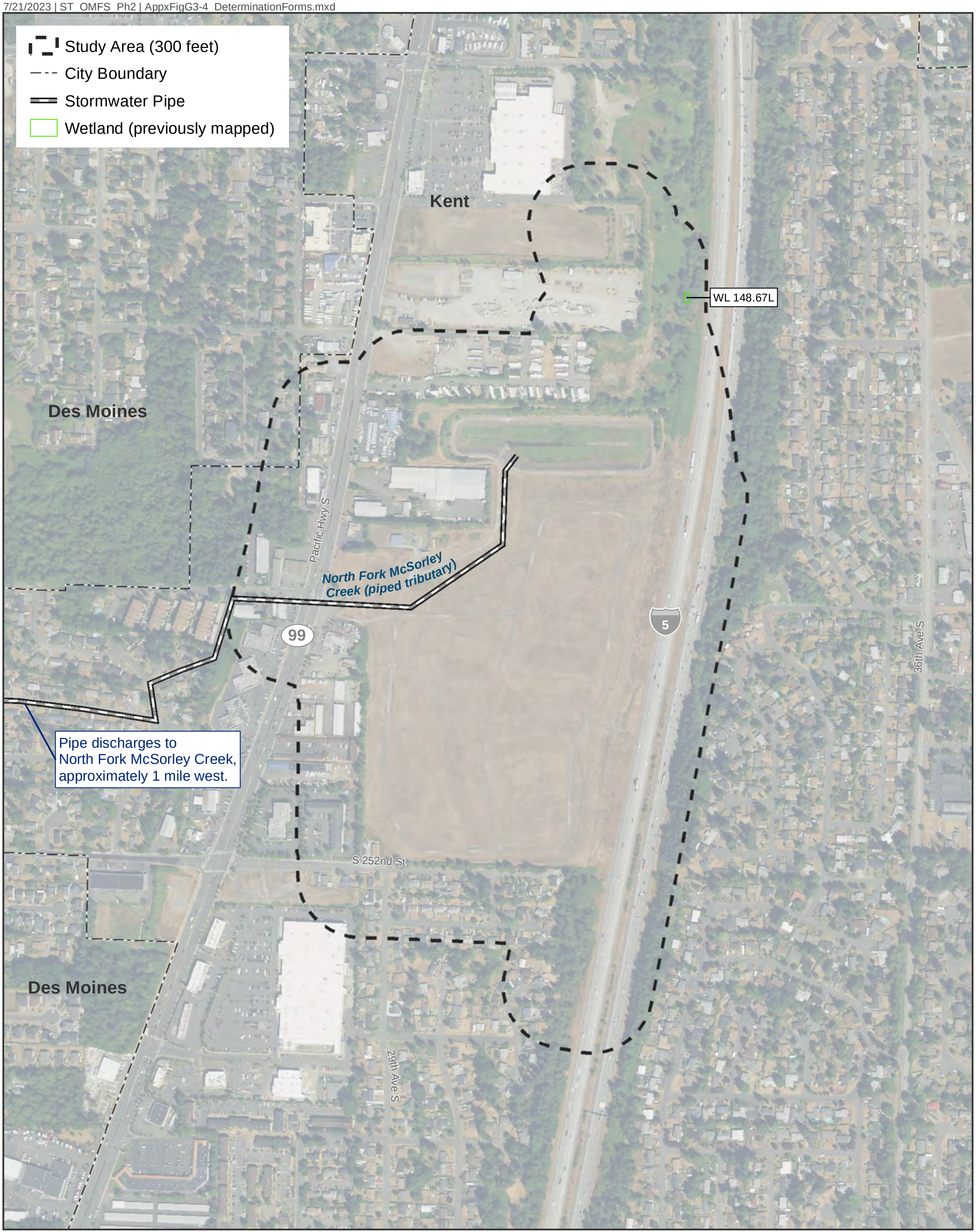
Table G3.4-1 Wetland Determination Sample Points (continued)

Sample Point	Wetland Determination (wetland/upland)	USFWS Wetland Classification	Vegetation	Soils	Hydrology	Report Notes
WFW-21-SP1	Wetland	PSS	Dominance Test	F6	Primary: A2, A3, B1, B2, B3 Secondary: D2, D5	
WFW-21-SP2	Upland	n/a	none	A11, F3	none	
WFW-22-SP1	Wetland	PSS	Dominance Test	A11, F3	Primary: A1, A2, A3, B4 Secondary: D2, D5	
WFW-22-SP2	Upland	n/a	Dominance Test	F3	none	
WFW-32-SP1	Wetland	PSS	Dominance Test	F3, A11	Primary: A2, A3 Secondary: D2	
WFW-32-SP2	Upland	n/a	Dominance Test	F3, A11	none	
SP FW V1	Upland	n/a	Dominance Test	none	none	
SP FW V2	Upland	n/a	none	none	none	
SP FW V3	Upland	n/a	none	none	none	
SP FW V4	Upland	n/a	none	none	none	
SP FW V5	Upland	n/a	none	none	Primary: A1, A2, A3	
SP FW V6	Upland	n/a	Dominance Test	none	Primary: A2, A3	
SP FW V7	Upland	n/a	Dominance Test	none	Primary: A2, A3	
SP FW V8	Upland	n/a	Dominance Test	n/a	none	

Notes:

1 Wetland determinations based on the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0 (Corps 2010).

2 PEM = palustrine emergent; PFO = palustrine forested; PSS= palustrine scrub-shrub (Cowardin et al. 1979, FGDC 2013).


Study Area (300 feet)
City Boundary
Stormwater Pipe
🟩 Wetland (previously mapped)
Kent
WL 148.67L
Des Moines
Pacific Hwy S
North Fork McSorley Creek (piped tributary)
99
5
36th Ave S
Pipe discharges to North Fork McSorley Creek, approximately 1 mile west.
S 252nd St
Des Moines
29th Ave S

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

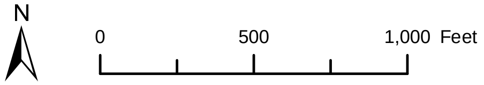
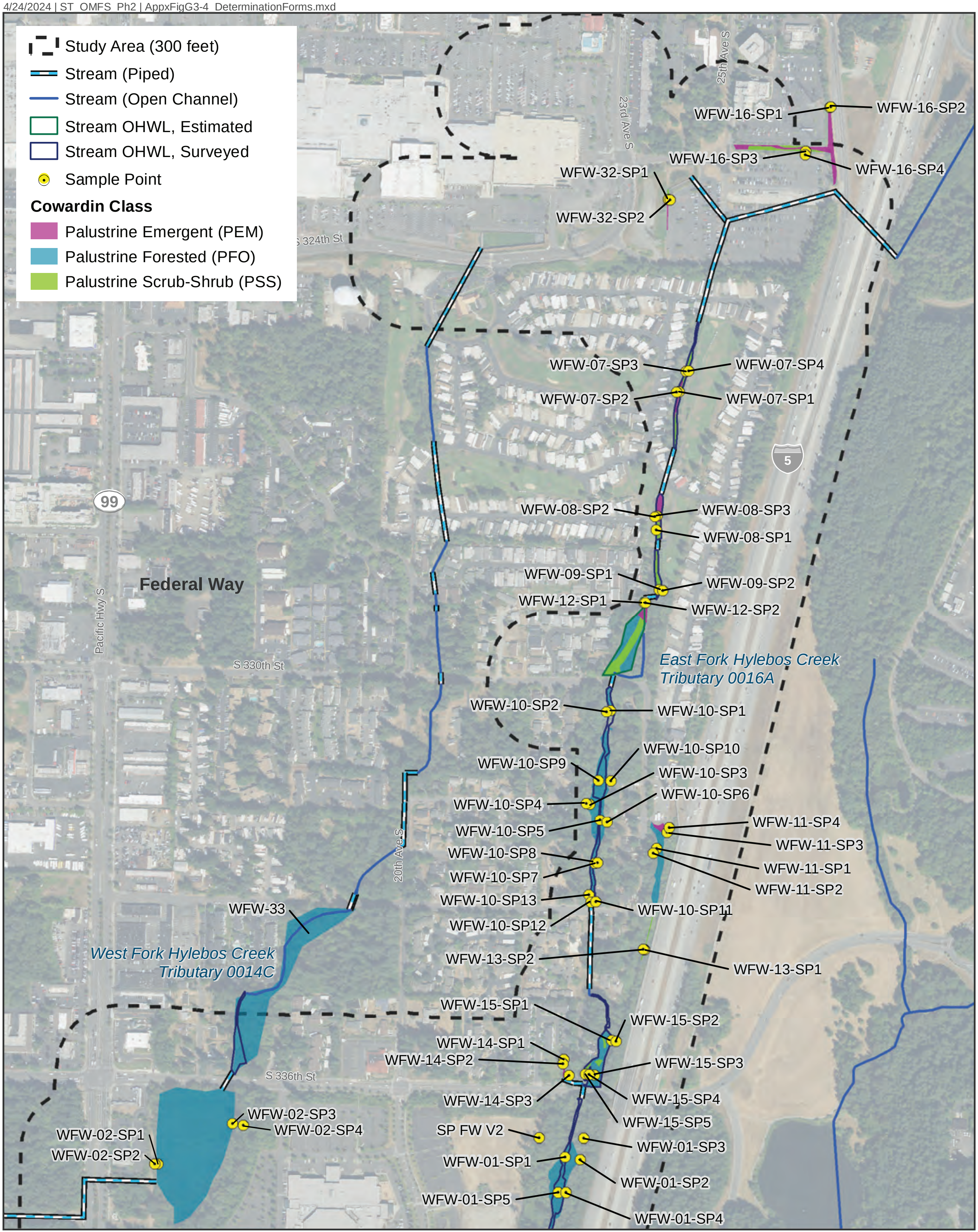

N
0
500
1,000 Feet

FIGURE G3-4.1

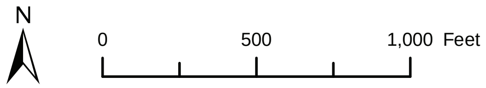
Wetland Determination Sample Points
Midway Landfill Alternative

OMF South

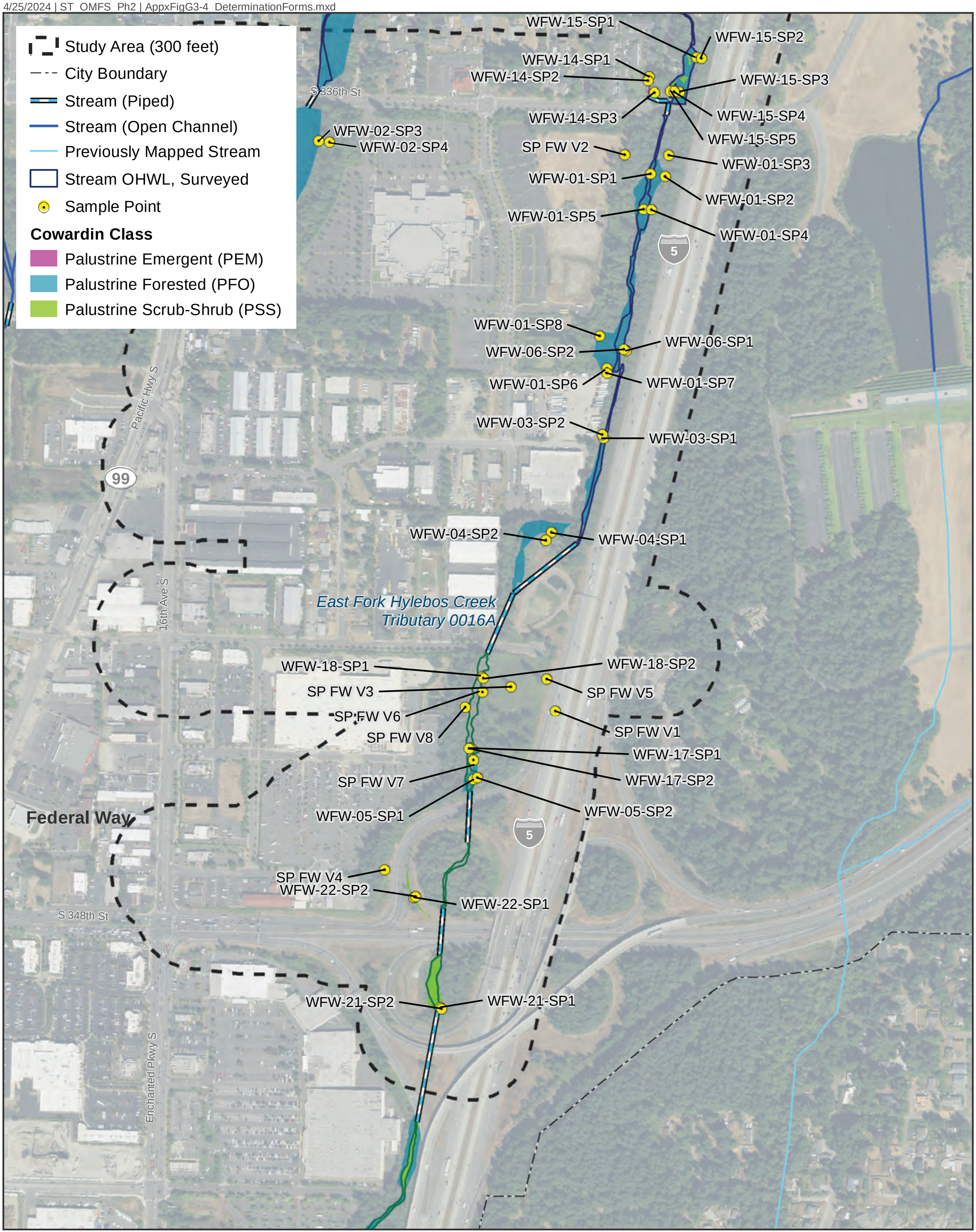

Study Area (300 feet)
Stream (Piped)
Stream (Open Channel)
Stream OHWL, Estimated
Stream OHWL, Surveyed
Sample Point
Cowardin Class
🟪 Palustrine Emergent (PEM)
🟦 Palustrine Forested (PFO)
🟩 Palustrine Scrub-Shrub (PSS)
25th Ave S
23rd Ave S
S 324th St
99
5
Pacific Hwy S
Federal Way
S 330th St
20th Ave S
S 336th St
East Fork Hylebos Creek
Tributary 0016A
West Fork Hylebos Creek
Tributary 0014C
WFW-16-SP1
WFW-16-SP2
WFW-16-SP3
WFW-16-SP4
WFW-32-SP1
WFW-32-SP2
WFW-07-SP3
WFW-07-SP4
WFW-07-SP2
WFW-07-SP1
WFW-08-SP2
WFW-08-SP3
WFW-08-SP1
WFW-09-SP1
WFW-09-SP2
WFW-12-SP1
WFW-12-SP2
WFW-10-SP2
WFW-10-SP1
WFW-10-SP10
WFW-10-SP9
WFW-10-SP3
WFW-10-SP4
WFW-10-SP6
WFW-11-SP4
WFW-10-SP5
WFW-11-SP3
WFW-10-SP8
WFW-11-SP1
WFW-10-SP7
WFW-11-SP2
WFW-10-SP13
WFW-10-SP11
WFW-10-SP12
WFW-33
WFW-13-SP2
WFW-13-SP1
WFW-15-SP1
WFW-15-SP2
WFW-14-SP1
WFW-14-SP2
WFW-15-SP3
WFW-14-SP3
WFW-15-SP4
WFW-15-SP5
WFW-02-SP3
WFW-02-SP4
WFW-02-SP1
WFW-02-SP2
SP FW V2
WFW-01-SP3
WFW-01-SP1
WFW-01-SP2
WFW-01-SP5
WFW-01-SP4

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

FIGURE G3-4.2
Wetland Determination Sample Points
South 336th Street and South 344th Street Alternatives


N
0
500
1,000 Feet

OMF South


Study Area (300 feet)
City Boundary
Stream (Piped)
Stream (Open Channel)
Previously Mapped Stream
Stream OHWL, Surveyed
Sample Point
Cowardin Class
🟪 Palustrine Emergent (PEM)
🟦 Palustrine Forested (PFO)
🟩 Palustrine Scrub-Shrub (PSS)
WFW-15-SP1
WFW-15-SP2
WFW-14-SP1
WFW-14-SP2
WFW-15-SP3
S 336th St
WFW-14-SP3
WFW-15-SP4
WFW-02-SP3
WFW-02-SP4
WFW-15-SP5
SP FW V2
WFW-01-SP3
WFW-01-SP1
WFW-01-SP2
WFW-01-SP5
WFW-01-SP4
5
WFW-01-SP8
WFW-06-SP1
WFW-06-SP2
WFW-01-SP6
WFW-01-SP7
Pacific Hwy S
WFW-03-SP2
WFW-03-SP1
99
WFW-04-SP2
WFW-04-SP1
16th Ave S
East Fork Hylebos Creek
Tributary 0016A
WFW-18-SP1
WFW-18-SP2
SP FW V3
SP FW V5
SP FW V6
SP FW V1
SP FW V8
WFW-17-SP1
WFW-17-SP2
SP FW V7
Federal Way
WFW-05-SP1
WFW-05-SP2
5
SP FW V4
WFW-22-SP2
WFW-22-SP1
S 348th St
WFW-21-SP2
WFW-21-SP1
Enchanted Pkwy S

Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G3-4.3
Wetland Determination Sample Points
South 336th Street and South 344th Street Alternatives

OMF South

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS   City/County: Federal Way, King   Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit   State: WA   Sampling Point: SP FW V1
Investigators: DANIELSKI   Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression   Local Relief (concave, convex, none): Concave   Slope(%): 0
Subregion (LRR): A   Lat: 47.292610   Long: -122.305954   Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam   NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year?   Yes ____   No X   (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed?   Are "Normal Circumstances" present?   Yes X   No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes	No X	**within a Wetland?**	Yes ____ No X

Remarks:

Verification plot in salmonberry dominated swale. Sample plot has 1 of 3 wetland indicators, is not located in a wetland. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	70	Yes	FAC
2. Oemleria cerasiformis	5	No	FACU
3. Rubus ursinus	5	No	FACU
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Tolmiea menziesii	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 85   % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species		x2=	0	
FAC species	85	x3=	255	
FACU species	10	x4=	40	
UPL species		x5=	0	
Column Totals:	95	(A)	295	(B)

Prevalence Index = B/A= 3.11

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0¹
- ____ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants¹
- ____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?   Yes X   No ____

Remarks:

Sample plot meets dominance test but does not meet prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 3/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ☐ No X

Remarks:

Sample plot lacks indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Tables (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aeriel Imagery (B
- ☐ Sparsley Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aeriel Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No X Depth (inches): ____________

Water Table Present? Yes ☐ No X Depth (inches): ____________

Saturation Present? Yes ☐ No X Depth (inches): ____________
(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/10/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP FW V2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.299988 Long: -122.304810 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy laom NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?** Yes ___ No X

Remarks:

Verification plot located in ditch south of S. 336th Street. Sample plot has 0 of 3 wetland indicators, is not located in a wetland. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	4	Yes	FAC
2.			
3.			
4.			
5.			
	4	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Hypochaeris radicata	15	Yes	FACU
2. Agrostis capillaris	7	No	FAC
3. Conium maculatum	5	No	FAC
4. Phalaris arundinacea	5	No	FACW
5. Carduus nutans	4	No	UPL
6. Claytonia sibirica	3	No	FAC
7. Galium aparine	3	No	FACU
8. Ranunculus repens	2	No	FAC
9.			
10.			
11.			
	44	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 56 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	5	x2=	10
FAC species	21	x3=	63
FACU species	18	x4=	72
UPL species	4	x5=	20
Column Totals:	48	(A)	165 (B)

Prevalence Index = B/A= 3.44

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	10YR 3/2	100					Silt Loam	
16-18								Drain rock

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRLA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators. Between horizon 1 and horizon 2 is a layer of geotextile fabric. Swale is clearly constructed and has drain rock liner to move water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Tables (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aeriel Imagery (B
____ Sparsley Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (**LRR A**)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aeriel Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (**LRR A**)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/22/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP FW V3
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.292915 Long: -122.306824 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____ No X

Remarks:
Conditions wetter than normal for time of year. Sample plot has 0 of 3 indicators, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Pseudotsuga menziesii	10	Yes	FACU
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	85	Yes	FAC
2. Prunus emarginata	5	No	FACU
3.			
4.			
5.			
	90	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 100		% Cover of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	85	x3=	255
FACU species	15	x4=	60
UPL species		x5=	0
Column Totals:	100	(A)	315 (B)

Prevalence Index = B/A= 3.15

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-8	10YR 3/3	100					Sandy Loam	
8-18	10YR 4/6	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ____ 2 cm Muck (A10)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Tables (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aeriel Imagery (B
- ____ Sparsley Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aeriel Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS   City/County: Federal Way, King   Sampling Date: 10/22/2019
Applicant/Owner: Sound Transit   State: WA   Sampling Point: SP FW V4
Investigators: STORY, PACE   Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope   Local Relief (concave, convex, none): None   Slope(%): 2
Subregion (LRR): A - Northwestern Forest,   Lat: 47.290462   Long: -122.309219   Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam   NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X		
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?**	Yes ___ No X

Remarks:

In stand of PSME on hill between off ramp and Walmart. Conditions wetter than normal for time of year. Sample plot has 0 of 3 wetland criteria, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Pseudotsuga menziesii	80	Yes	FACU
2.			
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Gaultheria shallon	60	Yes	FACU
2. Oemleria cerasiformis	10	No	FACU
3. Arbutus menziesii	5	No	UPL
4. Thuja plicata	3	No	FAC
5.			
	78	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100   % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	3	x3=	9
FACU species	150	x4=	600
UPL species	5	x5=	25
Column Totals:	158	(A)	634 (B)

Prevalence Index = B/A= 4.01

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-6	10YR 2/2	100					Silt Loam	Significant duff and leaf litter
6-18	10YR 4/6	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRLA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Tables (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aeriel Imagery (B
____ Sparsley Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (**LRR A**)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aeriel Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (**LRR A**)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____________
Water Table Present? Yes ____ No X Depth (inches): ____________
Saturation Present? Yes ____ No X Depth (inches): ____________
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS
City/County: Federal Way, King
Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit
State: WA
Sampling Point: SP FW V5
Investigators: STORY, DANIELSKI
Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Channel
Local Relief (concave, convex, none): None
Slope(%): 0
Subregion (LRR): A - Northwestern Forest,
Lat: 47.293034
Long: -122.306145
Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam
NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If No, explain in Remarks)
Are Vegetation: Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation: Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No	**within a Wetland?**	Yes No X

Remarks:

Sample plot located in small side channel. Sample plot has 1 of 3 wetland criteria, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	20	Yes	FAC
2. Rubus laciniatus	10	Yes	FACU
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Agrostis capillaris	40	Yes	FAC
2. Pteridium aquilinum	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50
% Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species		x2=	0	
FAC species	60	x3=	180	
FACU species	20	x4=	80	
UPL species		x5=	0	
Column Totals:	80	(A)	260	(B)

Prevalence Index = B/A= 3.25

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-9	10YR 3/2	100					Sandy Loam	
9-12	10YR 3/3	100					Sandy Loam	Gravelly, compacted

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________
Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 1.00
Water Table Present? Yes X No ____ Depth (inches): 0.0
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0.0

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Plot in small side channel, possibly old roadbed. Flooded from recent rains. Sample plot meets primary hydrology indicators for surface water, high water table, and saturation.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP FW V6
Investigators: STORY, DANIELSKI Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Channel Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A Lat: 47.292854 Long: -122.307457 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If No, explain in Remarks)
Are Vegetation: Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation: Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No	**within a Wetland?**	Yes No X

Remarks:

Sample plot lacks hydric soil and is not located within a wetland. Site visit occurred outside of growing season.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Salix scouleriana	25	Yes	FAC
2.			
3.			
4.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	35	Yes	FAC
2. Rubus ursinus	30	Yes	FACU
3. Rubus armeniacus	15	No	FAC
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	20	Yes	FAC
2. Pteridium aquilinum	20	Yes	FACU
3. Polystichum munitum	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	45	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	60	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species		x2=	0	
FAC species	95	x3=	285	
FACU species	55	x4=	220	
UPL species		x5=	0	
Column Totals:	150	(A)	505	(B)

Prevalence Index = B/A= 3.37

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0¹
4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
5 - Wetland Non-Vascular Plants¹
Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

Sample plot meets dominance test but not prevalence index for hydrophytic vegetation. Hydrophytic species found in plot are primarily deep-rooted tree and shrub species that have access to a deeper water table.

SOIL

Sampling Point: SP FW V6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-9	10YR 3/2	100					Sandy Loam	
9-12	10YR 3/3	100					Sandy Loam	Gravelly

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ______
Water Table Present? Yes X No ____ Depth (inches): 1.0
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0.0

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for saturation and high water table.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP FW V7
Investigators: Danielski, Story Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A Lat: 47.291878 Long: -122.307533 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot has 2 of 3 wetland indicators. Sample plot lacks hydric soil and is not located in a wetland. Site visit occurred outside of growing season.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Populus balsamifera	15	Yes	FAC
2. Thuja plicata	10	Yes	FAC
3.			
4.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Spiraea douglasii	50	Yes	FACW
2. Rubus spectabilis	10	No	FAC
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Hedera helix	5	Yes	FACU
2. Polystichum munitum	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	60	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species	50	x2=	100	
FAC species	35	x3=	105	
FACU species	10	x4=	40	
UPL species		x5=	0	
Column Totals:	95	(A)	245	(B)

Prevalence Index = B/A= 2.58

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation. Hydrophytic species found in plot are primarily deep-rooted tree and shrub species that have access to a deeper water table.

SOIL

Sampling Point: SP FW V7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-9	10YR 3/2	100					Sandy Loam	
9-14	10YR 3/3	100					Sandy Loam	
14-16	10YR 4/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ☐

Depth (inches): ☐

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Tables (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aeriel Imagery (B
- ☐ Sparsley Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aeriel Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☒ No ☐ Depth (inches): 5.0

Saturation Present? Yes ☒ No ☐ Depth (inches): 1.0

(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation at 1 inch and water table present at 5 inches. Sample plot meets primary hydrology indicators for saturation and high water table.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP FW V8
Investigators: Danielski, Story Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A Lat: 47.292641 Long: -122.307724 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

Sample plot has 1 of 3 wetland indicators and is not located in a wetland.

VEGETATION – Use scientific names of plants.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)				
1.	Populus balsamifera	40	Yes	FAC
2.	Alnus rubra	20	Yes	FAC
3.				
4.				
		60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)				
1.	Rubus armeniacus	10	Yes	FAC
2.	Prunus occidentalis	7	Yes	
3.				
4.				
5.				
		17	= Total Cover	
Herb Stratum (Plot size: 1m)				
1.	Ranunculus repens	60	Yes	FAC
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		60	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	130	x3=	390
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	130 (A)		390 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP FW V8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot located on highly compacted gravel/cobble. Possibly former road grade. Unable to dig into soil, therefore soils not sampled.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot lacks primary and secondary indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/9/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-1

Investigators: DANIELSKI, STORY Section, Township, Range: T21N R4E S21

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0

Subregion (LRR): A - Northwestern Forest, Lat: 47.299740 Long: -122.304298 Datum: WGS84

Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?**	Yes X No ___

Remarks:

On low bank of Hylebos creek, looks like possible wet spot. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot has 3 of 3 wetland criteria, is located in forested portion of WFW-1.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5)			
1. Fraxinus latifolia	60	Yes	FACW
2.			
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3)			
1. Oemleria cerasiformis	20	Yes	FACU
2. Acer circinatum	5	No	FAC
3. Cornus alba	3	No	FACW
4.			
5.			
	28	= Total Cover	
Herb Stratum (Plot size: 1)			
1. Phalaris arundinacea	60	Yes	FACW
2. Ranunculus repens	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	123	x2=	246
FAC species	35	x3=	105
FACU species	20	x4=	80
UPL species		x5=	0
Column Totals:	178 (A)		431 (B)

Prevalence Index = B/A= 2.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	7.5YR 2.5/1	100					Sandy Loam	
16-18	10YR 4/1	98	7.5 YR 4/6	2	C	M	Sandy Loam	Very gravelly from 10-18+

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRLA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:
Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot meets hydric soil indicator A12, thick dark surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Tables (A2)
Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aeriel Imagery (B
Sparsley Vegetated Concave Surface (B8)

Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (**LRR A**)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (**LRR A**)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches):
Water Table Present? Yes ____ No X Depth (inches):
Saturation Present? Yes ____ No X Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot located in forested area. No primary indicators observed, roughly 6 feet from OHWM of Hylebos Creek. Sample plot meets secondary hydrology indicators for FAC-Neutral Test (D5) and Geomorphic Position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-2
Investigators: DANIELSKI, STORY Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.299721 Long: -122.304062 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Located in depression adjacent to East Fork Hylebos Creek. Sample Plot has 3 of 3 wetland criteria, is located in forested portion of WFW-1.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Fraxinus latifolia	40	Yes	FACW
2. Alnus rubra	15	Yes	FAC
3.			
4.			
	55	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Acer circinatum	30	Yes	FAC
2. Rubus spectabilis	5	No	FAC
3.			
4.			
5.			
	35	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	30	Yes	FAC
2. Carex obnupta	30	Yes	OBL
3. Urtica dioica	3	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	63	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 37 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	30	x1=	30	
FACW species	40	x2=	80	
FAC species	83	x3=	249	
FACU species		x4=	0	
UPL species		x5=	0	
Column Totals:	153	(A)	359	(B)

Prevalence Index = B/A= 2.35

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-22	10YR 2/1	100					Silt Loam	
22-24	2.5Y 4/2	95	2.5Y 4/4	5	C	M	Silty Clay Loam	Lots of cobble/gravel

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRLA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:
Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot meets hydric soil indicator A12, Thick Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Tables (A2)
Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aeriel Imagery (B
Sparsley Vegetated Concave Surface (B8)

Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (**LRR A**)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (**LRR A**)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No X Depth (inches):
Water Table Present? Yes No X Depth (inches):
Saturation Present? Yes No X Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary indicators observed. Sample plot meets secondary hydrology indicators for FAC-Neutral Test (D5) and Geomorphic Position (D2).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-3
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): None Slope(%): 2
Subregion (LRR): A - Northwestern Forest, Lat: 47.299992 Long: -122.303947 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X		
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___	No X	**within a Wetland?**	Yes ___ No X

Remarks:

Sample plot has 0 of 3 wetland criteria, is not located in a wetland. Paired upland plot for WFW-1. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Acer macrophyllum	35	Yes	FACU
2. Pseudotsuga menziesii	30	Yes	FACU
3.			
4.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus ursinus	40	Yes	FACU
2. Gaultheria shallon	30	Yes	FACU
3. Acer circinatum	25	Yes	FAC
4. Rubus spectabilis	10	No	FAC
5. Acer macrophyllum	10	No	FACU
	115	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	35	x3=	105
FACU species	145	x4=	580
UPL species		x5=	0
Column Totals:	180	(A)	685 (B)

Prevalence Index = B/A= 3.81

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-8	10YR 3/3	100					Silt Loam	
8-18	10YR 4/4	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators. Soil is very dry, very bright.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators observed, dry to 18+.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-4
Investigators: Danielski Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 0
Subregion (LRR): A Lat: 47.299290 Long: -122.304367 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PEM1
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:

Sample plot has 3 of 3 wetland criteria, is located in PEM community in WFW-1. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Salix lasiandra	2	Yes	FACW
2.			
3.			
4.			
5.			
	2	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	90	Yes	FACW
2. Athyrium cyclosorum	10	No	FAC
3. Ranunculus repens	5	No	FAC
4. Solanum dulcamara	5	No	FAC
5. Urtica dioica	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	115	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	92	x2=	184
FAC species	25	x3=	75
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	117 (A)		259 (B)

Prevalence Index = B/A= 2.21

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-11	7.5 YR 2/2	100					Sandy Loam	
11-20	7.5 YR 2/2	95	5YR 4/6	5	C	M	Sandy Loam	Gravelly

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
X Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Sample plot nearly meets indicator for F6, Redox Dark Surface. Dark surface layers may have redox that is difficult to see. Given presence of hydrophytic vegetation and geomorphic position below OHWM of East Fork Hylebos Creek, soil is likely seasonally flooded for 14 or more consecutive days during the growing season, and therefore hydric soils presumed to exist.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Damp at 20 but no saturation or water table. Secondary indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) present. Below OHWM of Hylebos Creek. Sampling occurred at end of dry season/beginning of water year, before full groundwater recharge.

Subsequent visit on 10/18 showed sample plot under several inches of water. Is likely seasonally ponded.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-5
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): None Slope(%): 3
Subregion (LRR): A - Northwestern Forest, Lat: 47.299271 Long: -122.304420 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Slightly upslope from wetland boundary and channel of Hylebos Creek. Sample plot has 0 of 3 wetland indicators, is not located in a wetland. Paired upland plot for WFW-1 The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)				
1.	Thuja plicata	30	Yes	FAC
2.	Pseudotsuga menziesii	20	Yes	FACU
3.	Alnus rubra	15	Yes	FAC
4.	Prunus emarginata	10	No	FACU
		75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)				
1.	Rubus ursinus	60	Yes	FACU
2.	Acer circinatum	20	Yes	FAC
3.	Sambucus racemosa	7	No	FACU
4.	Oemleria cerasiformis	5	No	FACU
5.				
		92	= Total Cover	
Herb Stratum (Plot size: 1m)				
1.	Polystichum munitum	30	Yes	FACU
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		30	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	65	x3=	195
FACU species	132	x4=	528
UPL species		x5=	0
Column Totals:	197	(A)	723 (B)

Prevalence Index = B/A= 3.67

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-18	7.5YR 3/3	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Sample plot lacks indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Tables (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aeriel Imagery (B
- ☐ Sparsley Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aeriel Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? Yes ☐ No ☒ Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ **No** ☒

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS
City/County: Federal Way, King
Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit
State: WA
Sampling Point: SP WFW 1-6
Investigators: DANIELSKI, STORY
Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat
Local Relief (concave, convex, none): None
Slope(%): 0
Subregion (LRR): A - Northwestern Forest,
Lat: 47.296963
Long: -122.304909
Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam
NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed?
Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic?
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot meets 3 of 3 wetland criteria, is located in WFW-1.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Populus balsamifera	20	Yes	FAC
2. Salix scouleriana	5	Yes	FAC
3.			
4.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	12	Yes	FAC
2. Acer circinatum	5	Yes	FAC
3. Crataegus monogyna	3	No	FAC
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Agrostis stolonifera	40	Yes	FAC
2. Ranunculus repens	10	No	FAC
3. Solanum dulcamara	2	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	52	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 48
% Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	97	x3=	291
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	97	(A)	291 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 2/1	93	10YR 3/4	7	C	M	Silt Loam	Lot of gravel in profile starting at 14

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRLA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
X Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot meets hydric soil indicator F6, Redox Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Tables (A2)
Saturation (A3)
X Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aeriel Imagery (B
Sparsley Vegetated Concave Surface (B8)
Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (**LRR A**)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

X Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aeriel Imagery (C9)
X Geomorphic Position (D2)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (**LRR A**)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No X Depth (inches):
Water Table Present? Yes No X Depth (inches):
Saturation Present? Yes No X Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot has primary hydrology indicators for water marks on nearby trees, and secondary indicators for water stained leaves and geomorphic position. A site visit on 10/18 had 6 inches of surface water in the area near the sample plot.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS
City/County: Federal Way, King
Sampling Date: 10/9/2019
Applicant/Owner: Sound Transit
State: WA
Sampling Point: SP WFW 1-7
Investigators: STORY, PACE
Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope
Local Relief (concave, convex, none): Convex
Slope(%): 40
Subregion (LRR): A - Northwestern Forest,
Lat: 47.296970
Long: -122.304825
Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam
NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed?
Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic?
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Sample plot meets 0 of 3 wetland criteria, is not located in a wetland. Paired upland plot for WFW 1-7. CThe preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot located on fill slope.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	70	Yes	FAC
2.			
3.			
4.			
5.			
	70	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Polystichum munitum	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 80
% Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	70	x3=	210
FACU species	20	x4=	80
UPL species		x5=	0
Column Totals:	90	(A)	290 (B)

Prevalence Index = B/A= 3.22

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Cobble fill pad, no soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/10/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 1-8
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.297585 Long: -122.305229 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?**	Yes X No ___

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot has 3 of 3 wetland criteria, is located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Fraxinus latifolia	20	Yes	FACW
2. Populus balsamifera	15	Yes	FAC
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Acer circinatum	25	Yes	FAC
2. Salix lasiandra	20	Yes	FACW
3. Rubus spectabilis	7	No	FAC
4.			
5.			
	52	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	55	Yes	FAC
2. Carex obnupta	30	Yes	OBL
3. Oenanthe sarmentosa	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	6	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	35	x1=	35	
FACW species	40	x2=	80	
FAC species	102	x3=	306	
FACU species		x4=	0	
UPL species		x5=	0	
Column Totals:	177	(A)	421	(B)

Prevalence Index = B/A= 2.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 1-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 2/1	100					Silt Loam	
14-20	10YR 3/2	95	10YR 3/4	5	C	M	Silty Clay Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRLA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot nearly meets redox dark surface. Given presence of water marks in the area and presence of hydrophytic vegetation, it is assumed that the area is inundated for 14 or more consecutive days during growing season and therefore hyric soil is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Tables (A2)
- Saturation (A3)
- X Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aeriel Imagery (B
- Sparsley Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (**LRR A**)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aeriel Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (**LRR A**)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes X No Depth (inches): 16.0

(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturated at 16. Sample plot meets primary hydrology indicator for water marks and secondary hydrology indicator for FAC-neutral test. Although October is technically during the wet season, in a forested depressional wetland, groundwater has not yet recharged. Water marks indicate area around sample plot is inundated at least occasionally.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/16/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 2-1
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.299564 Long: -122.312294 Datum: WGS84
Soil Map Unit Name: Tukwila muck NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

Sample plot meets 3 of 3 wetland criteria, is located in WFW 2. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Salix lasiandra	80	Yes	FACW
2.			
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Spiraea douglasii	15	Yes	FACW
2. Salix lasiandra	10	Yes	FACW
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	105	x2=	210
FAC species		x3=	0
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	105 (A)		210 (B)

Prevalence Index = B/A= 2.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets rapid test, dominance test, and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 2-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 3/1	100					Organic	Muck

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRLA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot meets hydric soil indicator A1, Histosol.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- X Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aeriel Imagery (B
- Sparsley Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (**LRR A**)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aeriel Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (**LRR A**)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No Depth (inches): 0.50

Water Table Present? Yes X No Depth (inches): 0.0

Saturation Present? Yes X No Depth (inches): 0.0

(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for Surface Water (A1), High Water Table (A2), Saturation (A3), and Water Marks (B1) and secondary hydrology indicator for FAC-Neutral Test (D5)..

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/16/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 2-2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): Convex Slope(%): 15
Subregion (LRR): A - Northwestern Forest, Lat: 47.299557 Long: -122.312218 Datum: WGS84
Soil Map Unit Name: Tukwila muck NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes	No X	**within a Wetland?** Yes ___ No X

Remarks:

On constructed fill berm upslope from boundary. Sample plot has 1 of 3 wetland criteria, is not located in a wetland. Paired upland plot for WFW 2-1. Conditions wetter than normal for time of year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Alnus rubra	15	Yes	FAC
2.			
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus ursinus	5	Yes	FACU
2. Rubus armeniacus	4	Yes	FAC
3. Rubus spectabilis	3	Yes	FAC
4.			
5.			
	12	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Agrostis capillaris	50	Yes	FAC
2. Dactylis glomerata	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	72	x3=	216
FACU species	35	x4=	140
UPL species		x5=	0
Column Totals:	107	(A)	356 (B)

Prevalence Index = B/A= 3.33

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test but not prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 2-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10 YR 3/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Quarry Spall
Depth (inches): 14

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators. Refusal at 14 inches due to quarry spall.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/16/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 2-3
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): None Slope(%): 1
Subregion (LRR): A - Northwestern Forest, Lat: 47.300098 Long: -122.310761 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?**	Yes X No ___

Remarks:
Plot in WFW 2. Sample plot has 3 of 3 criteria, is located in a wetland. Conditions wetter than normal for time of year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Fraxinus latifolia	60	Yes	FACW
2.			
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	40	Yes	FAC
2. Spiraea douglasii	20	Yes	FACW
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species	80	x2=	160	
FAC species	40	x3=	120	
FACU species		x4=	0	
UPL species		x5=	0	
Column Totals:	120	(A)	280	(B)

Prevalence Index = B/A= 2.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 2-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 2/1	100					Silt Loam	
14-18	10 YR 4/2	97	10YR 3/4	3	C	M	Silty Clay Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
X Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________
Depth (inches): ________

Hydric Soil Present? Yes X No ___

Remarks:

Hydrogen sulfide odor at 10 inches. Sample plot meets hydric soil indicator A4, Hydrogen Sulfide, and A12, thick dark surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
X Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes X No ___ Depth (inches): 8.0
Saturation Present? Yes X No ___ Depth (inches): 0.0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets wetland hydrology indicators for High Water Table (A2), Saturation (A3), and Hydrogen Sulfide Odor (C1). Surface water present in vicinity of plot.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/16/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 2-4

Investigators: STORY, PACE Section, Township, Range: T21N R4E S21

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Convex Slope(%): 15

Subregion (LRR): A - Northwestern Forest, Lat: 47.300045 Long: -122.310776 Datum: WGS84

Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X

Hydric Soil Present? Yes ___ No X

Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

Upland plot for wetland WFW 2. Sample plot has 0 of 3 wetland criteria, is not located in a wetland. Conditions wetter than normal for time of year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Fraxinus latifolia	30	Yes	FACW
2. Pseudotsuga menziesii	10	Yes	FACU
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus ursinus	50	Yes	FACU
2. Rubus spectabilis	20	Yes	FAC
3. Oemleria cerasiformis	20	Yes	FACU
4. Symphoricarpos albus	20	Yes	FACU
5.			
	110	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Polystichum munitum	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 29 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	30	x2=	60
FAC species	20	x3=	60
FACU species	130	x4=	520
UPL species		x5=	0
Column Totals:	180 (A)		640 (B)

Prevalence Index = B/A= 3.56

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants¹

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 2-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 3/2	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRLA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Tables (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aeriel Imagery (B
____ Sparsley Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (**LRR A**)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aeriel Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (**LRR A**)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____________
Water Table Present? Yes ____ No X Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____________

Wetland Hydrology Present? Yes ____ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot lacks primary and second hydrology indicators.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/18/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 3-1
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Floodplain Local Relief (concave, convex, none): None Slope(%): 2
Subregion (LRR): A - Northwestern Forest, Lat: 47.296341 Long: -122.305145 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** Yes X No ___

Remarks:
On bench above E. Hylebos Creek. Conditions wetter than normal for time of year. Sample plot has 3 of 3 criteria, is located within WFW-3.

VEGETATION – Use scientific names of plants.

Tree Statum (Plot size: 5m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	60	Yes	FACW
2. Alnus rubra	10	No	FAC
3.			
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	20	Yes	FAC
2. Rubus spectabilis	15	Yes	FAC
3. Oemleria cerasiformis	10	Yes	FACU
4. Rubus ursinus	3	No	FACU
5.			
	48	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Hedera helix	5	Yes	FACU
2. Ranunculus repens	3	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	8	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 89 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	67	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	60	x2=	120
FAC species	48	x3=	144
FACU species	18	x4=	72
UPL species		x5=	0
Column Totals:	126 (A)		336 (B)

Prevalence Index = B/A= 2.67

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 3-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10 YR 3/2	95	10YR 4/6	5	C	M	Silt Loam	
14-18	10YR 4/2	98	10YR 5/4	2	C	M	Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRLA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
X Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:
Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Lots of gravel. Sample plot meets hydric soil indicator F6, Redox Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aeriel Imagery (B
Sparsley Vegetated Concave Surface (B8)

Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (**LRR A**)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aeriel Imagery (C9)
Geomorphic Position (D2)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (**LRR A**)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No X Depth (inches):
Water Table Present? Yes X No Depth (inches): 12.0
Saturation Present? (includes capillary fringe) Yes X No Depth (inches): 9.0

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for saturation and high water table.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/18/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 3-2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Toeslope Local Relief (concave, convex, none): None Slope(%): 3
Subregion (LRR): A - Northwestern Forest, Lat: 47.296326 Long: -122.305130 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil X or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Soil disturbed from adjacent fill. Conditions wetter than normal for time of year. Sample plot has 1 of 3 wetland criteria, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	45	Yes	FAC
2. Acer circinatum	35	Yes	FAC
3. Oemleria cerasiformis	10	No	FACU
4. Rubus ursinus	4	No	FACU
5.			
	94	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Polystichum munitum	7	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 89 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	67	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species		x2=	0	
FAC species	80	x3=	240	
FACU species	21	x4=	84	
UPL species		x5=	0	
Column Totals:	101	(A)	324	(B)

Prevalence Index = B/A= 3.21

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Sample plot meets dominance test but not prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 3-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					Loamy Sand	
7-18	2.5Y 4/3	100					Loamy Sand	Significant gravel and cobble

[1]Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/18/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 4-1
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.295021 Long: -122.305908 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____		
Hydric Soil Present?	Yes X No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ____	**within a Wetland?**	Yes X No ____

Remarks:

Conditions wetter than normal for time of year. Sample plot meets 3 of 3 wetland criteria, is located in WFW-4.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Fraxinus latifolia	40	Yes	FACW
2. Populus balsamifera	30	Yes	FAC
3. Salix lasiandra	10	No	FACW
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Spiraea douglasii	40	Yes	FACW
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Carex obnupta	25	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x1=	25
FACW species	90	x2=	180
FAC species	30	x3=	90
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	145 (A)		295 (B)

Prevalence Index = B/A= 2.03

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
____ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants¹
____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 4-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type¹	Loc²		
0-18	10YR 2/1	97	10YR 3/3	3	C	M	Silt Loam	High organic content

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Sample plot meets hydric soil indicator F6, Redox Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 0.0
Saturation Present? Yes X No ___ Depth (inches): 0.0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water elsewhere in wetland. Sample plot meets primary hydrology indicators for High Water Table (A2) and Saturation (A3). Sample plot also passes FAC-Neutral Test (D5).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/18/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 4-2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.295021 Long: -122.305908 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____ No X

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.. Sample plot is paired upland plot for WFW-4, located on fill pad adjacent to WFW-4. Sample plot has 1 of 3 indicators, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	35	Yes	FAC
2.			
3.			
4.			
5.			
	35	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	30	Yes	FAC
2. Polystichum munitum	5	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	65	x3=	195
FACU species	5	x4=	20
UPL species		x5=	0
Column Totals:	70	(A)	215 (B)

Prevalence Index = B/A= 3.07

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 4-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-4	2.5Y 4/2	99	2.5Y 3/4	1	C	M	Sandy Loam	Refusal at 4; lots of cobble

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Cobble
Depth (inches): 4

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators. Refusal at 4 inches due to cobble. Located on fill pad with minimal soil development. Soil color likely comes from color of parent material (fill pad) and is not caused by weathering or depletion.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/23/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 5-1
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Channel Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.291679 Long: -122.307571 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PSS
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	Yes X No ___

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology.Sample plot meets 3 of 3 wetland criteria, is located in WFW-5.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Populus balsamifera	15	Yes	FAC
2. Frangula purshiana	5	Yes	FAC
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Symphoricarpos albus	60	Yes	FACU
2. Lonicera involucrata	30	Yes	FAC
3. Spiraea douglasii	30	Yes	FACW
4. Rubus spectabilis	20	No	FAC
5. Rubus ursinus	10	No	FACU
	150	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	10	Yes	FAC
2. Athyrium cyclosorum	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	6	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	86	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species	30	x2=	60	
FAC species	85	x3=	255	
FACU species	70	x4=	280	
UPL species		x5=	0	
Column Totals:	185	(A)	595	(B)

Prevalence Index = B/A= 3.22

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0¹
___ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants¹
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test but not prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 5-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-14	10YR 2/1	100					Silt Loam	
14-18	10YR 4/2	95	10YR 4/4	5	C	M	Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRLA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Sample plot meets hydric soil indicator A12, Thick Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aeriel Imagery (B
Sparsley Vegetated Concave Surface (B8)

Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (**LRR A**)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aeriel Imagery (C9)
Geomorphic Position (D2)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (**LRR A**)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No Depth (inches): 2.00
Water Table Present? Yes X No Depth (inches): 0.0
Saturation Present? Yes X No Depth (inches): 0.0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for Surface Water (A1), High Water Table (A2), and Saturation (A3).

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/23/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 5-2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Toeslope Local Relief (concave, convex, none): Convex Slope(%): 2
Subregion (LRR): A - Northwestern Forest, Lat: 47.291729 Long: -122.307503 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

At toe of slope, just upslope from edge of wetland WFW-5. Located in relatively mature upland forest. The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot has 0 of 3 criteria, is not located in a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Thuja plicata	30	Yes	FAC
2. Pseudotsuga menziesii	30	Yes	FACU
3. Populus balsamifera	10	No	FAC
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Gaultheria shallon	40	Yes	FACU
2. Rubus ursinus	40	Yes	FACU
3. Holodiscus discolor	7	No	FACU
4. Oemleria cerasiformis	5	No	FACU
5.			
	92	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Polystichum munitum	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	40	x3=	120
FACU species	137	x4=	548
UPL species		x5=	0
Column Totals:	177	(A)	668 (B)

Prevalence Index = B/A= 3.77

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 5-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	7.5YR 3/4	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators observed.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/23/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 6-1
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Channel Local Relief (concave, convex, none): Concave Slope(%): 1
Subregion (LRR): A - Northwestern Forest, Lat: 47.297321 Long: -122.304733 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PSS
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

Swale feature likely associated with construction of I-5. Conveys stormwater runoff from multiple culverts. Conditions wetter than normal for time of year. Sample plot has 3 of 3 criteria, is located in a WFW-6.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	30	Yes	FAC
2. Rubus ursinus	15	Yes	FACU
3. Oemleria cerasiformis	5	No	FACU
4.			
5.			
	50	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Tolmiea menziesii	40	Yes	FAC
2. Athyrium cyclosorum	20	Yes	FAC
3. Polystichum munitum	10	No	FACU
4. Geranium robertianum	3	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	73	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 12 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species		x2=	0	
FAC species	90	x3=	270	
FACU species	33	x4=	132	
UPL species		x5=	0	
Column Totals:	123	(A)	402	(B)

Prevalence Index = B/A= 3.27

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0¹
- ____ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants¹
- ____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test but not prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 6-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-16	10YR 3/2	95	10YR 4/6	5	C	M	Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1) (except MLRLA 1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ____ 2 cm Muck (A10)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Quarry spall

Depth (inches): 16

Hydric Soil Present? Yes X No ____

Remarks:

Impenetrable restrictive layer at 16 inches. Sample plot meets hydric soil indicator F6, Redox Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aeriel Imagery (B
- ____ Sparsley Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Stunted or Stressed Plants (D1) (**LRR A**)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- ____ Drainage Patterns (B10)
- ____ Dry-Season Water Table (C2)
- ____ Saturation Visible on Aeriel Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Raised Ant Mounds (D6) (**LRR A**)
- ____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0.50

Water Table Present? Yes X No ____ Depth (inches): 0.0

Saturation Present? Yes X No ____ Depth (inches): 0.0

(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for surface water, high water table, and saturation.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 10/23/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 6-2
Investigators: STORY, PACE Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Toeslope Local Relief (concave, convex, none): Convex Slope(%): 0
Subregion (LRR): A Lat: 47.297447 Long: -122.304787 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X		
Hydric Soil Present?	Yes ___ No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___ No X	**within a Wetland?**	Yes ___ No X

Remarks:

The preceding three months were wetter than normal; however, site visit occurred at end of the dry season so dry season conditions were still considered when evaluating hydrology. Sample plot has 0 of 3 wetland criteria, is not located in a wetland. Paired upland plot for WFW-5.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Pseudotsuga menziesii	35	Yes	FACU
2.			
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus ursinus	30	Yes	FACU
2. Acer circinatum	10	No	FAC
3. Rubus armeniacus	10	No	FAC
4. Thuja plicata	10	No	FAC
5. Acer macrophyllum	7	No	FACU
	79	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	30	x3=	90
FACU species	84	x4=	336
UPL species		x5=	0
Column Totals:	114	(A)	426 (B)

Prevalence Index = B/A= 3.74

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample plot does not meet dominance test or prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 6-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-18	10YR 3/3	100					Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Tables (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators of wetland hydrology observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-07-SP1**
Investigator(s): Steve Krueger, Aaron Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): convex Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.309896 Long: -122.302392 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station. Precipitation was above the normal range for the three months prior to the site visit.

Remarks:
PEM wetland SP for WFW-07 located 2 meters east of E. Fork Hylebos Creek along stream bench @ OHWM LB-11. The stream has been heavily modified and is adjacent to a golf course.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 1m radius)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m radius			
1. *Rubus armeniacus*	1%	No	FAC
2.			
3.			
4.			
5.			
	1% = Total Cover		
Herb Stratum (Plot size: 1m radius)			
1. *Phalaris arundinacea*	95%	Yes	FACW
2. *Ranunculus repens*	3%	No	FAC
3. *Equisetum telmateia*	2%	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 1m radius)			
1. *none*	0%		
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-07-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	10YR 2/2	100					L	
4-7	2.5Y 3/1	100					L	
7-9	5Y 4/1	100					SaL	decaying grass
9-20	10YR 4/1	100					CL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
X Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks:
Assumed to be hydric based on aquic moisture regime and fluvial entisol. Decaying grass thoughout layers, proximity to floodplain may explain lack of hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 12
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 11

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-07-SP2**

Investigator(s): Steve Kruger, Aaron Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >10%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.309893 Long: -122.302418 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station. Precipitation was above the normal range for the three months prior to the site visit.

Remarks:
Upland SP for WFW-07 paired with WFW-07-SP1. SP is ~4m east and upslope of East Fork Hylebos Creek and 2m east of WFW-07-SP1.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 1m radius)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m radius)			
1. *Ilex aquifolium*	12%	Yes	FACU
2. *Rubus armeniacus*	5%	Yes	FAC
3.			
4.			
5.			
	17% = Total Cover		
Herb Stratum (Plot size: 1m radius)			
1. *Equisetum telmateia*	80%	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80% = Total Cover		
Woody Vine Stratum (Plot size: 1m radius)			
1. *none*	0%		
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-07-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	10YR 3/2	100					L	
7-20	10YR 5/3	100					GSaL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/16/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-07-SP3**
Investigator(s): Steve Krueger, Aaron Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.310171 Long: -122.302239 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation X, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes X** **No ____**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Precipitation:
According to the Seattle Tacoma International NOAA weather station. Precipitation was above the normal range for the three months prior to the site visit.

Remarks:
PSS SP for WFW-07. Located near pedestrian bridge ~2m east and upslope of E. Fork Hylebos Creek Tributary 0016A. The stream has been heavily modified and is adjacent to a golf course.
Vegetation within the wetland and also adjacent upland is dominated by the aggressive species, English ivy (Hedera helix), which would be considered problematic vegetation.
Hydric soil indicators and hydrology indicators are both strong, supporting the assumption that vegetation is also hydric.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Salix sitchensis*	80%	Yes	FACW
2. *Rubus armeniacus*	5%	No	FAC
3.			
4.			
5.			
	85% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Equisetum telmateia*	5%	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	95%	Yes	FACU
2.			
	95% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Vegetation within the wetland and also adjacent upland is dominated by the aggressive species, English ivy (*Hedera helix*), which would be considered problematic vegetation. Hydric soil indicators and hydrology indicators are both strong, supporting the assumption that vegetation is also hydric.

SOIL

Sampling Point: **WFW-07-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	10YR 3/2	100					SaL	
7-17	10YR 4/2	90	10YR 5/6	10	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
x Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
X Sediment Deposits (B2)
X Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	X	No	Depth (inches):	16
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	11

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Hydrology check conducted on 03/02/2020: soils saturated to the surface, ground water table at 3 inches. Signs of riverine hydrology in immediate vicinity include drift deposits and sediment deposits.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-07-SP4**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >10%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.310178 Long: -122.302193 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No x (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes x No ___
Are Vegetation X, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes	No X		
Wetland Hydrology Present?	Yes	No X		

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
upland SP for WFW-07. Near OHWM flag EH-RB11. East of WFW-07-SP3. Vegetation is naturally problematic due to presence of aggressive species, English ivy and Himalayan blackberry, dominate this area.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=2m)			
1. *Pseudotsuga menziesii*	40%	Yes	FACU
	40%	= Total Cover	
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	55%	Yes	FAC
2. *Rubus ursinus*	1%	No	FACU
	56%	= Total Cover	
Herb Stratum (Plot size: r=1m)			
1. *Equisetum telmateia*	2%	No	FACW
	2%	= Total Cover	
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	98%	Yes	FACU
	98%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:
Aggressive vegetation (English ivy and Himalayan blackberry) dominate this area.

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: **WFW-07-SP4**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	10YR 2/1	100					L	
7-11	10YR 3/2	80	10YR 4/2	20	D	M	GrSaL	
11-17	2.5YR 5/2	99	10YR 5/6	<1	C	M	GrSaL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? **Yes** ______ **No** X

Remarks:
Soils may be the result of prior disturbances

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way/King Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-08-SP1**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): concave Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.308060 Long: -122.302762 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?**	**Yes X** **No**
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes X	No		

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
PSS wetland SP for WFW-08. In SW section of wetland. Wetland is adjacent to E. Fork Hylebos Creek Trib 0016A. The stream is heavily modified and appears to be used as a constructed stormwater facility.
Problematic Soil: Soil appears to be a fluvial entisol with aquic moisture regime. Strong hydrophytic vegetation, geomorphic position on stream bench, significant organics in soils, and strong wetland hydrology indicators support determination as hydric soil.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=1m)			
1. *Salix lasiandra*	70%	Yes	FACW
2. *Rubus armeniacus*	20%	Yes	FAC
3.			
4.			
5.			
	90% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	80%	Yes	FACW
2. *Typha latifolia*	15%	No	OBL
3. *Ranunculus repens*	5%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-08-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	10YR 2/2	100					CL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
X Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: quarry spalls
Depth (inches): 4.5

Hydric Soil Present? Yes X No ___

Remarks:
unable to dig past quarry spalls at 4.5" below ground surface. Stream has been heavily modified and appears to be used as a constructed stormwater facility. Wetlands have developed at the edges. Soil appears to be a fluvial entisol with aquic moisture regime. Strong hydrophytic vegetation, geomorphic position on stream bench, significant organics in soils, and strong wetland hydrology indicators support determination as hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
X Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): surface
Water Table Present? Yes X No ___ Depth (inches): surface
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/9/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-08-SP2**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Flat area Local relief (concave, convex, none): convex Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.308239 Long: -122.302792 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
upland SP to WFW-08-SP1 and SP3, located on fairway of golf course. SP is west of wetland and just outside the fence surrounding the wetland.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
= Total Cover	0%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
5.			
= Total Cover	0%		
Herb Stratum (Plot size: r=1m)			
1. *Poa pratensis*	30%	Yes	FAC
2. *Stellaria media*	15%	Yes	FACU
3. *Draba verna*	10%	No	NOL
4. *Trifolium repens*	2%	No	FAC
5. *Hypochaeris radicata*	1%	No	FACU
6. *Phalaris arundinacea*	1%	No	FACW
7. *Cirsium arvense*	1%	No	FAC
8.			
9.			
10.			
11.			
= Total Cover	60%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		
% Bare Ground in Herb Stratum	40%		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
moss cover is 40%

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-030 and -019

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-08-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-2	10YR 2/2	100					SaL	
2-19	2.5Y 4/2	100					GrSa	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
sample plot in golf fairway.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-08-SP3**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Stream bench Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.308250 Long: -122.302752 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil X, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes **X**	No	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** ___
Hydric Soil Present?	Yes **X**	No		
Wetland Hydrology Present?	Yes **X**	No		

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
PEM wetland SP for WFW-08; located in NW section of wetland. Wetland associated with E. Fork Hylebos Creek Tributary 0016A and is adjacent to a golf course. The stream has been heavily modified, resulting in disturbed soils in riverine wetlands.
Problematic Soil: Soil appears to be a fluvial entisol with aquic moisture regime. Strong hydrophytic vegetation, geomorphic position on stream bench, significant organics in soils, and strong wetland hydrology indicators support determination as hydric soil.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 1m^2)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m^2)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 1m^2)			
1. *Phalaris arundinacea*	95%	Yes	FACW
2. *Typha latifolia*	5%	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 1m^2)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

SOIL

Sampling Point: **WFW-08-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	10YR 2/2	100					CL	greasy

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: quarry spalls

Depth (inches): 7"

Hydric Soil Present? Yes X No ___

Remarks:

unable to dig past 7" due to dense quarry spalls. Stream has been heavily modified.

Soil appears to be a fluvial entisol with aquic moisture regime. Strong hydrophytic vegetation, geomorphic position on stream bench, significant organics in soils, and strong wetland hydrology indicators support determination as hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	1
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-030 and -019

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-09-SP1**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): none Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.307276 Long: -122.302679 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
PSS wetland SP for WFW-09. Approx. 3m east of E. Fork Hylebos Creek Tributary 0016A near OHWM flag WH-LB34

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
= Total Cover	0%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	50%	Yes	FAC
2. *Spiraea douglasii*	30%	Yes	FACW
3. *Fraxinus latifolia*	10%	No	FACW
4. *Rubus armeniacus*	5%	No	FAC
5. *Rubus ursinus*	5%	No	FACU
= Total Cover	100%		
Herb Stratum (Plot size: r=1m)			
1. *Carex obnupta*	60%	Yes	OBL
2. *Phalaris arundinacea*	10%	No	FACW
3. *Ranunculus repens*	2%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	72%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		

% Bare Ground in Herb Stratum 28%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: **WFW-09-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-5	10YR 2/2	100					CL	
5-10	10YR 4/1	95	10YR 5/8	5	C	M	CL	
10-16	5Y 5/2	70	7.5YR 4/4	30	C	PL	CL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ____

Remarks:
redox features along living roots between 10-16" BGS.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☒ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☒ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 8

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Oxidized rhisopheres observed at depths between 10 and 16 inches.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/6/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-09-SP2**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.307265 Long: -122.302611 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 0 to 6 percent slopes - AmB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit.

Remarks:
Upland SP for WFW-09. located approx. 5m east of E. Fork Hylebos Creek Tributary 0016A and approx. 3m east of WFW-09-SP1

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Populus balsamifera*	20%	Yes	FAC
2. *Fraxinus latifolia*	10%	Yes	FACW
3.			
4.			
	30% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	70%	Yes	FAC
2. *Rubus ursinus*	2%	No	FACU
3.			
4.			
5.			
	72% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Carex obnupta*	80%	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: WFW-09-SP2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-9	10YR 3/2	100					CL	
9-18	10YR 3/2	90	10YR 5/6	5	C	M	CL	
			10YR 4/6	C	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/20/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP03**
Investigator(s): Steve Krueger, Aaron Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304418 Long: -122.303953 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
PFO wetland SP for WFW10, Unit A. Located approx. 2m west of E. Fork Hylebos near OHWM flag RB5.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	80%	Yes	FAC
2. *Acer circinatum*	5%	No	FAC
3. *Rubus laciniatus*	5%	No	FACU
4. *Ilex aquifolium*	2%	No	FACU
5.			
	92% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Ranunculus repens*	1%	No	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	1% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 99%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-10-SP03**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					L	
2-9	10YR 3/2	100					L	redox may be masked by organics
9-12	10YR 4/2	100					SaL	
12-16	2.5Y 4/2	90	7.5Y 5/8	10	C	M	SaL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- x Hydrogen Sulfide (A4)
- x Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Assumed to be hydric, with a problematic layer 9-12 (lots of organic masking)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):
Water Table Present?	Yes x	No	Depth (inches): 5.5
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches): surface

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP04**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304432 Long: -122.304019 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** **X**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
Upland SP for WFW-10 Unit A. located west of East Fork Hylebos Creek.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Acer circinatum*	40%	Yes	FAC
2.			
3.			
4.			
	40% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Acer circinatum*	20%	Yes	FAC
2. *Phalaris arundinacea*	15%	Yes	FACW
3. *Ilex aquifolium*	15%	Yes	FACU
4.			
5.			
	50% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Polystichum munitum*	15%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	90%	Yes	FACU
2.			
	90% = Total Cover		

% Bare Ground in Herb Stratum 85%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** **X**

Remarks:
leaf litter covering ground

SOIL

Sampling Point: **WFW-10-SP04**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/3	100					L	
7-17	10YR 4/6	80					GrL	mixed matrix
	10YR 4/3	20						

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/1/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP01**
Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.305663 Long: -122.303589 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	
Hydric Soil Present?	Yes X	No	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No	**within a Wetland?** **Yes** X **No**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
PFO wetland SP in WFW-10, Unit B. Located west of E. Fork Hylebos Creek Trib 0016A (left bank).

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Thuja plicata*	70%	Yes	FAC
2. *Populus balsamifera*	20%	Yes	FAC
3. *Alnus rubra*	5%	No	FAC
4.			
	95% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Populus balsamifera*	10%	Yes	FAC
2. *Rubus spectabilis*	10%	Yes	FAC
3. *Fraxinus latifolia*	5%	Yes	FACW
4.			
5.			
	25% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Athyrium cyclosorum*	15%	Yes	FAC
2. *Carex obnupta*	10%	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *Hedera helix*	100%	Yes	FACU
2.			
	100% = Total Cover		
% Bare Ground in Herb Stratum 75%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	7	(A)
Total Number of Dominant Species Across All Strata:	8	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	88%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:
Ground covered by English ivy, an aggressive, non-native species.

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-10-SP01**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	100					L	some OM
11-16	10YR 3/2	100					GrL	gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** X **No** ___

Remarks:
SP located within the floodplain of a stream. Strong hydrophytic vegetation and wetland hydrology support determination of wetland area. Fluvial entisol with aquic moisture regime.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
x Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes x No ___ Depth (inches): 4
Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): surface

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/1/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP02**

Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): <3%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.305642 Long: -122.303664 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes	No X	**within a Wetland?** **Yes** ____ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
Upland SP for WFW-10, Unit B. Located upslope (west) of SP1 and E. Fork Hylebos Creek Trib 0016A.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Thuja plicata*	80%	Yes	FAC
2. *Alnus rubra*	20%	Yes	FAC
3.			
4.			
	100% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	40%	Yes	FAC
2. *Mahonia nervosa*	3%	No	FACU
3.			
4.			
5.			
	43% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Polystichum munitum*	50%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *Hedera helix*	60%	Yes	FACU
2.			
	60% = Total Cover		
% Bare Ground in Herb Stratum 50%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-10-SP02**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					L	
6-15	10YR 3/2	80					L	mixed matrix
6-15	10YR 3/6	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No x	Depth (inches): ___
Water Table Present?	Yes ___	No x	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No x	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP05**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304213 Long: -122.303748 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	
Hydric Soil Present?	Yes X	No	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No	**within a Wetland?** **Yes** X **No**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
PFO wetland SP located within WFW-10, Unit B. SP located west of E. Fork Hylebos Creek Trib 0016A. Creek on parcel is channelized with concrete armoring.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	40%	Yes	FAC
2.			
3.			
4.			
	40% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	45%	Yes	FAC
2. *Rubus armeniacus*	35%	Yes	FAC
3.			
4.			
5.			
	80% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 100%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
ground covered by leaf litter

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-10-SP05**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					L	
3-11	10YR 3/2	95	10YR 4/6	5	C	M	GrL	
11-17	10YR 3/6	95	7.5YR 5/8	5	C	M	GrL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
x Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
x Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No x	Depth (inches): ___
Water Table Present?	Yes x	No ___	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes x	No ___	Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP06**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304181 Long: -122.303611 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
Upland SP for WFW-10, Unit B. Located upslope of wetland, west of E. Fork Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	80%	Yes	FAC
2. *Rubus spectabilis*	20%	Yes	FAC
3.			
4.			
5.			
	100% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 100%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-10-SP06**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					L	
5-16	10YR 3/2	98	10YR 4/6	2	C	M	GrL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP07**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): flat bench Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303639 Long: -122.303835 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
PFO wetland SP in WFW-10, Unit B. Located approx. 3 m east of OHWM of E. Fork Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	90%	Yes	FACW
2. *Ranunculus repens*	7%	No	FAC
3. *Poa pratensis*	2%	No	FAC
4. *Galium aparine*	1%	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-10-SP07**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					GrL	
5-16	10YR 2/2	95	10YR 4/6	5	C	M	GrL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
x Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
x High Water Table (A2)
x Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):	
Water Table Present?	Yes x	No	Depth (inches):	11
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches):	9

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP08**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): flat stream bench Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303661 Long: -122.303870 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
upland SP of WFW10, Unit B. Located approx. 6m east of E. Fork Hylebos Creek (and 3m east of wetland SP WFW10-SP5).

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	5%	Yes	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Poa pratensis*	45%	Yes	FAC
2. *Phalaris arundinacea*	35%	Yes	FACW
3. *Ranunculus repens*	18%	No	FAC
4. *Galium aparine*	2%	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-10-SP08**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					GrL	
4-10	10YR 2/2	70					GrL	mixed matrix
	10YR 3/6	30					GrL	mixed matrix
10-16	10YR 3/6	100					GrL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? **Yes** **No** X

Remarks:

appears to be fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Table (A2)
Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aerial Imagery (B7)
Sparsely Vegetated Concave Surface (B8)

Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (LRR A)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aerial Imagery (C9)
Geomorphic Position (D2)
Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (LRR A)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No x	Depth (inches):	
Water Table Present?	Yes		No x	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No x	Depth (inches):	

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/5/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP09**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304739 Long: -122.303713 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
PFO wetland SP in WFW10, Unit C. SP positioned on a terrace to the east of E. Fork Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	90%	Yes	FAC
2.			
3.			
4.			
	90% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	40%	Yes	FAC
2. *Rubus armeniacus*	15%	Yes	FAC
3. *Rubus ursinus*	15%	Yes	FACU
4.			
5.			
	70% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	100%	Yes	FACU
2.			
	100% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: WFW-10-SP09

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	100					GrCL	
11-17	5Y 5/2	70	10YR 5/6	25	C	M	C	
			7.5YR 5/8	5	C	M	C	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
x Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Table (A2)
x Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aerial Imagery (B7)
Sparsely Vegetated Concave Surface (B8)
Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (LRR A)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aerial Imagery (C9)
Geomorphic Position (D2)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (LRR A)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):	
Water Table Present?	Yes		No	x	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	x	No		Depth (inches):	11

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/5/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP10**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304735 Long: -122.303799 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November and within the normal range for visits within December. The month of November was drier than normal, and December was wetter than normal.

Remarks:
Upland SP in WFW-10, Unit C. SP positioned above stream terrace to the east of E. Fork Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	100%	Yes	FAC
2.			
3.			
4.			
= Total Cover	100%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	40%	Yes	FAC
2. *Sambucus racemosa*	30%	Yes	FACU
3. *Rubus ursinus*	25%	Yes	FACU
4. *Rubus armeniacus*	5%	No	FAC
5. *Ilex aquifolium*	5%	No	FACU
= Total Cover	105%		
Herb Stratum (Plot size: r=1m)			
1. *Polystichum munitum*	15%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	15%		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	50%	Yes	FACU
2.			
= Total Cover	50%		

% Bare Ground in Herb Stratum 35%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:
ground covered by leaf litter

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: WFW-10-SP10

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/2	100					L	
13-17	10YR 3/3	95	7.5YR 4/6	5	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No x	Depth (inches): ___
Water Table Present?	Yes ___	No x	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No x	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 1/21/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP11**
Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): >10%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303131 Long: -122.303800 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was normal for the three months prior to the site visits in Janurary. The month of Decement was wet, November was dry and October was normal.

Remarks:
Upland SP to WFW-10 Unit C, SP located between driveway and stream bank east of East Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Pseudotsuga menziesii*	70%	Yes	FACU
2.			
3.			
4.			
	70% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	80%	Yes	FACW
2. *Agrostis* sp.	15%	No	FAC*
3. Hypochaeris radicata	3%	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	98% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 2%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
*presumed FAC

SOIL

Sampling Point: WFW-10-SP11

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 2/2	100					GrSaL	cobbles
15-16	10YR 3/3	90	10YR 4/6	10	C	M	GrSaL	cobbles

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? Yes No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (LRR A)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (LRR A)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes No X Depth (inches):

Wetland Hydrology Present? Yes No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 1/21/2020

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP12**

Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): <3%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303121 Long: -122.303895 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was normal for the three months prior to the site visits in Janurary. The month of Decement was wet, November was dry and October was normal.

Remarks:
WFW10-Unit C. Emergent sample point within PFO wetland vegetation unit. Located on right bank within floodplain near E. Hylebos RB401 OHWM flag, 3m north of double culvert within OHWLs.
Problematic Soil: lack of indicators but appears to be a fluvial entisol with aquic moisture regime. Geomorphic position, strong hydrophytic vegetation and wetland hydrology support determination of wetland area.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. none			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	20%	Yes	FAC
2.			
3.			
4.			
5.			
	20% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	99%	Yes	FACW
2. *Ranunculus repens*	1%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. none			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-10-SP12**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/2	100					GrL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1) (except MLRA 1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10)
Red Parent Material (TF2)
Very Shallow Dark Surface (TF12)
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** X **No**

Remarks:
No hydric soil indicator met, SP located within the floodplain of a stream. Fluvial entisol with aquic moisture regime. Soil is hydric based on strong vegetation and hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Surface Soil Cracks (B6)
Inundation Visible on Aerial Imagery (B7)
Sparsely Vegetated Concave Surface (B8)
Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
Salt Crust (B11)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Stunted or Stressed Plants (D1) (LRR A)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
Raised Ant Mounds (D6) (LRR A)
Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	X	No	Depth (inches):	2"
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	surface

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 1/21/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-10-SP13**
Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303221 Long: -122.303937 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was normal for the three months prior to the site visits in Janurary. The month of Decement was wet, November was dry and October was normal.

Remarks:
PFO wetland SP on right bank of East Hylebos Creek Trib 0016A, above OHWL.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	70%	Yes	FAC
2.			
3.			
4.			
	70% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	25%	Yes	FAC
2. *Rubus armeniacus*	20%	Yes	FAC
3.			
4.			
5.			
	45% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. none			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 100%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: **WFW-10-SP13**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1	100					L	slighly greasy
8-16	10YR 3/1	95	7.5YR 3/4	5	C	M	GrL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 7

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/1/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-11-SP1**
Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303850 Long: -122.302638 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
PFO wetland SP, located east of 24th Ave. S

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Populus balsamifera*	40%	Yes	FAC
2.			
3.			
4.			
= Total Cover	40%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus laciniatus*	25%	Yes	FACU
2. *Spiraea douglasii*	15%	Yes	FACW
3. *Lonicera involucrata*	10%	No	FAC
4. *Oemleria cerasiformis*	5%	No	FACU
5. *Cornus alba*	5%	No	FACW
= Total Cover	70%*		
Herb Stratum (Plot size: r=1m)			
1. *Ranunculus repens*	15%	Yes	FAC
2. *Phalaris arundinacea*	5%	Yes	FACW
3. *Solanum dulcamara*	1%	No	FAC
4. *Geum macrophyllum*	1%	No	FAC
5. *Epilobium ciliatum*	1%	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	23%		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	10%	Yes	FACU
2.			
= Total Cover	10%		
% Bare Ground in Herb Stratum 67%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	67%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
* Fraxinus latifolia, 5%, no, FACW
* Rubus ursinus, 5%, no, FACU
ground covered by leaf litter

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-11-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					L	
5-7	2.5Y 4/2	85	2.5Y 6/2	10	D	M	L	
			10YR 5/6	5	C	M	L	
7-16	10YR 6/2	65					L	
	10YR 4/2	20	10YR 4/6	15	C	M	L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
x Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
x High Water Table (A2)
x Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
x Geomorphic Position (D2)
___ Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	x	Depth (inches):
Water Table Present?	Yes	x	No		Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes	x	No		Depth (inches): 4

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/1/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-11-SP2**
Investigator(s): A. Hoenig, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.303783 Long: -122.302703 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
upland SP of WFW11. SP located east of 24th Ave S

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Acer circinatum*	50%	Yes	FAC
2. *Pseudotsuga menziesii*	40%	Yes	FACU
3.			
4.			
	90% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Gaultheria shallon*	60%	Yes	FACU
2. *Corylus cornuta*	15%	No	FACU
3. *Rubus laciniatus*	10%	No	FACU
4. *Symphoricarpos albus*	5%	No	FACU
5. *Mahonia nervosa*	2%	No	FACU
	93%* = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Chamaenerion angustifolium (dead)*	2%	No	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	2% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 100%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
* Ilex aquifolium, 1%, No, FACU

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-11-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					L	
2-5	7.5YR 2.5/2	100					L	
5-16	7.5YR 3/4	100					L	some gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No x Depth (inches): ____
Water Table Present? Yes ____ No x Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No x Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/19/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-11-SP3**

Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): None

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304059 Long: -122.302397 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No x (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? **Yes** X **No**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
PEM wetland SP, located in NW corner of WFW11

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=1m)			
1. *Rubus armeniacus*	5%	Yes	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	98%	Yes	FACW
2. *Ranunculus repens*	2%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: **WFW-11-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					SaL	
2-10	10YR 3/2	90	10YR 5/6	10	C	M	SaL	
10-16	10YR 3/2	95	5Y 5/1	5	D	M	SaL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
x Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:
lots of large rock on surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
x High Water Table (A2)
x Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
x FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes x No ___ Depth (inches): 4.5
Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-11-SP4**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): road slope Local relief (concave, convex, none): none Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.304125 Long: -122.302397 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 % slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
upland SP for WFW11, located approx. 2m east of 24th Ave S.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=1m)			
1. *Rubus armeniacus*	30%	Yes	FAC
2. *Rubus spectabilis*	5%	No	FAC
3.			
4.			
5.			
	35% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Schedonorus arundinaceus*	70%	Yes	FAC
2. *Ranunculus repens*	10%	No	FAC
3. *Galium aparine*	5%	Yes	FACU
4. *Phalaris arundinacea*	5%	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 10%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-11-SP4**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					L	
3-17	10YR 3/2	98	10YR 6/6	2	C	M	L	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):	
Water Table Present?	Yes	No x	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No x	Depth (inches):	

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/14/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-12-SP1**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): stream bench Local relief (concave, convex, none): none Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.307100 Long: -122.302974 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ____ No x
Are Vegetation ____, Soil x, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**
Wetland Hydrology Present?	Yes X	No ____	**Yes X No ____**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
PEM wetland SP for WFW-12. Associated with East Fork Hylebos Creek Trib 0016A. Located at toe of slope near culvert OHWM flag EH-LB35 and 37.
Problematic soils: No hydric soils indicators, but rganics may be masking redox features, as well as fluvial entisol with aquic moisture regime

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Phalaris arundinacea*	90%	Yes	FACW
2. *Ranunculus repens*	5%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1.			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 5%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-12-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					CL	OM - roots
7-17	5Y 4/1	100					L	roots throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- x Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:
Sample point is approximately 2m from wetted stream and is within the floodplain. The stream has been highly modified. Soils have high organic content. Fluvial entisol with aquic moisture regime. Strong hydrophytic vegetation and hydrology and geomorphic position support the determination of wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- x Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):	
Water Table Present?	Yes x	No	Depth (inches):	7
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches):	surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/14/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-12-SP2**
Investigator(s): S. Krueger, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): >10%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.307101 Long: -122.302950 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?**	
Hydric Soil Present?	Yes	No X		
Wetland Hydrology Present?	Yes	No X		**Yes** ______ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
Upland SP for WFW-12. Located on fill slope near stream bench between OHWM flag LB36 and 37.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=1m)			
1. *Rubus armeniacus*	1%	No	FAC
2.			
3.			
4.			
5.			
	1% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Barbarea vulgaris*	5%	Yes	FAC
2. *Festuca rubra*	2%	Yes	FAC
3. *Ranunculus repens*	1%	no	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	8% = Total Cover		
Woody Vine Stratum (Plot size: r=1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 92%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-12-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 4/3	99	10YR 6/6	<1	C	M	GrL	
11-16	10YR 4/3	100					Sa	sm-med gravel

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/26/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-13-SP1**
Investigator(s): A. Thom, A. Hoenig Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): ditch Local relief (concave, convex, none): concave Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.302502 Long: -122.302818 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
PSS wetland SP in middle of ditch, which runs north-south parallel to I-5. It is located southeast of S 333rd St.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 85cm^2)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 85cm^2)			
1. *Rubus armeniacus*	5%	Yes	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 85cm^2)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: 85cm x 1m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 100%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: WFW-13-SP1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					L	cobble and gravel
8-14	10YR 4/1	85	7.5YR 4/6	5	C	M	SaL	gravel
14-17	2.5Y 6/1	70	7.5YR 4/4	30	C	M	C	gravel

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
_x_ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
_x_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay and gravel compacted

Depth (inches): 17

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
_x_ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
_x_ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
_x_ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 8

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 11/26/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-13-SP2**
Investigator(s): A. Hoenig, M. Murphy Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.302510 Long: -122.302856 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X		
Hydric Soil Present?	Yes ____ No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____ No X	**within a Wetland?**	**Yes** ____ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
Upland SP for WFW-13. Located west of SP-1 and west of the wetland within the WSDOT I-5 ROW.

VEGETATION

Tree Stratum (Plot size: r=3m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m^2)			
1. *Rubus armeniacus*	100%	Yes	FAC
2.			
3.			
4.			
5.			
	100% = Total Cover		
Herb Stratum (Plot size: r=1m^2)			
1. *Polystichum munitum*	25%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25% = Total Cover		
Woody Vine Stratum (Plot size: r=2m^2)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 75%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: WFW-13-SP2

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					SaL	
4-8	10YR 4/2	100					GSaL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: gravel
Depth (inches): 8"

Hydric Soil Present? Yes ___ No X

Remarks:
dense gravel starts at 4", cannot excavate below 8"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way/King Sampling Date: 12/3/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-14-SP1**
Investigator(s): ______ Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): concave Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.301029 Long: -122.304361 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)
Are Vegetation x , Soil ____ , or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____
Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was within the normal range for the three months prior to the site visit in December.

Remarks:
PEM wetland SP positioned in a swale that conveys water stormwater from the condo complex south to the East Fork Hylebos Creek Trib 0016A through a pipe. Vegetation is regularly maintained.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Poa pratensis*	55%	Yes	FAC
2. *Ranunculus repens*	30%	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 15%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-14-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	100					L	
3-13	2.5Y 4/2	90	7.5YR 5/8	10	C	M/PL	SaL	oxidiz. Rhizo.; cobbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: cobbles compaction
Depth (inches): 13

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
x Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
x Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No x	Depth (inches): ___
Water Table Present?	Yes ___	No x	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No x	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
SP in swale that receives stormwater input. Oxidized rhizospheres at 3"

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way/King Sampling Date: 12/3/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-14-SP2**

Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): >10%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.300974 Long: -122.304379 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No x

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was within the normal range for the three months prior to the site visit in December.

Remarks:
Upland SP to WFW-14. Located to the east of SP-1 and east of the wetland. It is uplope of the swale. Vegetation regularly maintained and mowed.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
= Total Cover	0%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *none*			
2.			
3.			
4.			
5.			
= Total Cover	0%		
Herb Stratum (Plot size: r=1m)			
1. *Poa pratensis*	50%	Yes	FAC
2. *Pteridium aquilinum*	10%	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	60%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		
% Bare Ground in Herb Stratum 40%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:
vegetation regularly maintained and mowed.

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: **WFW-14-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					CL	
2-4	10YR 4/6	100					CL	
4-11	2.5Y 5/3	97	2.5Y 5/4	3	C	M	GrCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: compaction
Depth (inches): 11

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No x	Depth (inches): ______
Water Table Present?	Yes ______	No x	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No x	Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way/King Sampling Date: 12/3/2019

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-14-SP3**

Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): <3%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.300822 Long: -122.304254 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes	No X	**within a Wetland?**	**Yes** ____ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was within the normal range for the three months prior to the site visit in December.

Remarks:
Upland SP in slight depression north of S 336th St, east of wetland WFW-14, and west of the apartment building cross road.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	100%	Yes	FAC
2.			
3.			
4.			
= Total Cover	100%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Acer circinatum*	40%	Yes	FAC
2. *Rubus armeniacus*	40%	Yes	FAC
3.			
4.			
5.			
= Total Cover	80%		
Herb Stratum (Plot size: r=1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	0%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		

% Bare Ground in Herb Stratum 100%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
leaf litter covering ground

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

SOIL

Sampling Point: **WFW-14-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR 2/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: S = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1) (except MLRA 1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

____ 2 cm Muck (A10)
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes ____ No X

Remarks:
No redoximorphic features were detected. No assumption of hydric soil because only supported by moderate hydrophytic vegetation but lacks wetland hydrology and geomorphic position.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
____ Salt Crust (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Stunted or Stressed Plants (D1) (LRR A)
____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

____ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Saturation Visible on Aerial Imagery (C9)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)
____ Raised Ant Mounds (D6) (LRR A)
____ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No x Depth (inches): ____
Water Table Present? Yes ____ No x Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No x Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-019 and -030

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/5/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-15-SP1**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.301297 Long: -122.303442 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? **Yes** X **No**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
PFO wetland SP is positioned on a terrace to the east of East Hylebos Creek Trib 0016A

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Alnus rubra*	90%	Yes	FAC
2.			
3.			
4.			
= Total Cover	90%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	40%	Yes	FAC
2. *Rubus armeniacus*	15%	Yes	FAC
3. *Rubus ursinus*	15%	Yes	FACU
4.			
5.			
= Total Cover	70%		
Herb Stratum (Plot size: r=1m)			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	0%		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	100%	Yes	FACU
2.			
= Total Cover	100%		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-030 and -019

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-15-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-11	10YR 2/2	100					GrCL	
11-17	5Y 5/2	70	10YR 5/6	25	C	M	C	
			7.5YR 5/8	5	C	M		

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 11"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 12/5/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-15-SP2**
Investigator(s): T. Parry, A. Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.301291 Long: -122.303605 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 0 to 8 percent slopes - AgB - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes	No X	**within a Wetland?** Yes ____ No X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in November.

Remarks:
SP is positioned above a stream terrace to the east.

VEGETATION

Tree Stratum (Plot size: r=3m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	100%	Yes	FAC
2.			
3.			
4.			
	100% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus spectabilis*	40%	Yes	FAC
2. *Sambucus racemosa*	30%	Yes	FACU
3. *Rubus ursinus*	25%	Yes	FACU
4. *Rubus armeniacus*	5%	No	FAC
5. *Ilex aquifolium*	5%	No	FACU
	105% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Polystichum munitum*	15%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *Hedera helix*	50%	Yes	FACU
2.			
	50% = Total Cover		

% Bare Ground in Herb Stratum 35%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SOIL

Sampling Point: **WFW-15-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-13	10YR 2/2	100					L	
13-17	10YR 3/3	95	7.5YR 4/6	5	C	M	CL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS City/County: Federal Way/King Sampling Date: 4/20/2023
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-15-SP3**
Investigator(s): Kaylee Moser, Aaron Thom Section, Township, Range: T21N R04E S16 SWSW
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.300833 Long: -122.303764 Datum: NAD 1983 (HARN)
Soil Unit (Name-ID-Hydric Rating): Alderwood gr sandy loam, 0 to 8% slopes - 5 - Not Hydric NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are “Normal Circumstances” present? Yes X No ____
Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?**	**Yes** X **No**
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes X	No		

Precipitation:
According to the Seattle Tacoma Airport NOAA weather station, precipitation was below the normal range for the three months prior to the site visit.

Remarks:
PFO wetland SP. Paired with upland SP WFW-15-SP4.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Populus balsamifera*	60%	Yes	FAC
2.			
3.			
4.			
= Total Cover	60%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	30%	Yes	FAC
2. *Spiraea douglasii*	20%	Yes	FACW
3. *Populus balsamifera*	20%	Yes	FAC
4. *Rubus spectabilis*	10%	No	FAC
5.			
= Total Cover	80%		
Herb Stratum (Plot size: r=1m)			
1. *Epilobium ciliatum*	15%	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	15%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-032

SOIL

Sampling Point: **WFW-15-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	10YR 2/1	100					GrSaL	
6-16	10YR 2/1	80	2.5Y 5/2	15	D	M	GrSaL	
			10YR 4/4	5	C	M		

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 6
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 1

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-032

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS City/County: Federal Way/King Sampling Date: 4/20/2023
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-15-SP4**
Investigator(s): Kaylee Moser, Aaron Thom Section, Township, Range: T21N R04E S16 SWSW
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.300842 Long: -122.303860 Datum: NAD 1983 (HARN)
Soil Unit (Name-ID-Hydric Rating): Alderwood gr sandy loam, 0 to 8% slopes - 5 - Not Hydric NWI classification: R5UBH
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are “Normal Circumstances” present? Yes X No ____
Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Precipitation:
According to the Seattle Tacoma Airport NOAA weather station, precipitation was below the normal range for the three months prior to the site visit.

Remarks:
Paired upland SP with two wetland SPs (SP3 and SP5). Sample point is on hillslope above WFW-15/ordinary high water mark line.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
= Total Cover	0%		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	85%	Yes	FAC
2. *Rubus spectabilis*	5%	No	FAC
3.			
4.			
5.			
= Total Cover	90%		
Herb Stratum (Plot size: r=1m)			
1. *Polystichum munitum*	30%	Yes	FACU
2. *Ilex aquifolium*	2%	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	32%		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
= Total Cover	0%		

% Bare Ground in Herb Stratum 40%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	90	x 3 =	270
FACU species	32	x 4 =	128
UPL species		x 5 =	
Column Totals:	122	(A)	398 (B)

Prevalence Index = B/A = 3.26

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-032

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: WFW-15-SP4

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-5	10YR 3/3	100					GrSaL	
5-16	2.5Y 5/3	99	7.5YR 5/4	1	C	M	GrSaL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-032

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS
City/County: Federal Way/King
Sampling Date: 4/20/2023
Applicant/Owner: Sound Transit
State: WA
Sampling Point: **WFW-15-SP5**
Investigator(s): Kaylee Moser, Aaron Thom
Section, Township, Range: T21N R04E S16 SWSW
Landform (hillslope, terrace, etc.): Depression
Local relief (concave, convex, none): concave
Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A)
Lat: 47.300845
Long: -122.303938
Datum: NAD 1983 (HARN)
Soil Unit (Name-ID-Hydric Rating): Alderwood gr sandy loam, 0 to 8% slopes - 5 - Not Hydric
NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation no , Soil no , or Hydrology no significantly disturbed?
Are "Normal Circumstances" present? Yes X No ____
Are Vegetation no , Soil no , or Hydrology no naturally problematic?
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Precipitation:
According to the Seattle Tacoma Airport NOAA weather station, precipitation was below the normal range for the three months prior to the site visit.

Remarks:
PFO wetland SP. Paired with upland SP WFW-15-SP4. Sampling point is located in a linear depression that was dry at the time of the site visit. Water stained leaves and low vegetation cover was observed indicating seasonal ponding.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 3x1m)			
1. *Populus balsamifera*	95%	Yes	FAC
2.			
3.			
4.			
= Total Cover	95%		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *Crataegus monogyna*	30%	Yes	FAC
2. *Rubus armeniacus*	5%	No	FAC
3.			
4.			
5.			
= Total Cover	35%		
Herb Stratum (Plot size: 1x1m)			
1. *none*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	0%		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
= Total Cover	0%		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-15-SP5**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR 2/1	95	10YR 5/8	5	C	M	SiL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:
There is likely a higher percentage of redox that is masked by the dark matrix color.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
_X_ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 6
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 2

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-032

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE   City/County: Federal Way, King County   Sampling Date: 3/2/2020
Applicant/Owner: Sound Transit   State: WA   Sampling Point: **WFW-16-SP1**
Investigator(s): Kaylee Moser, Adam Thom   Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Slope of ditch   Local relief (concave, convex, none): concave   Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A))   Lat: 47.313703   Long: -122.299546   Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 6 to 15 percent slopes - AmC - Not Hydric   NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed?   Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?**	**Yes** X **No**
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes X	No		

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in March.

Remarks:
Sample point is located in a vegetated roadside ditch west of on ramp to I-5 South. This sample point is a palustrine emergent sample point for WFW-16.

VEGETATION

Tree Stratum (Plot size: 3x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		

Sapling/Shrub Stratum (Plot size: 2x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		

Herb Stratum (Plot size: 1x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Festuca rubra*	50%	Yes	FAC
2. *Juncus effusus*	40%	Yes	FACW
3. *Poa pratensis*	30%	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	120% = Total Cover		

Woody Vine Stratum (Plot size: 2x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-16-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	2.5Y 3/2	100					SiL	
7-16	2.5Y 5/1	85	10YR 4/6	15	C	M	SiCL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: gravelly silty clay loam-compacted
Depth (inches): 7

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 6

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturation between 5-7" on top of restrictive layer. Episaturated conditions.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 3/2/2020

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-16-SP2**

Investigator(s): Kaylee Moser, Adam Thom Section, Township, Range: T21N R04E S16

Landform (hillslope, terrace, etc.): Midslope of ditch Local relief (concave, convex, none): concave Slope (%): 3-5%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.313706 Long: -122.299526 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 6 to 15 percent slopes - AmC - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?**	
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes	No X		**Yes ____ No X**

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in March.

Remarks:
This sample point is the upland paired SP with WFW-16-SP1. It occurs upslope and east of WFW-16-SP1.

VEGETATION

Tree Stratum (Plot size: 3x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. *Poa pratensis*	50%	Yes	FAC
2. *Dactylis glomerata*	30%	Yes	FACU
3. *Holcus lanatus*	15%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95% = Total Cover		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 5%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: **WFW-16-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	10YR 3/2	100					GrSaL	
10-16	10YR 4/2	90	10YR 4/6	10	C	M	GrSaL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: compacted layer - road fill - gravel
Depth (inches): 10

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Soils are heavily compacted at 10 inches below the surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
soils dry throughout profile

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 3/2/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-16-SP3**
Investigator(s): Kaylee Moser, Adam Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.313112 Long: -122.299995 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 6 to 15 percent slopes - AmC - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in March.

Remarks:
PSS wetland SP. SP located north of NE park and ride parking lot and ~100ft west of tower

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 3x1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *Rubus armeniacus*	25%	Yes	FAC
2. *Spiraea douglasii*	40%	Yes	FACW
3. *Robinia pseudoacacia*	10%	No	FACU
4.			
5.			
	75% = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. *Ranunculus repens*	40%	Yes	FAC
2. *Juncus effusus*	30%	Yes	FACW
3. *Poa pratensis*	10%	No	FAC
4. *Typha latifolia*	10%	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

SOIL

Sampling Point: **WFW-16-SP3**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	2.5YR 3/2	100					SiL	
6-16	2.5YR 4/1	85	10YR 4/6	15	C	M	GrSiL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 9
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Surface water was observed both upslope and downslope of this sample point.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS and TDLE City/County: Federal Way, King County Sampling Date: 3/2/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-16-SP4**
Investigator(s): Kaylee Moser, Adam Thom Section, Township, Range: T21N R04E S16
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 3-5%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.313068 Long: -122.300005 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Arents, Alderwood material, 6 to 15 percent slopes - AmC - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visits in March.

Remarks:
Sample point is located 1 foot north of park and ride curb. Upland sample point to WFW-16-SP3. Remained of gras strip south of fence determined wetland area.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 3x1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *none*			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. *Poa pratensis*	85%	Yes	FAC
2. *Stellaria media*	10%	No	FACU
3. *Draba verna*	5%	No	NOL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110% = Total Cover		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-030 and -019

SOIL

Sampling Point: **WFW-16-SP4**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-7	10YR 2/1	100					L	
7-10	2.5Y 5/2	98	10YR 4/4	2	C	M	GrL	
10+								compacted

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: higly compacted gravelly loam
Depth (inches): 10

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
dry to10" BGS

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 2/27/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 17-1
Investigators: STORY Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Channel Local Relief (concave, convex, none): None Slope(%): 0
Subregion (LRR): A - Northwestern Forest, Lat: 47.292095 Long: -122.307587 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)
Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
Sample plot meets 3 of 3 criteria, is located in wetland WFW-17.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Alnus rubra	30	Yes	FAC
2. Populus balsamifera	30	Yes	FAC
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	60	Yes	FAC
2. Rosa pisocarpa	5	No	FAC
3. Rubus armeniacus	5	No	FAC
4.			
5.			
	70	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	7	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 93 % Cover of Biotic Crust ___

Dominance Test Worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	137	x3=	411
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	137	(A)	411 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 17-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-11	10YR 3/2	100					Silt Loam	
11-18	10YR 4/1	90	10YR 4/6	10	C	M	Silt Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Sample plot meets hydric soil indicator A11, depleted below dark surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 1.0
Saturation Present? Yes X No ___ Depth (inches): 0.0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets wetland hydrology indicators for saturation and high water table.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 17-2
Investigators: Danielski, Story Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): None Slope(%): 2
Subregion (LRR): A Lat: 47.292091 Long: -122.307617 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No		
Hydric Soil Present?	Yes	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No	**within a Wetland?**	Yes ____ No X

Remarks:

Sample plot has 2 of 3 wetland indicators and lacks hydric soil; plot not located in a wetland. Upland sample plot for WFW-17. Site visit occurred outside of growing season.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Populus balsamifera	50	Yes	FAC
2. Alnus rubra	45	Yes	FAC
3.			
4.			
	95	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Lonicera involucrata	50	Yes	FAC
2. Rubus spectabilis	50	Yes	FAC
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 1m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	195	x3=	585
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	195	(A)	585 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
____ 4 - Morphological Adaptations¹ (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants¹
____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plots meets dominance test and prevalence index for hydrophytic vegetation. Hydrophytic species found in plot are primarily deep-rooted tree and shrub species that have access to a deeper water table.

SOIL

Sampling Point: SP WFW 17-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-7	10YR 2/2	100					Sandy Loam	
7-9	10YR 5/1	95	10YR 4/6	5	C	M	Sandy Loam	
9-15	10YR4/4	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks:

Gravels throughout. Sample plot lacks hydric soil indicators. Since the layer with depleted matrix is only 2 inches thick and starts at 7 inches, soil does not meet minimum thickness or depth requirements to qualify for hydric soil indicators A11 (depleted below dark surface) or F3 (depleted matrix). Soil below the depleted matrix is also very bright (4/4).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ________
Water Table Present? Yes X No ____ Depth (inches): 6.0
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 2.0

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturated at 2, water table present at 6. Sample plot meets primary hydrology indicators for high water table and saturation.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 2/27/2020

Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 18-1

Investigators: STORY Section, Township, Range: T21N R4E S21

Landform (hillslope, terrace, etc.): Channel Local Relief (concave, convex, none): None Slope(%): 0

Subregion (LRR): A - Northwestern Forest, Lat: 47.292809 Long: -122.306519 Datum: WGS84

Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If No, explain in Remarks)

Are Vegetation: ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation: ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

Sample plot meets 3 of 3 criteria, is located in wetland WFW-18.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1. Alnus rubra	15	Yes	FAC
2.			
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus spectabilis	15	Yes	FAC
2. Rubus armeniacus	5	Yes	FAC
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	40	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	40	x2=	80
FAC species	35	x3=	105
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	75 (A)		185 (B)

Prevalence Index = B/A= 2.47

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

Sample plot meets dominance test and prevalence index for hydrophytic vegetation.

SOIL

Sampling Point: SP WFW 18-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type¹	Loc²	Texture	Remarks
0-5	10YR 3/2	100					Silt Loam	
5-18	10YR 4/2	95	10YR 4/6	5	C	M	Silty Clay Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRLA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Sample plot meets hydric soil indicator F3, depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Tables (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aeriel Imagery (B
___ Sparsley Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aeriel Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1.00
Water Table Present? Yes X No ___ Depth (inches): 3.0
Saturation Present? Yes X No ___ Depth (inches): 0.0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets wetland hydrology indicators for surface water, saturation and high water table.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Sound Transit OMFS City/County: Federal Way, King Sampling Date: 12/19/2019
Applicant/Owner: Sound Transit State: WA Sampling Point: SP WFW 18-2
Investigators: Danielski Section, Township, Range: T21N R4E S21
Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): None Slope(%): 2
Subregion (LRR): A Lat: 47.292816 Long: -122.306473 Datum: WGS84
Soil Map Unit Name: Alderwood gravelly sandy loam NWI Classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)
Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

Sample plot meets 2 of 3 wetland criteria and lacks hydric soils, is not located in a wetland. Upland plot for WFW 18. Site visit occurred outside of growing season.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 5m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m)			
1. Rubus armeniacus	25	Yes	FAC
2. Salix scouleriana	20	Yes	FAC
3. Rubus ursinus	15	Yes	FACU
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	10	Yes	FACW
2. Epilobium anagallidifolium	5	Yes	FACU
3. Polystichum munitum	2	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	17	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 68 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	10	x2=	20
FAC species	45	x3=	135
FACU species	22	x4=	88
UPL species		x5=	0
Column Totals:	77 (A)		243 (B)

Prevalence Index = B/A= 3.16

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sample plot meets dominance test but not prevalence index for hydrophytic vegetation. Hydrophytic species found in plot are primarily deep-rooted tree and shrub species that have access to a deeper water table.

SOIL

Sampling Point: SP WFW 18-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0-10	10YR 2/2	100					Sandy Loam	
10-16	10YR 3/3	100					Sandy Loam	

¹Type: C= Concentration, D= Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRLA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ____ No X

Remarks:

Sample plot lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- X High Water Tables (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aeriel Imagery (B
- Sparsley Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (**except MRLA 1, 2, 4A, and 4B**)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (**LRR A**)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Stained Leaves (B9) (**MRLA 1, 2, 4A, and 4B**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aeriel Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (**LRR A**)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	12.0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	4.0

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Date (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample plot meets primary hydrology indicators for high water table and saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: TDLE City/County: Federal Way, King County Sampling Date: 2/21/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-21-SP1**
Investigator(s): J. Wozniak, M. Murphy Section, Township, Range: T21N R04E S21
Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.288658 Long: -122.308085 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 8 to 15 percent slopes - AgC - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit in February.

Remarks:
WFW-21-SP1 is identified as PSS (paulstrine scrub-shrub) under Cowardin classification. Sample point is located below ordinary high on West Hylebos Creek about 20 feet upstream of culvert outlet within an I-5 cloverleaf.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Rubus armeniacus*	20%	Yes	FAC
2. *Salix scouleriana*	10%	Yes	FAC
3.			
4.			
5.			
	30% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Solanum dulcamara*	40%	Yes	FAC
2. *Veronica americana*	30%	Yes	OBL
3. *Poa pratensis*	20%	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 10%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

Project No.: 554-1800-030

SOIL

Sampling Point: WFW-21-SP1

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	80	7.5YR 4/6	20	C	M	GrL	
10-16	10YR 4/2	95	10YR 4/6	5	C	M	GrL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
X Water Marks (B1)
X Sediment Deposits (B2)
X Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: TDLE City/County: Federal Way, King County Sampling Date: 2/21/2020

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-21-SP2**

Investigator(s): J. Wozniak, M. Murphy Section, Township, Range: T21N R04E S21

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3-5%

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.288638 Long: -122.308054 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 8 to 15 percent slopes - AgC - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit in February.

Remarks:
Sample point is located upslope and east of WFW-21-SP1 within an I-5 cloverleaf. Associated with E Fork Hylebos Creek Tributary 0016A. Paired upland SP to WFW-21-SP1.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Populus tremuloides*	40%	Yes	FACU
2. *Pseudotsuga menziesii*	20%	Yes	FACU
3.			
4.			
	60% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Gaultheria shallon*	40%	Yes	FACU
2. *Rubus ursinus*	20%	Yes	FACU
3. *Rubus spectabilis*	5%	No	FAC
4. *Rubus armeniacus*	5%	No	FAC
5.			
	70% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Geranium robertianum*	40%	Yes	FACU
2. *Polystichum munitum*	20%	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 20%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-21-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/1	100	none				L	
1-9	10YR 3/2	100	none				GrL	
9-15	10YR 4/2	95	10YR 4/6	5	C	M	Very GrL	
15-18	7.5YR 3/4	100					GrL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): n/a

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: TDLE City/County: Federal Way, King County Sampling Date: 2/25/2020
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-22-SP1**
Investigator(s): M. Murphy, A. Thom Section, Township, Range: T21N R04E S21
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): <3%
Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.290108 Long: -122.308639 Datum: NAD 1983
Soil Unit (Name-ID-Hydric Rating): Alderwood gravelly sandy loam, 8 to 15 percent slopes - AgC - Not Hydric NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)
Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit in February.

Remarks:
PSS wetland SP. SP located in a roadside depression near off-ramp of I-5 south. Headed south on I-5 exit 142 B on east side of off ramp in a roadside "clover leaf".

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Populus balsamifera*	10%	Yes	FAC
2.			
3.			
4.			
	10% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Cornus alba*	15%	Yes	FACW
2. *Rubus armeniacus*	5%	Yes	FAC
3.			
4.			
5.			
	20% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Poa pratensis*	40%	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *None*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 60%			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Spirea located on north and south end of the weltnad but not located in plot. 60% of plot is in standing water/ditches.

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
Project No.: 554-1800-030

US Army Corps of Engineers
Western Mountains, Valleys, and Coast Region (Version 2.0)

SOIL

Sampling Point: **WFW-22-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-5	10YR 2/1	100					L	
5-11	2.5Y 4/2	98	10YR 4/6	2	C	M	SaGrL	
11-15	2.5Y 5/2	80	10YR 5/8	20	C	M	VGrSaL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
X Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 6
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 5

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: TDLE City/County: Federal Way, King County Sampling Date: 2/25/2020

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-22-SP2**

Investigator(s): M. Murphy, A. Thom Section, Township, Range: T21N R04E S21

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): None

Subregion (LRR): Northwest Forests and Coast (LRR A)) Lat: 47.290117 Long: -122.308600 Datum: NAD 1983

Soil Unit (Name-ID-Hydric Rating): lerwood gravelly sandy loam, 8 to 15 percent slo - AgC - Not Hydric NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?**	
Hydric Soil Present?	Yes X	No		
Wetland Hydrology Present?	Yes	No X		**Yes** ___ **No** X

Precipitation:
According to the Seattle Tacoma International NOAA weather station, precipitation was above the normal range for the three months prior to the site visit in February.

Remarks:
SP-2 is located approximately 10 feet upslope of SP-1. SP is located on the side of a fill prism/WSDOT service road and serves as the upland paired SP to WFW-22-SP1.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: r=3m)			
1. *Pseudotsuga menziesii*	10%	Yes	FACU
2. *Populus balsamifera*	5%	Yes	FAC
3. *Thuja plicata*	2%	No	FAC
4.			
	17% = Total Cover		
Sapling/Shrub Stratum (Plot size: r=2m)			
1. *Cytisus scoparius*	5%	Yes	NOL
2. *Cornus alba*	5%	Yes	FACW
3. *Pseudotsuga menziesii*	2%	No	FACU
4. *Thuja plicata*	2%	No	FAC
5.			
	14% = Total Cover		
Herb Stratum (Plot size: r=1m)			
1. *Lupinus polyphylllus*	40%	Yes	FAC
2. *Holcus lanatus*	30%	Yes	FAC
3. *Schedonorus arundinaceus*	20%	Yes	FAC
4. *Festuca rubra*	10%	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: r=2m)			
1. *None*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

Project No.: 554-1800-030

SOIL

Sampling Point: **WFW-22-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-2	10YR 4/2	100					SaL	
3-16	2.5Y 5/2	95	10YR 5/8	5	C	M	SaL	Cobbles
16-19	2.5Y 4/3	100					GrSa	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

[3] Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None
Depth (inches): N/A

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
soils moist but not saturated.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS City/County: Federal Way/King Sampling Date: 4/20/2023

Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-32-SP1**

Investigator(s): Kaylee Moser, Aaron Thom Section, Township, Range: T21N R04E S16 NE

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): <3%

Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 48.028651 Long: -122.993426 Datum: NAD 1983 (HARN)

Soil Unit (Name-ID-Hydric Rating): Alderwood gr sandy loam, 0 to 8% slopes - 5 - Not Hydric NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks)

Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Precipitation:
According to the Seattle Tacoma Airport NOAA weather station, precipitation was below the normal range for the three months prior to the site visit.

Remarks:
Wetland swale connected to stormwater pond. PSS wetland SP. Paired with upland SP, WFW-32-SP2.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 3x1m)			
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *Rubus armeniacus*	60%	Yes	FAC
2.			
3.			
4.			
5.			
	60% = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. *Ranunculus repens*	70%	Yes	FAC
2. *Plantago lanceolata*	10%	No	FACU
3. *Poa pratensis*	1%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	81% = Total Cover		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 19%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation (Explain)[1]

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: **WFW-32-SP1**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-5	10YR 2/2						GrSaL	
5-14	2.5Y 5/1	90	10YR 5/8	10	C	M	GrSaL	
14-16	2.5Y 5/1	90	10YR 5/8	10	C	M	SaL	Cobbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): na

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): surface

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: OMFS City/County: Federal Way/King Sampling Date: 4/20/2023
Applicant/Owner: Sound Transit State: WA Sampling Point: **WFW-32-SP2**
Investigator(s): Kaylee Moser, Aaron Thom Section, Township, Range: T21N R04E S16 NE
Landform (hillslope, terrace, etc.): 0 Local relief (concave, convex, none): none Slope (%): None
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.312443 Long: -122.302611 Datum: NAD 1983 (HARN)
Soil Unit (Name-ID-Hydric Rating): Alderwood gr sandy loam, 0 to 8% slopes - 5 - Not Hydric NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks)
Are Vegetation no , Soil no , or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation no , Soil no , or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Precipitation:
According to the Seattle Tacoma Airport NOAA weather station, precipitation was below the normal range for the three months prior to the site visit.

Remarks:
Flat area near fenceline upslope of WFW-32-SP1. Upland SP paired with WFW-32-SP2.

VEGETATION

Tree Stratum (Plot size: 3x1m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 2x1m)			
1. *Rubus armeniacus*	60%	Yes	FAC
2. *Photinia glabra*	5%	No	FAC
3.			
4.			
5.			
	60% = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. *Poa pratensis*	90%	Yes	FAC
2. *Chamaenerion angustifolium*	10%	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 2x1m)			
1. *none*			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation (Explain)[1]

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: **WFW-32-SP2**

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators):

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-9	10YR 2/2	100					GrSaL	
9-16	2.5Y 6/1	99	10YR 5/6	1	C	M	GrSaL	with cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

[3]Texture: Sa = sand; Si = silt; C = clay; L = loam or loamy. Texture Modifier: co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted):

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none
Depth (inches): na

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (LRR A)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (LRR A)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Operations and Maintenance Facility South

ATTACHMENT G3-5

Ecology Wetland Rating Forms

Federal Transit Administration

SOUNDTRANSIT

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-01

Date of site visit: 10/9/2019

Rated by A. Weiss

Trained by Ecology?☑ Yes☐ No

Date of training Oct-20

HGM Class used for rating Depressional & Flats

Wetland has multiple HGM classes?☑ Yes☐ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).

Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

___ **Category I** - Total score = 23 - 27

___ **Category II** - Total score = 20 - 22

X **Category III** - Total score = 16 - 19

___ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
	List appropriate rating (H, M, L)			
Site Potential	M	L	M	
Landscape Potential	M	H	L	
Value	M	M	H	**Total**
Score Based on Ratings	6	6	6	**18**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**11**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is:☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**1**

Rating of Value If score is:☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number WFW-01

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	 points = 4 points = 2 points = 1 points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet ☐ The wetland is a “headwater” wetland Wetland is flat but has small depressions on the surface that trap water Marks of ponding less than 0.5 ft (6 in)	 points = 7 points = 5 points = 3 points = 3 points = 1 points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit The area of the basin is 10 to 100 times the area of the unit The area of the basin is more than 100 times the area of the unit ☐ Entire wetland is in the Flats class	 points = 5 points = 3 points = 0 points = 5	0
Total for D 4	Add the points in the boxes above	**5**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. ☑ • Surface flooding problems are in a sub-basin farther down-gradient. ☐ Flooding from groundwater is an issue in the sub-basin. ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why ☐ There are no problems with flooding downstream of the wetland.	 points = 2 points = 1 points = 1 points = 0 points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed
☐ Emergent
☐ Scrub-shrub (areas where shrubs have > 30% cover)
☑ Forested (areas where trees have > 30% cover)

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

If the unit has a Forested class, check if :

☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated
☑ Seasonally flooded or inundated
☑ Occasionally flooded or inundated
☑ Saturated only
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** **2 points**
☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

3

H 1.3. Richness of plant species

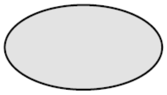
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:
> 19 species points = 2
5 - 19 species points = 1
< 5 species points = 0

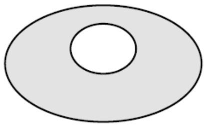
1

H 1.4. Interspersion of habitats

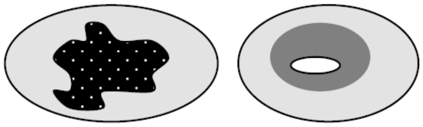
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

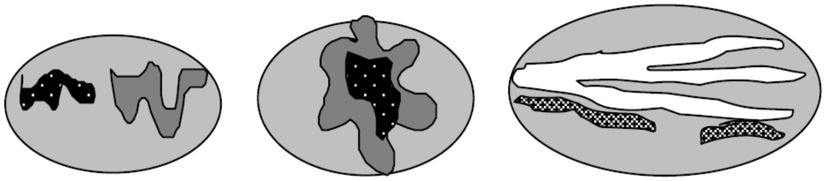


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 — Add the points in the boxes above	**9**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.4 % undisturbed habitat + (1.2 % moderate & low intensity land uses / 2) = 3% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 25.2 % undisturbed habitat + (22.2 % moderate & low intensity land uses / 2) = 36.3% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m — points = 1 Site does not meet any of the criteria above — points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☑ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number __WFW-01____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-02 Date of site visit: 10/16/2019

Rated by A. Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct-20

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☑ Yes ☐ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY II (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
X **Category II** - Total score = 20 - 22
____ **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	H	M	M	
Landscape Potential	H	H	L	
Value	H	M	M	**Total**
Score Based on Ratings	9	7	5	**21**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	4
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**15**

Rating of Site Potential If score is: ☑ **12 - 16 = H** ☐ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source trash Yes = 1 No = 0	1
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**2**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a “headwater” wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	5
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	**7**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☑ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☐ There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aachat bed — 4 structures or more: points = 4
☐ Emergent — 3 structures: points = 2
☐ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1
☑ Forested (areas where trees have > 30% cover) — 1 structure: points = 0
If the unit has a Forested class, check if:
☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☑ Permanently flooded or inundated — 4 or more types present: points = 3
☑ Seasonally flooded or inundated — 3 types present: points = 2
☐ Occasionally flooded or inundated — 2 types present: points = 1
☐ Saturated only — 1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** — **2 points**
☐ **Freshwater tidal wetland** — **2 points**

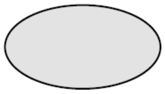
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

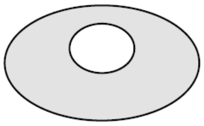
If you counted: > 19 species — points = 2
5 - 19 species — points = 1
< 5 species — points = 0

1

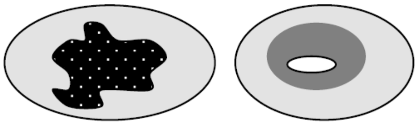
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

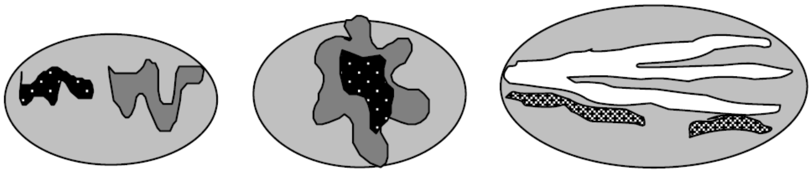


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.*		3
☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long)		
☑ Standing snags (dbh > 4 in) within the wetland		
☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)		
☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*)		
☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by*		
☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)		
Total for H 1	Add the points in the boxes above	**8**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?		
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.9 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.9% If total accessible habitat is:		0
> $^{1}/_{3}$ (33.3%) of 1 km Polygon	points = 3	
20 - 33% of 1 km Polygon	points = 2	
10 - 19% of 1 km Polygon	points = 1	
< 10 % of 1 km Polygon	points = 0	
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 18.1 % undisturbed habitat + (13.8 % moderate & low intensity land uses / 2) = 25%		1
Undisturbed habitat > 50% of Polygon	points = 3	
Undisturbed habitat 10 - 50% and in 1-3 patches	points = 2	
Undisturbed habitat 10 - 50% and > 3 patches	points = 1	
Undisturbed habitat < 10% of 1 km Polygon	points = 0	
H 2.3 Land use intensity in 1 km Polygon: If		-2
> 50% of 1 km Polygon is high intensity land use	points = (-2)	
≤ 50% of 1km Polygon is high intensity	points = 0	
Total for H 2	Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*.		1
Site meets ANY of the following criteria:	points = 2	
☐ It has 3 or more priority habitats within 100 m (see next page)		
☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)		
☐ It is mapped as a location for an individual WDFW priority species		
☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources		
☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan		
Site has 1 or 2 priority habitats (listed on next page) with in 100m	points = 1	
Site does not meet any of the criteria above	points = 0	

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☑ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number WFW-02

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,

☐ Vegetated, and

☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☐ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^{2})

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-03 Date of site visit: 10/18/2019

Rated by A. Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct-20

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	L	M	H	**Total**
Score Based on Ratings	6	7	6	**19**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^3/_4$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		6
Trees or shrubs > $^2/_3$ area of the wetland	points = 8	
☑ Trees or shrubs > $^1/_3$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^2/_3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^1/_3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^1/_3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		
If the ratio is more than 20	points = 9	2
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		7
Forest or shrub for > $^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area	points = 7	
Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	1
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed
☐ Emergent
☐ Scrub-shrub (areas where shrubs have > 30% cover)
☑ Forested (areas where trees have > 30% cover)
If the unit has a Forested class, check if:
☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

0

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated
☐ Seasonally flooded or inundated
☑ Occasionally flooded or inundated
☑ Saturated only
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** **2 points**
☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

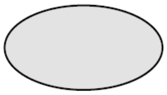
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

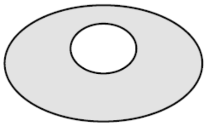
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

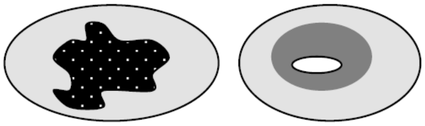
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



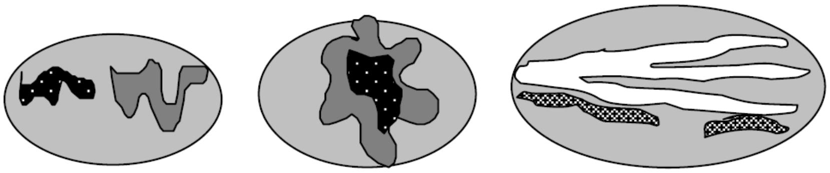
None = 0 points



Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH** = 3 points

1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**7**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.7 % undisturbed habitat + (1.3 % moderate & low intensity land uses / 2) = 3.35% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 27.9 % undisturbed habitat + (19.7 % moderate & low intensity land uses / 2) = 37.75% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103
☐ Grayland-Westport: Lands west of SR 105
☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-04 Date of site visit: 10/18/2019

Rated by A. Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2020

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	H	M	L	
Landscape Potential	M	H	L	
Value	M	M	M	**Total**
Score Based on Ratings	7	7	4	**18**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**12**

Rating of Site Potential If score is: ☑ **12 - 16 = H** ☐ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number WFW-04

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	**7**

Rating of Site Potential If score is: ☐**12 - 16 = H** ☑**6 - 11 = M** ☐**0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑**3 = H** ☐**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☑ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☐ There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐**2 - 4 = H** ☑**1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed
☐ Emergent
☐ Scrub-shrub (areas where shrubs have > 30% cover)
☑ Forested (areas where trees have > 30% cover)
If the unit has a Forested class, check if :
☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated
☑ Seasonally flooded or inundated
☐ Occasionally flooded or inundated
☑ Saturated only
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☐ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** **2 points**
☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

1

H 1.3. Richness of plant species

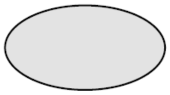
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species points = 2
5 - 19 species points = 1
< 5 species points = 0

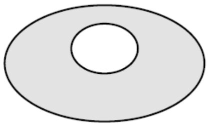
1

H 1.4. Interspersion of habitats

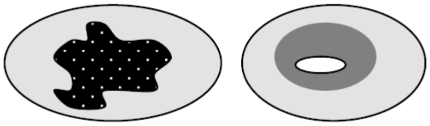
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

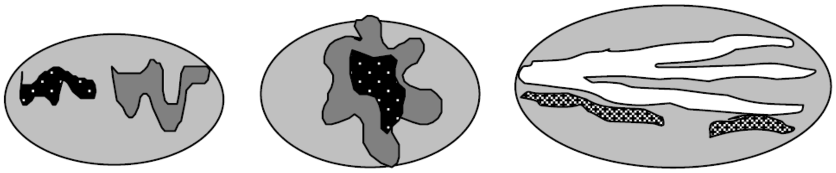


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☑ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**6**

Rating of Site Potential If Score is: ☐**15 - 18 = H** ☐**7 - 14 = M** ☑**0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.6 % undisturbed habitat + (1.3 % moderate & low intensity land uses / 2) = 3.25% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 26.5 % undisturbed habitat + (18.2 % moderate & low intensity land uses / 2) = 35.6% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** .

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-05 Date of site visit: 10/23/2019

Rated by A. Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2020

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	L	M	H	**Total**
Score Based on Ratings	6	7	6	**19**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	
☐ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

Wetland name or number WFW-05

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		2
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).*		7
Forest or shrub for > $^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area	points = 7	
Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

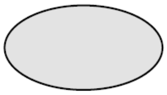
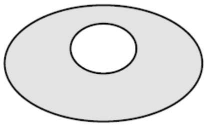
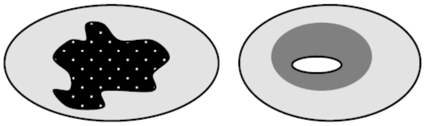
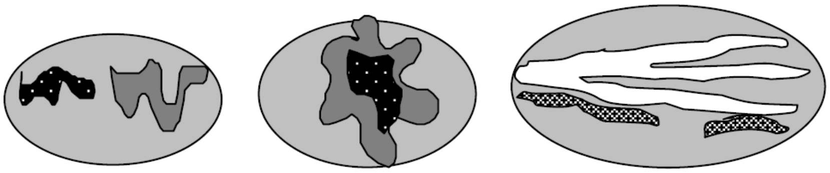
Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the site have the potential to provide habitat?	
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed — 4 structures or more: points = 4 ☐ Emergent — 3 structures: points = 2 ☐ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1 ☑ Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if*: ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	0
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated — 4 or more types present: points = 3 ☑ Seasonally flooded or inundated — 3 types present: points = 2 ☑ Occasionally flooded or inundated — 2 types present: points = 1 ☐ Saturated only — 1 types present: points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☑ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake Fringe wetland** — **2 points** ☐ **Freshwater tidal wetland** — **2 points**	2
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points 	1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	**8**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?		
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.8 % undisturbed habitat + (1.4 % moderate & low intensity land uses / 2) = 3.5% If total accessible habitat is:		0
> $^1/_3$ (33.3%) of 1 km Polygon	points = 3	
20 - 33% of 1 km Polygon	points = 2	
10 - 19% of 1 km Polygon	points = 1	
< 10 % of 1 km Polygon	points = 0	
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 20.1 % undisturbed habitat + (18.8 % moderate & low intensity land uses / 2) = 29.5%		1
Undisturbed habitat > 50% of Polygon	points = 3	
Undisturbed habitat 10 - 50% and in 1-3 patches	points = 2	
Undisturbed habitat 10 - 50% and > 3 patches	points = 1	
Undisturbed habitat < 10% of 1 km Polygon	points = 0	
H 2.3 Land use intensity in 1 km Polygon: If		-2
> 50% of 1 km Polygon is high intensity land use	points = (-2)	
≤ 50% of 1km Polygon is high intensity	points = 0	
Total for H 2	Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*.		2
Site meets ANY of the following criteria: ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan	points = 2	
Site has 1 or 2 priority habitats (listed on next page) with in 100m	points = 1	
Site does not meet any of the criteria above	points = 0	

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE*** *: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103
☐ Grayland-Westport: Lands west of SR 105
☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-06 Date of site visit: 10/23/2019

Rated by A. Weiss Trained by Ecology? ☐ Yes ☐ No Date of training Oct. 2020

HGM Class used for rating Slope Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
_____ **Category III** - Total score = 16 - 19
X **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
		List appropriate rating (H, M, L)		
Site Potential	L	L	L	
Landscape Potential	M	M	L	
Value	M	M	H	**Total**
Score Based on Ratings	5	5	5	**15**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Wetland name or number __WFW-06______

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☐ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☐ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☐ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☐ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: (*a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance*) Slope is 1% or less points = 3 Slope is > 1% - 2% points = 2 Slope is > 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*): Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	3
Total for S 1 Add the points in the boxes above	**4**

Rating of Site Potential If score is: ☐ **12 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources stormwater outfalls Yes = 1 No = 0	1
Total for S 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☑ **1 - 2 = M** ☐ **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list.* Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? A*nswer YES if there is a TMDL for the basin in which the unit is found*? Yes = 2 No = 0	0
Total for S 3 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > $^1/_8$ in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 All other conditions points = 0	0

Rating of Site Potential If score is: ☐**1 = M** ☑**0 = L** *Record the rating on the first page*

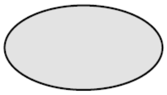
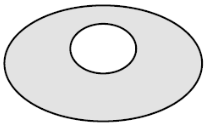
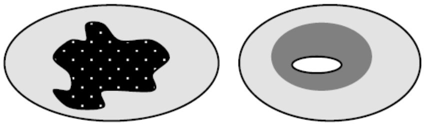
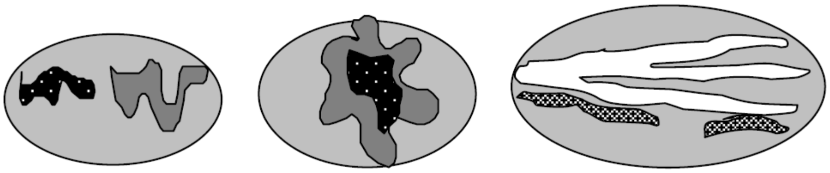
S 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0	1

Rating of Landscape Potential If score is: ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	1
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐**2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.	
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat	
H 1.0. Does the site have the potential to provide habitat?	
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed 4 structures or more: points = 4 ☐ Emergent 3 structures: points = 2 ☑ Scrub-shrub (areas where shrubs have > 30% cover) 2 structures: points - 1 ☐ Forested (areas where trees have > 30% cover) 1 structure: points = 0 *If the unit has a Forested class, check if*: ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	0
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated 4 or more types present: points = 3 ☐ Seasonally flooded or inundated 3 types present: points = 2 ☑ Occasionally flooded or inundated 2 types present: points = 1 ☐ Saturated only 1 types present: points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake Fringe wetland** **2 points** ☐ **Freshwater tidal wetland** **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points 	0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☑ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	**3**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.8 % undisturbed habitat + (1.4 % moderate & low intensity land uses / 2) = 3.5% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 26.9 % undisturbed habitat + (22.2 % moderate & low intensity land uses / 2) = 38% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number WFW-06

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. **If you answer YES you will still need to rate the wetland based on its functions**.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**	

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^{2})

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-07 Date of site visit: 11/6/2019

Rated by A. Thom, S. Kreuger Trained by Ecology? ☑ Yes ☐ No Date of training Jul-18

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	M	L	L	
Landscape Potential	H	H	L	
Value	L	M	M	**Total**
Score Based on Ratings	6	6	4	**16**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☐ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover > 3/4 area of wetland Depressions cover > ½ area of wetland Depressions present but cover < ½ area of wetland No depressions present	points = 8 points = 4 points = 2 points = 0	0
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs > 2/3 area of the wetland ☑ Trees or shrubs > 1/3 area of the wetland ☐ Herbaceous plants (> 6 in high) > 2/3 area of the wetland Herbaceous plants (> 6 in high) > 1/3 area of the wetland Trees, shrubs, and ungrazed herbaceous < 1/3 area of the wetland	points = 8 points = 6 points = 6 points = 3 points = 0	6
Total for R 1	Add the points in the boxes above	**6**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		2
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		4
Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area	points = 7	
Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**6**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed — 4 structures or more: points = 4
☑ Emergent — 3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1
☐ Forested (areas where trees have > 30% cover) — 1 structure: points = 0
If the unit has a Forested class, check if:
☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated — 4 or more types present: points = 3
☑ Seasonally flooded or inundated — 3 types present: points = 2
☐ Occasionally flooded or inundated — 2 types present: points = 1
☐ Saturated only — 1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** — **2 points**
☐ **Freshwater tidal wetland** — **2 points**

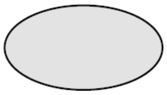
1

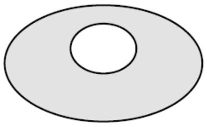
H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

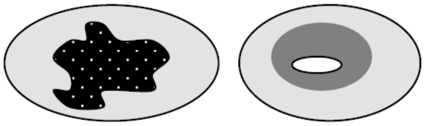
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

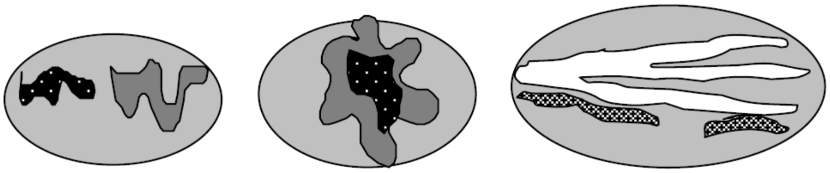
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*


None = 0 points


Low = 1 point


Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☑ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	**6**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (0.1 % moderate & low intensity land uses / 2) = 0.05% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 13.7 % undisturbed habitat + (17.7 % moderate & low intensity land uses / 2) = 22.55% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number WFW-07

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☑ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☑ Yes - Go to **SC 3.3** ☐ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**	

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^{2})

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-08 Date of site visit: 11/6/2019

Rated by A Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2020

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	M	M	L	
Landscape Potential	H	M	L	
Value	L	M	M	**Total**
Score Based on Ratings	6	6	4	**16**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number WFW-08

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover > $^3/_4$ area of wetland Depressions cover > ½ area of wetland Depressions present but cover < ½ area of wetland No depressions present	 points = 8 points = 4 points = 2 points = 0	0
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs > $^2/_3$ area of the wetland ☑ Trees or shrubs > $^1/_3$ area of the wetland ☐ Herbaceous plants (> 6 in high) > $^2/_3$ area of the wetland Herbaceous plants (> 6 in high) > $^1/_3$ area of the wetland Trees, shrubs, and ungrazed herbaceous < $^1/_3$ area of the wetland	 points = 8 points = 6 points = 6 points = 3 points = 0	6
Total for R 1	Add the points in the boxes above	**6**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		2
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		7
Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area	points = 7	
Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	0
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	0
Total for R 5	Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☑ Emergent
- ☑ Scrub-shrub (areas where shrubs have > 30% cover)
- ☐ Forested (areas where trees have > 30% cover)

If the unit has a Forested class, check if:

- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☐ Saturated only
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☑ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

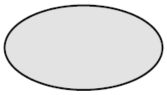
1

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

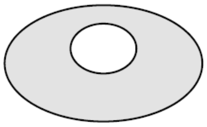
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

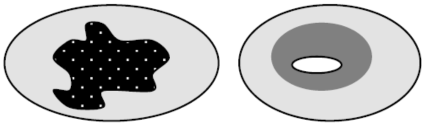
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

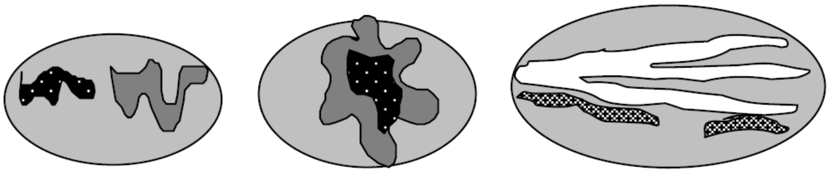


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	**4**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 15.8 % undisturbed habitat + (19.9 % moderate & low intensity land uses / 2) = 25.75% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-09 Date of site visit: 11/14/2019

Rated by A. Thom, S. Krueger Trained by Ecology? ☑ Yes ☐ No Date of training Oct-18

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY **III** (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
List appropriate rating (H, M, L)				
Site Potential	M	M	L	
Landscape Potential	H	H	L	
Value	L	M	M	**Total**
Score Based on Ratings	6	7	4	**17**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☐ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		0
Depressions cover > $^3/_4$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^2/_3$ area of the wetland	points = 8	
☐ Trees or shrubs > $^1/_3$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^2/_3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^1/_3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^1/_3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 If the ratio is 10 - 20 If the ratio is 5 - < 10 If the ratio is 1 - < 5 If the ratio is < 1	points = 9 points = 6 points = 4 points = 2 points = 1	2
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area Plants do not meet above criteria	points = 7 points = 4 points = 0	7
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?			
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0	No = 1	1
Total for R 5		Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) Surface flooding problems are in a sub-basin farther down-gradient No flooding problems anywhere downstream	points = 2 points = 1 points = 0	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☐ Emergent
- ☑ Scrub-shrub (areas where shrubs have > 30% cover)
- ☐ Forested (areas where trees have > 30% cover)

If the unit has a Forested class, check if:

- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

0

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☐ Saturated only
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☑ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

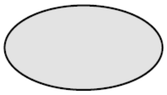
1

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

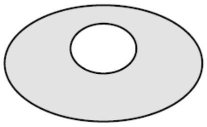
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

0

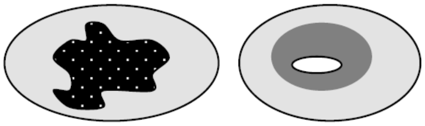
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

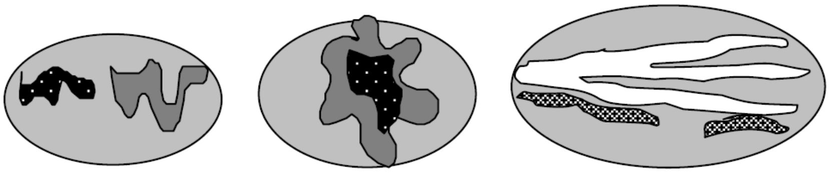


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☑ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
Total for H 1 Add the points in the boxes above	**2**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.3 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.3% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 17.5 % undisturbed habitat + (21 % moderate & low intensity land uses / 2) = 28% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**	

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-10 Date of site visit: 11/1/2019

Rated by A. Hoenig, A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct-15

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

___ **Category I** - Total score = 23 - 27
___ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
___ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	L	M	M	**Total**
Score Based on Ratings	6	7	5	**18**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Wetland name or number WFW-10

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
R3.3, R6.1, R6.2:
Schwartz, M., Salibury, N., Brosseau, W., Bui, P., and Anderson, R. 2016. Hylebos Watershed Plan. Prepared by Earth Corps. July 2016.
Pierce County 2006. HYLEBOS BROWNS-DASH POINT Volume 1 – Basin Plan & SEIS. Prepared by Pierce County Public Works Utilities Water Program. December 2006.

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^3/_4$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^2/_3$ area of the wetland	points = 8	
☑ Trees or shrubs > $^1/_3$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^2/_3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^1/_3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^1/_3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources trash	Yes = 1 No = 0	1
Total for R 2	Add the points in the boxes above	**5**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		2
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		7
Forest or shrub for > $^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area	points = 7	
Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?			
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0	No = 1	1
Total for R 5	Add the points in the boxes above		**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed
☐ Emergent
☐ Scrub-shrub (areas where shrubs have > 30% cover)
☑ Forested (areas where trees have > 30% cover)
If the unit has a Forested class, check if:
☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated
☐ Seasonally flooded or inundated
☑ Occasionally flooded or inundated
☑ Saturated only
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** **2 points**
☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

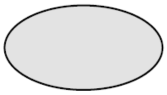
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

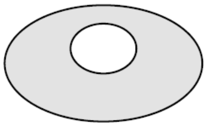
If you counted:
> 19 species points = 2
5 - 19 species points = 1
< 5 species points = 0

1

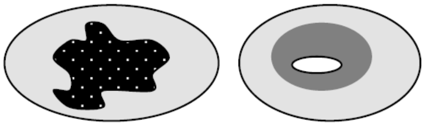
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



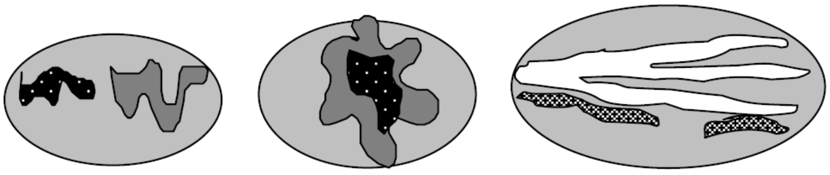
None = 0 points



Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH** = 3 points

2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**9**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.3 % undisturbed habitat + (3.3 % moderate & low intensity land uses / 2) = 1.95% If total accessible habitat is: > $^{1}/_{3}$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 21.4 % undisturbed habitat + (19.7 % moderate & low intensity land uses / 2) = 31.25% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^{2})

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-11 Date of site visit: 11/1/2019

Rated by A. Hoenig, A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2015

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	M	M	M	
Landscape Potential	M	M	L	
Value	M	M	M	**Total**
Score Based on Ratings	6	6	5	**17**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	3
Total for D 4 Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☑ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☐ There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4
☑ Emergent	3 structures: points = 2
☐ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1
☑ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if :

☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3
☑ Seasonally flooded or inundated	3 types present: points = 2
☐ Occasionally flooded or inundated	2 types present: points = 1
☑ Saturated only	1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

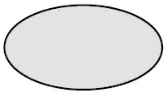
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

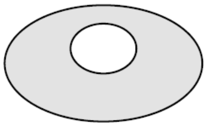
1

H 1.4. Interspersion of habitats

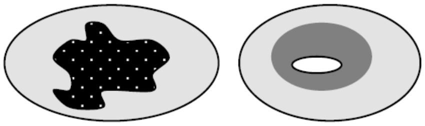
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



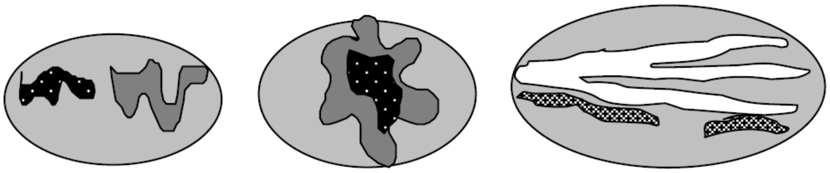
Low = 1 point



Moderate = 2 points

1

All three diagrams in this row are **HIGH** = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	**7**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (13.2 % moderate & low intensity land uses / 2) = 6.6% If total accessible habitat is: > $^{1}/_{3}$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 23.7 % undisturbed habitat + (21.2 % moderate & low intensity land uses / 2) = 34.3% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE***: *This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. **If you answer YES you will still need to rate the wetland based on its functions**.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**	

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^1/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-12 Date of site visit: 11/14/2019

Rated by A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2018

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

___ **Category I** - Total score = 23 - 27
___ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
___ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	L	M	M	**Total**
Score Based on Ratings	6	7	5	**18**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	
☐ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources lots of trash	Yes = 1 No = 0	1
Total for R 2	Add the points in the boxes above	**5**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		2
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).*		7
Forest or shrub for > $^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area	points = 7	
Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?			
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0	No = 1	1
Total for R 5	Add the points in the boxes above		**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☑ Emergent
- ☑ Scrub-shrub (areas where shrubs have > 30% cover)
- ☑ Forested (areas where trees have > 30% cover)

If the unit has a Forested class, check if:

- ☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

4

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☑ Saturated only
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☑ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

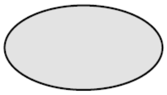
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

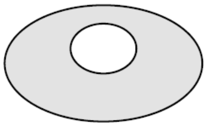
If you counted:		
	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

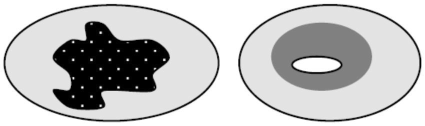
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



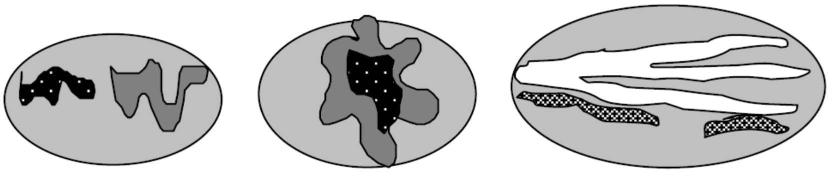
Low = 1 point



Moderate = 2 points

2

All three diagrams in this row are **HIGH** = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**12**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.3 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.3% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 19.6 % undisturbed habitat + (20.6 % moderate & low intensity land uses / 2) = 29.9% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number WFW-12

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-13 Date of site visit: 11/26/2019

Rated by A. Hoenig, M. Murphy, A. Thor Trained by Ecology? ☑ Yes ☐ No Date of training 15-Oct

HGM Class used for rating Slope Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
_____ **Category III** - Total score = 16 - 19
X **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
	List appropriate rating (H, M, L)			
Site Potential	L	L	L	
Landscape Potential	M	M	L	
Value	M	M	L	**Total**
Score Based on Ratings	5	5	3	**13**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number WFW-13

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☑ The wetland is on a slope (*slope can be very gradual*),
☑ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☑ The water leaves the wetland **without being impounded.**

☐ NO - go to 5 ☑ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: (*a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance*) Slope is 1% or less points = 3 Slope is > 1% - 2% points = 2 Slope is > 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*): Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	0
Total for S 1 Add the points in the boxes above	**1**

Rating of Site Potential If score is: ☐ **12 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Yes = 1 No = 0	0
Total for S 2 Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☑ **1 - 2 = M** ☐ **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list.* Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? A*nswer YES if there is a TMDL for the basin in which the unit is found*? Yes = 2 No = 0	0
Total for S 3 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > $^1/_8$ in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 All other conditions points = 0	0

Rating of Site Potential If score is: ☐**1 = M** ☑**0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0	1

Rating of Landscape Potential If score is: ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	1
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐**2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4	0
☐ Emergent	3 structures: points = 2	
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1	
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

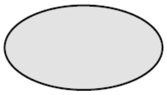
☐ Permanently flooded or inundated	4 or more types present: points = 3	
☐ Seasonally flooded or inundated	3 types present: points = 2	0
☐ Occasionally flooded or inundated	2 types present: points = 1	
☑ Saturated only	1 types present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

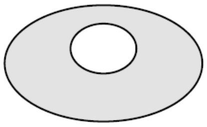
0

If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

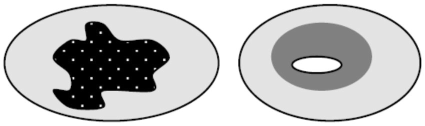
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



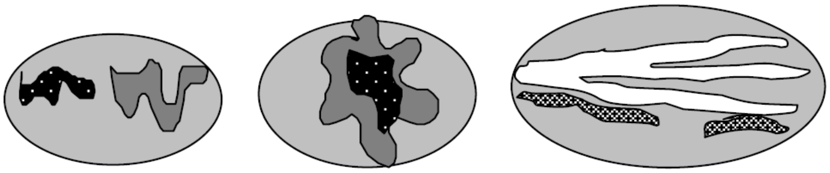
Low = 1 point



Moderate = 2 points

0

All three diagrams in this row are **HIGH** = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 — Add the points in the boxes above	**0**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (1.6 % moderate & low intensity land uses / 2) = 0.8% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 24.4 % undisturbed habitat + (22 % moderate & low intensity land uses / 2) = 35.4% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number WFW-13

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☐ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☐ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☐ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☐ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☐ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☐ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-14 Date of site visit: 12/3/2019

Rated by T. Parry, A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct-18

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
_____ **Category III** - Total score = 16 - 19
X **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			List appropriate rating (H, M, L)	
Site Potential	L	L	L	
Landscape Potential	M	H	L	
Value	M	M	M	**Total**
Score Based on Ratings	5	6	4	**15**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☐ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		2
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2	
☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*).	Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		0
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > ½ of area	points = 3	
Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area	points = 1	
Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.*		0
Area seasonally ponded is > ½ total area of wetland	points = 4	
Area seasonally ponded is > ¼ total area of wetland	points = 2	
Area seasonally ponded is < ¼ total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	**2**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source	Yes = 1 No = 0	0
Total for D 2	Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = 0	0
Total for D 3	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	0
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	**2**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

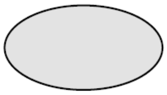
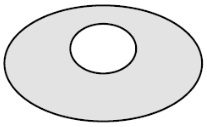
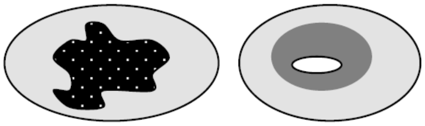
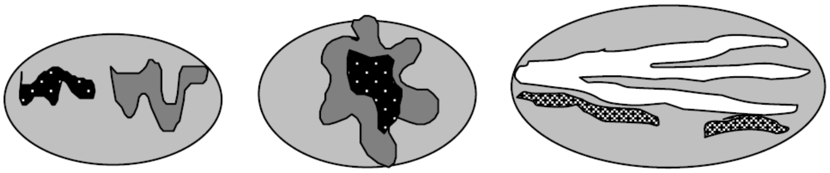
D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☑ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☐ There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed — 4 structures or more: points = 4 ☑ Emergent — 3 structures: points = 2 ☐ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1 ☐ Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if*: ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	0
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated — 4 or more types present: points = 3 ☐ Seasonally flooded or inundated — 3 types present: points = 2 ☐ Occasionally flooded or inundated — 2 types present: points = 1 ☑ Saturated only — 1 types present: points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake Fringe wetland** — **2 points** ☐ **Freshwater tidal wetland** — **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points 	0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☑ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
Total for H 1 — Add the points in the boxes above	**1**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (1.1 % moderate & low intensity land uses / 2) = 0.55% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 25.2 % undisturbed habitat + (21.4 % moderate & low intensity land uses / 2) = 35.9% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m — points = 1 Site does not meet any of the criteria above — points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). ☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**	
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) ☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than $^1/_{10}$ ac (4350 ft^2) ☐ Yes = **Category I** ☐ No = **Category II**	
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 ☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ☐ Yes = **Category I** ☐ No - Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? ☐ Yes = **Category II** ☐ No - Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? ☐ Yes = **Category III** ☐ No = **Category IV**	
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-15 Date of site visit: 4/20/2023

Rated by Kaylee Moser and A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2018

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

___ **Category I** - Total score = 23 - 27
___ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
___ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	H	M	M	
Landscape Potential	H	M	L	
Value	L	M	H	**Total**
Score Based on Ratings	7	6	6	**19**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☑ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	4
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	8
☐ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**12**

Rating of Site Potential If score is: ☑ **12 - 16 = H** ☐ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 points = 9 If the ratio is 10 - 20 points = 6 If the ratio is 5 - < 10 points = 4 If the ratio is 1 - < 5 points = 2 If the ratio is < 1 points = 1	2
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*). Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area points = 7 Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area points = 4 Plants do not meet above criteria points = 0	7
Total for R 4 Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	0
Total for R 5	Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for R 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed — 4 structures or more: points = 4
☐ Emergent — 3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1
☑ Forested (areas where trees have > 30% cover) — 1 structure: points = 0
If the unit has a Forested class, check if:
☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated — 4 or more types present: points = 3
☑ Seasonally flooded or inundated — 3 types present: points = 2
☑ Occasionally flooded or inundated — 2 types present: points = 1
☑ Saturated only — 1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** — **2 points**
☐ **Freshwater tidal wetland** — **2 points**

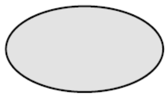
3

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

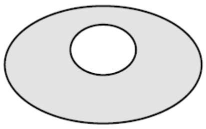
If you counted: > 19 species — points = 2
5 - 19 species — points = 1
< 5 species — points = 0

1

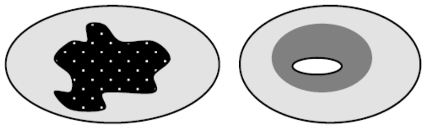
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

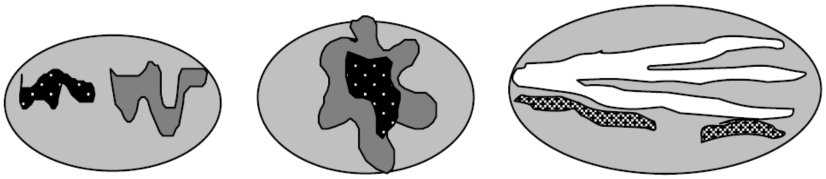


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**11**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (9 % moderate & low intensity land uses / 2) = 4.5% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 31 % undisturbed habitat + (17 % moderate & low intensity land uses / 2) = 39.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

- ☐ The dominant water regime is tidal,
- ☐ Vegetated, and
- ☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

- ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
- ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-16 Date of site visit: 3/2/2020

Rated by A. Hoenig, K. Moser Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2015

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	M	M	L	
Landscape Potential	M	H	L	
Value	M	M	L	**Total**
Score Based on Ratings	6	7	3	**16**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
Entire wetland sits in a depression. The wetland is rated as depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	3
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 Add the points in the boxes above	**7**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a “headwater” wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	3
Total for D 4 Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐**12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☑ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☐ There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4
☑ Emergent	3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3
☑ Seasonally flooded or inundated	3 types present: points = 2
☐ Occasionally flooded or inundated	2 types present: points = 1
☑ Saturated only	1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

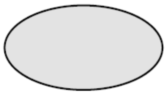
1

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

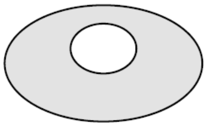
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

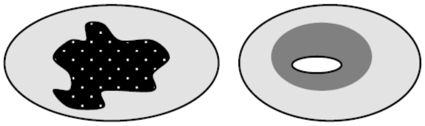
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



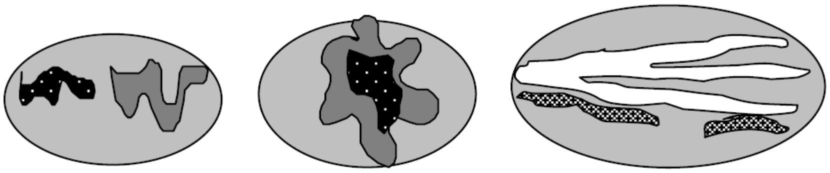
Low = 1 point



Moderate = 2 points

1

All three diagrams
in this row are
HIGH = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	**4**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 16.8 % undisturbed habitat + (16.5 % moderate & low intensity land uses / 2) = 25.05% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^1/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-17 Date of site visit: 12/19/2019

Rated by A Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct-20

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	M	M	L	
Landscape Potential	H	M	L	
Value	L	M	H	**Total**
Score Based on Ratings	6	6	5	**17**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		6
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	
☑ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	0
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		
If the ratio is more than 20	points = 9	1
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		7
Forest or shrub for > $^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area	points = 7	
Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	0
Total for R 5	Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed — 4 structures or more: points = 4
☐ Emergent — 3 structures: points = 2
☐ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points - 1
☑ Forested (areas where trees have > 30% cover) — 1 structure: points = 0
If the unit has a Forested class, check if:
☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated — 4 or more types present: points = 3
☑ Seasonally flooded or inundated — 3 types present: points = 2
☐ Occasionally flooded or inundated — 2 types present: points = 1
☐ Saturated only — 1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☑ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** — **2 points**
☐ **Freshwater tidal wetland** — **2 points**

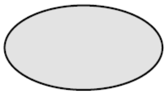
1

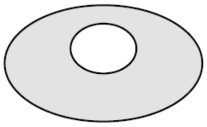
H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

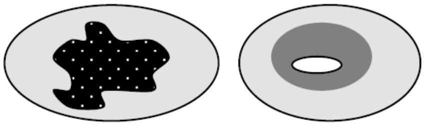
If you counted: > 19 species — points = 2
5 - 19 species — points = 1
< 5 species — points = 0

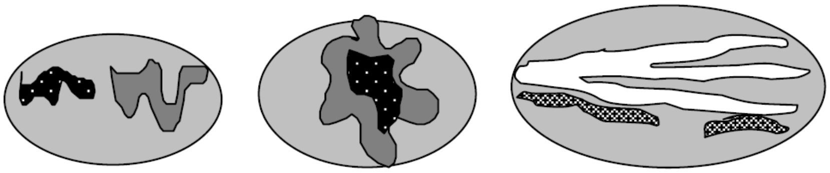
1

H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*


None = 0 points


Low = 1 point


Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points


1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☑ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	**5**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.9 % undisturbed habitat + (1.4 % moderate & low intensity land uses / 2) = 3.6% If total accessible habitat is: > $^{1}/_{3}$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 21.5 % undisturbed habitat + (18.5 % moderate & low intensity land uses / 2) = 30.75% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☑ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^1/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103
☐ Grayland-Westport: Lands west of SR 105
☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-18 Date of site visit: 12/19/2019

Rated by A Weiss Trained by Ecology? ☑ Yes ☐ No Date of training Oct-20

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
		List appropriate rating (H, M, L)		
Site Potential	M	M	L	
Landscape Potential	H	H	L	
Value	L	M	H	**Total**
Score Based on Ratings	6	7	5	**18**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**x**

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	
☐ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		1
If the ratio is more than 20	points = 9	
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).*		7
Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area	points = 7	
Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**8**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		1
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4
☐ Emergent	3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☑ Occasionally flooded or inundated	2 types present: points = 1
☐ Saturated only	1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☑ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

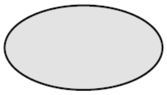
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

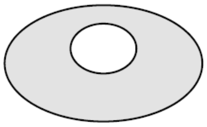
1

H 1.4. Interspersion of habitats

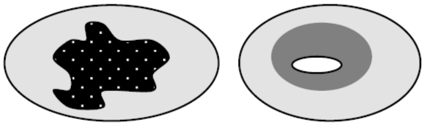
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



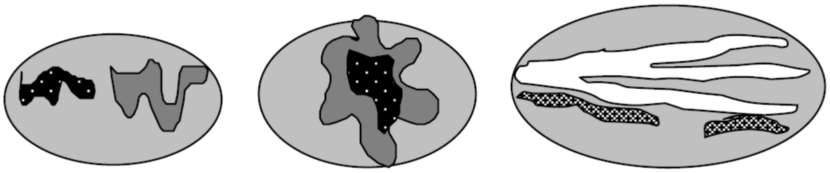
Low = 1 point



Moderate = 2 points

1

All three diagrams in this row are **HIGH** = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
Total for H 1 — Add the points in the boxes above	**4**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 2.9 % undisturbed habitat + (1.4 % moderate & low intensity land uses / 2) = 3.6% If total accessible habitat is: > $^{1}/_{3}$ (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 22.6 % undisturbed habitat + (17.9 % moderate & low intensity land uses / 2) = 31.55% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m — points = 1 Site does not meet any of the criteria above — points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number WFW-18

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-21 Date of site visit: 2/21/2020

Rated by Josh Wozniak & Matt Murphy Trained by Ecology? ☑ Yes ☐ No Date of training 2014, 2019

HGM Class used for rating Riverine & Fresh Water Tidal Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	L	M	H	**Total**
Score Based on Ratings	6	7	6	**19**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		2
Depressions cover > $^{3}/_{4}$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		8
Trees or shrubs > $^{2}/_{3}$ area of the wetland	points = 8	
☐ Trees or shrubs > $^{1}/_{3}$ area of the wetland	points = 6	
☐ Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	0
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1 - R 2.4? Other Sources	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	**4**

Rating of Landscape Potential If score is: ☑ **3 - 6 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	0
Total for R 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*		
If the ratio is more than 20	points = 9	2
If the ratio is 10 - 20	points = 6	
If the ratio is 5 - < 10	points = 4	
If the ratio is 1 - < 5	points = 2	
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are* *NOT Cowardin* *classes*).		
Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area	points = 7	7
Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area	points = 4	
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	1
R 5.3 Is the up-gradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.*		
The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	1
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = 0	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for R 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4
☐ Emergent	3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3
☑ Seasonally flooded or inundated	3 types present: points = 2
☐ Occasionally flooded or inundated	2 types present: points = 1
☑ Saturated only	1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☑ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

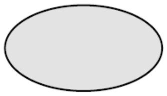
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

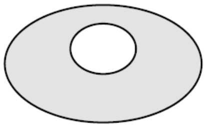
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

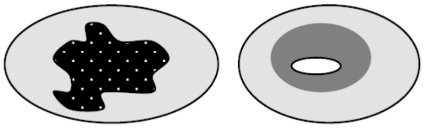
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

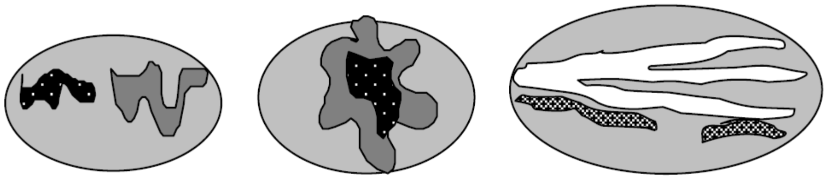


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**8**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.4 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.4% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 16.8 % undisturbed habitat + (15.2 % moderate & low intensity land uses / 2) = 24.4% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	2
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**0**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☑ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If Score is: ☑ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

- ☑ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,

☐ Vegetated, and

☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☑ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** *.*

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☑ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☑ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☑ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☑ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-22 Date of site visit: 2/25/2020

Rated by Adam Merrill & Matt Murphy Trained by Ecology? ☑ Yes ☐ No Date of training Oct-19

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	L	L	L	
Landscape Potential	H	H	L	
Value	H	M	M	**Total**
Score Based on Ratings	7	6	4	**17**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☑ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☑ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☑ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area points = 0	3
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	0
Total for D 1 Add the points in the boxes above	**4**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Trash Yes = 1 No = 0	1
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**2**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number WFW-22

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland:		0
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		0
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
☐ The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		3
☐ The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
☐ Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	**3**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		1
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
☑ • Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
☐ Flooding from groundwater is an issue in the sub-basin.	points = 1	
☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why	points = 0	
☐ There are no problems with flooding downstream of the wetland.	points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4
☐ Emergent	3 structures: points = 2
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3
☐ Seasonally flooded or inundated	3 types present: points = 2
☑ Occasionally flooded or inundated	2 types present: points = 1
☐ Saturated only	1 types present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland	
☐ Seasonally flowing stream in, or adjacent to, the wetland	
☐ **Lake Fringe wetland**	**2 points**
☐ **Freshwater tidal wetland**	**2 points**

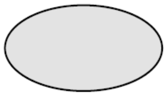
0

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

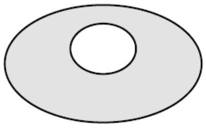
If you counted:	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

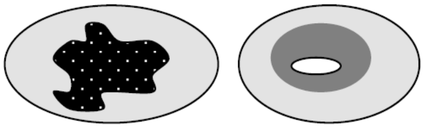
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

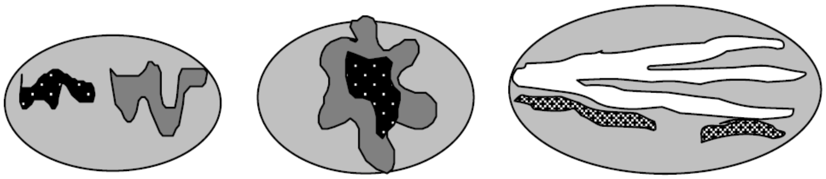


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	**1**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.7 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.7% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 18.6 % undisturbed habitat + (15.8 % moderate & low intensity land uses / 2) = 26.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	2
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**0**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☑ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☑ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,

☐ Vegetated, and

☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☑ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☐ Yes - Go to **SC 2.2** ☑ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☑ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.***

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☑ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☑ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☑ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☑ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-32 Date of site visit: 4/20/2023

Rated by Kaylee Moser and A. Thom Trained by Ecology? ☑ Yes ☐ No Date of training Oct.2018

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY **IV** (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

____ **Category I** - Total score = 23 - 27
____ **Category II** - Total score = 20 - 22
____ **Category III** - Total score = 16 - 19
X **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			List appropriate rating (H, M, L)	
Site Potential	M	L	L	
Landscape Potential	H	H	L	
Value	L	M	L	**Total**
Score Based on Ratings	6	6	3	**15**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it.
Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☑ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
Wetland 32 receives water from a stormwater vault at its southern end and discharges into a stormwater feature at its northern edge.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area points = 0	3
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐**12 - 16 = H** ☑**6 - 11 = M** ☐**0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source Particulates in exhaust from motor vehicles Yes = 1 No = 0	1
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**0**

Rating of Value If score is: ☐**2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland:		2
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		0
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
☐ The wetland is a “headwater” wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		0
☐ The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
☐ Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	**2**

Rating of Site Potential If score is: ☐**12 - 16 = H** ☐**6 - 11 = M** ☑**0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑**3 = H** ☐**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		1
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		
● Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
☑ ● Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
☐ Flooding from groundwater is an issue in the sub-basin.	points = 1	
☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why	points = 0	
☐ There are no problems with flooding downstream of the wetland.	points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐**2 - 4 = H** ☑**1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4	1
☑ Emergent	3 structures: points = 2	
☑ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points - 1	
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3	
☑ Seasonally flooded or inundated	3 types present: points = 2	1
☐ Occasionally flooded or inundated	2 types present: points = 1	
☑ Saturated only	1 types present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

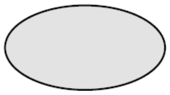
0

If you counted:	> 19 species	points = 2	
	5 - 19 species	points = 1	
	< 5 species	points = 0	

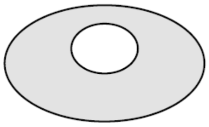
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

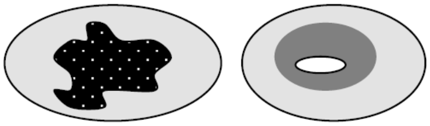
1



None = 0 points

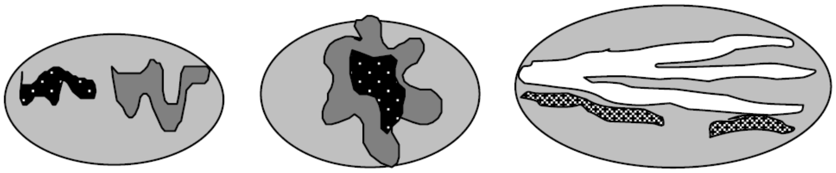


Low = 1 point



Moderate = 2 points

All three diagrams
in this row are
HIGH = 3 points



H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	**3**

Rating of Site Potential If Score is: ☐**15 - 18 = H** ☐ **7 - 14 = M** ☑**0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 18.6 % undisturbed habitat + (7.5 % moderate & low intensity land uses / 2) = 22.35% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE****: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**

SC 1.0. Estuarine Wetlands

Does the wetland meet the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt

☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**

SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

☐ Yes = **Category I** ☐ No - Go to **SC 1.2**

SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

☐ Yes = **Category I** ☐ No = **Category II**

SC 2.0. Wetlands of High Conservation Value (WHCV)

SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?

☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3**

SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?

☐ Yes = **Category I** ☑ No = **Not WHCV**

SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf

☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV**

SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?

☐ Yes = **Category I** ☐ No = **Not WHCV**

SC 3.0. Bogs

Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions***.

SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?

☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2**

SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog**

SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?

☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.

SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^1/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

RATING SUMMARY – Western Washington

Name of wetland (or ID #): WFW-33 Date of site visit: NONE

Rated by A. Hoenig Trained by Ecology? ☑ Yes ☐ No Date of training Oct. 2015

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☑ Yes ☐ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI / Google Earth Pro

OVERALL WETLAND CATEGORY II (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

___ **Category I** - Total score = 23 - 27
X **Category II** - Total score = 20 - 22
___ **Category III** - Total score = 16 - 19
___ **Category IV** - Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
	List appropriate rating (H, M, L)			
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	H	M	M	**Total**
Score Based on Ratings	8	7	5	**20**

Score for each function based on three ratings
(*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	**Category**
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☑ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☑ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

☐ The water leaves the wetland **without being impounded.**

☑ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☑ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

☑ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☑ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the*

☐ NO - go to 7 ☑ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
A portion of the wetland is riverine and a portion is depressional. Depressional + Riverine along stream within boundary of depression, therefore the HGM class used for this rating is Depressional.

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*). Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 Add the points in the boxes above	**9**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source trash Yes = 1 No = 0	1
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**2**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. Characteristics of surface water outflows from the wetland:		2
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		5
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
☐ The wetland is a “headwater” wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		0
☐ The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
☐ Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	**7**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 = H** ☐ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		1
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon		
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
☑ • Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
☐ Flooding from groundwater is an issue in the sub-basin.	points = 1	
☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why	points = 0	
☐ There are no problems with flooding downstream of the wetland.	points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	**1**

Rating of Value If score is: ☐ **2 - 4 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☐ Emergent
- ☐ Scrub-shrub (areas where shrubs have > 30% cover)
- ☑ Forested (areas where trees have > 30% cover)

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

If the unit has a Forested class, check if:

- ☑ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☑ Occasionally flooded or inundated
- ☐ Saturated only
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☑ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

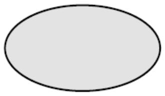
2

H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

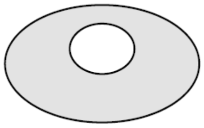
If you counted:		
	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

1

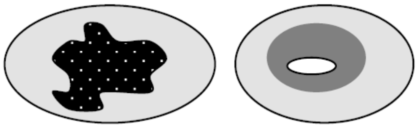
H 1.4. Interspersion of habitats
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

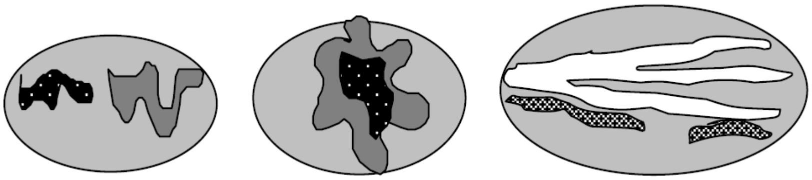


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☑ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**8**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☑ **7 - 14 = M** ☐ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 0.6 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0.6% If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 24 % undisturbed habitat + (11 % moderate & low intensity land uses / 2) = 29.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☑ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** . SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☑ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☑ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**	

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☑ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☑ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

ATTACHMENT G3-6

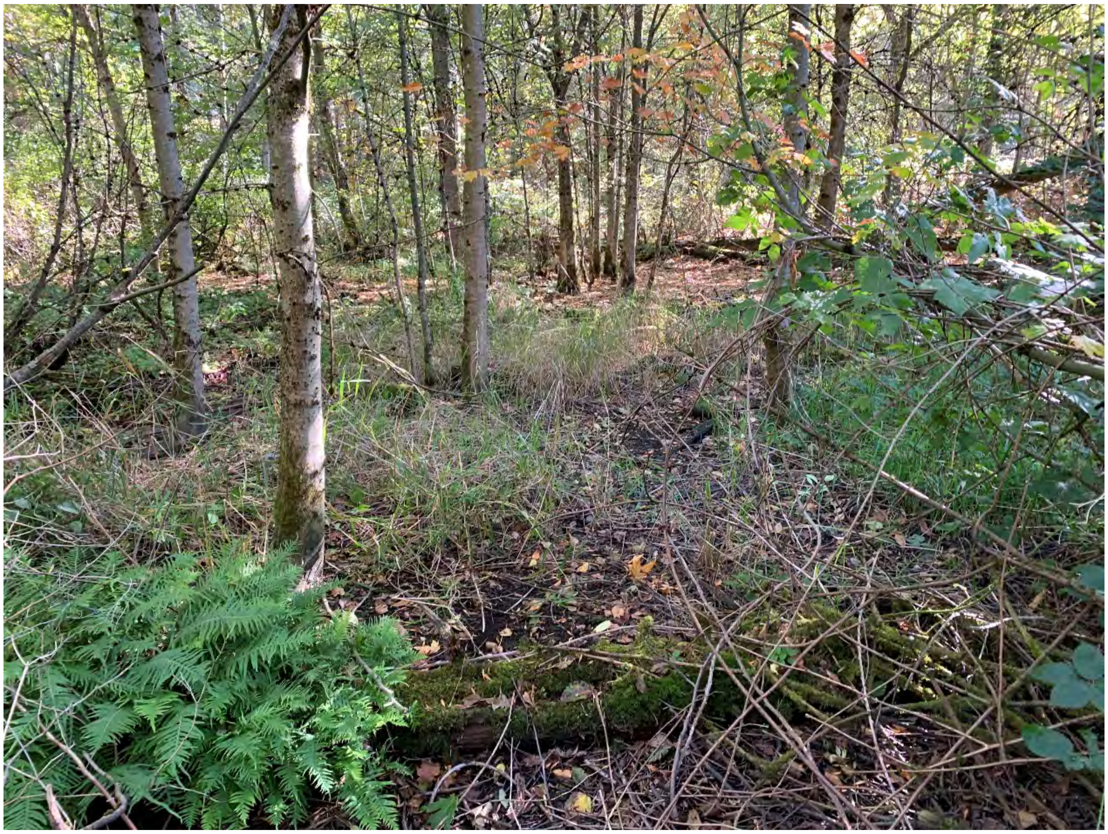
Wetland, Stream, and Habitat Photographs

Federal Transit Administration

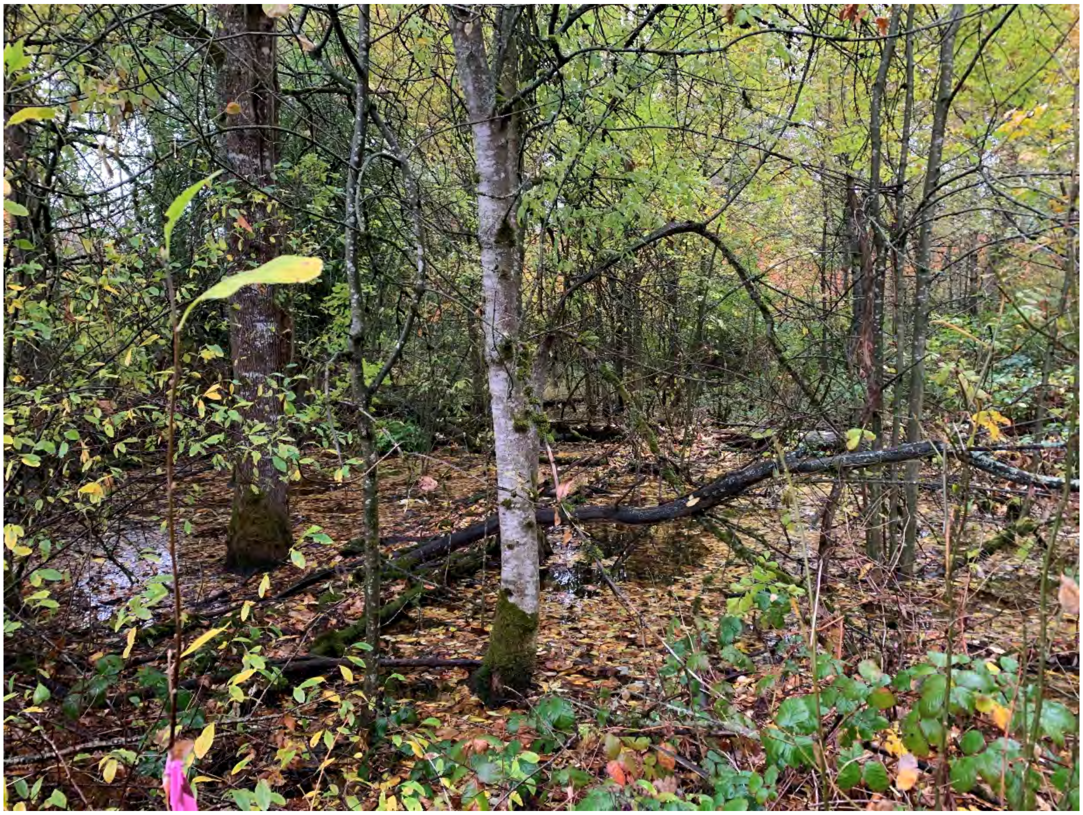
SOUNDTRANSIT

Photograph 1 Wetland WL148.67L in Kent (Photo source: Anchor 2019)

Photograph 2 Wetland WFW-1 along East Fork Hylebos Creek facing southwest, 10/9/2019



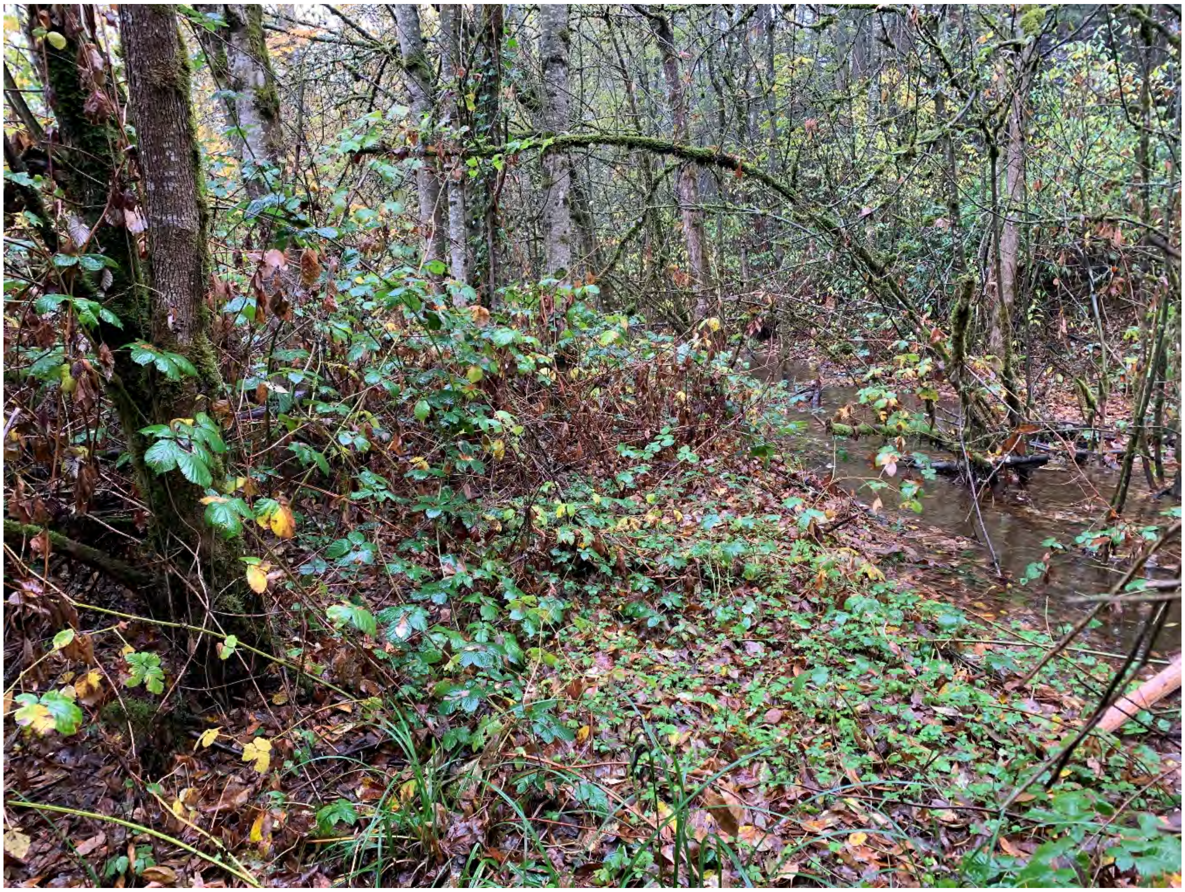
Photograph 3 Southern portion of Wetland WFW-1 facing east, 10/10/2019



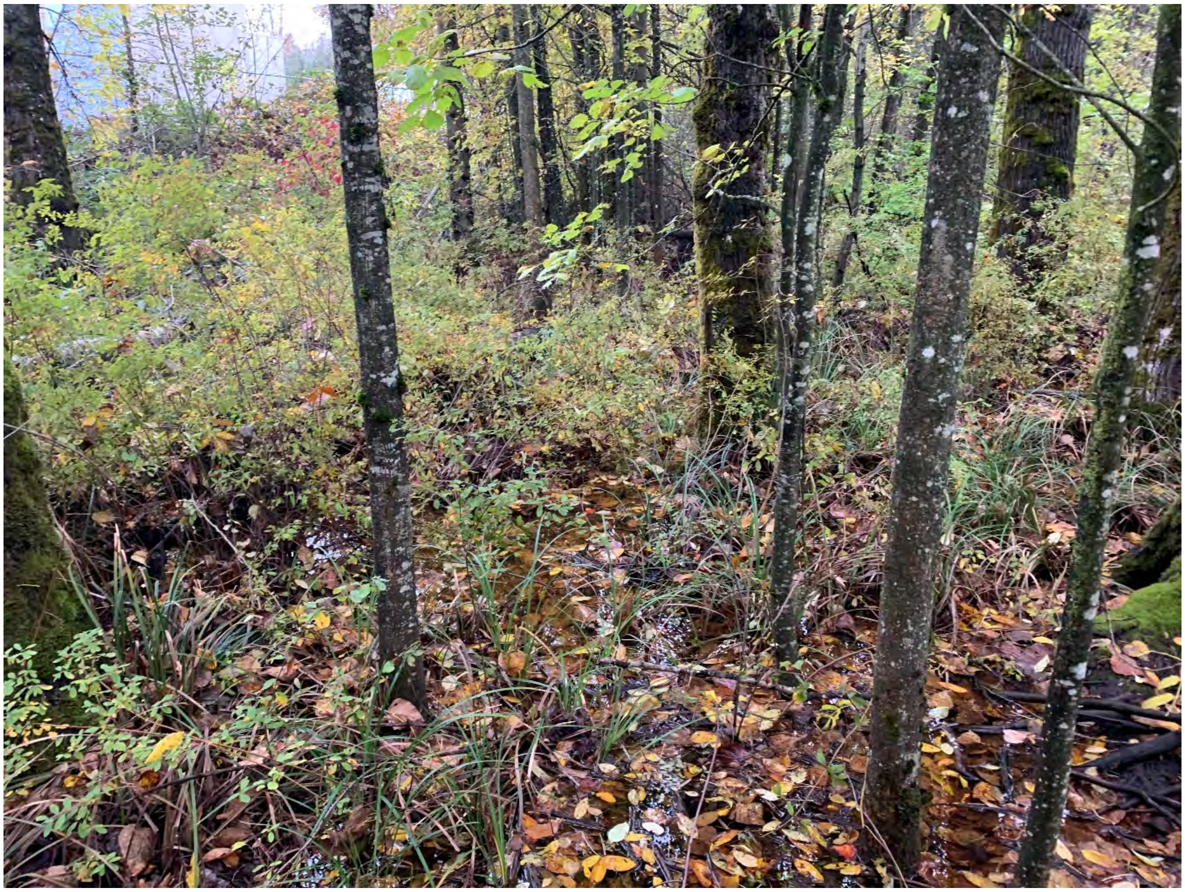
Photograph 4 Southern portion of Wetland WFW-1 after storm event facing northwest, 10/18/2019

Photograph 5 Wetland WFW-2 facing east, 10/16/2019

Photograph 6 Northern portion of Wetland WFW-2 near culvert under South 336th Street facing south, 10/16/2019



Photograph 7 Wetland WFW-3 along East Fork Hylebos Creek facing north, 10/18/2019



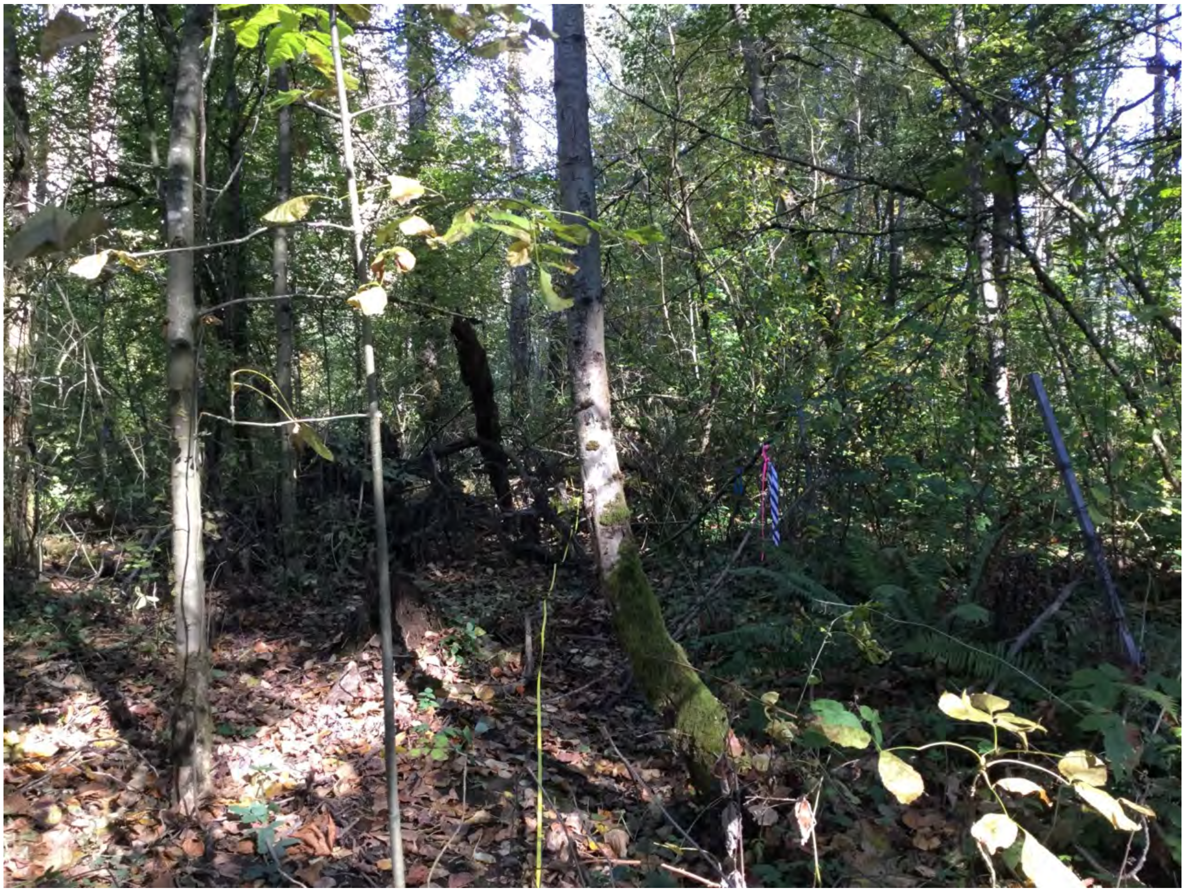
Photograph 8 Wetland WFW-4 facing northeast, 10/22/2019

Photograph 9 Wetland WFW-4 facing northwest, 10/22/2019

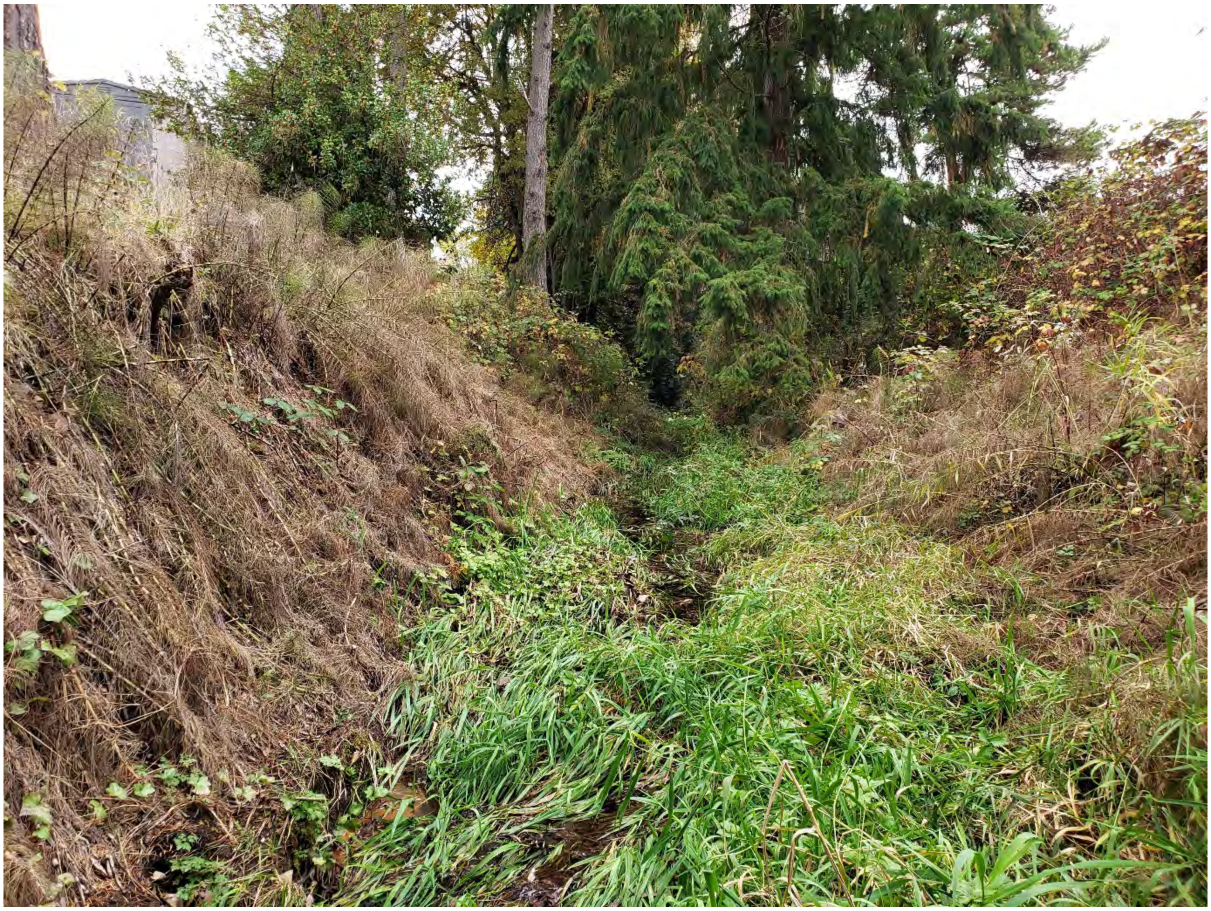
Photograph 10 Wetland WFW-5 facing southeast, 10/23/2019

Photograph 11 Wetland WFW-5 facing south, 10/23/2019

Photograph 12 Wetland WFW-5 facing southeast, 10/23/2019

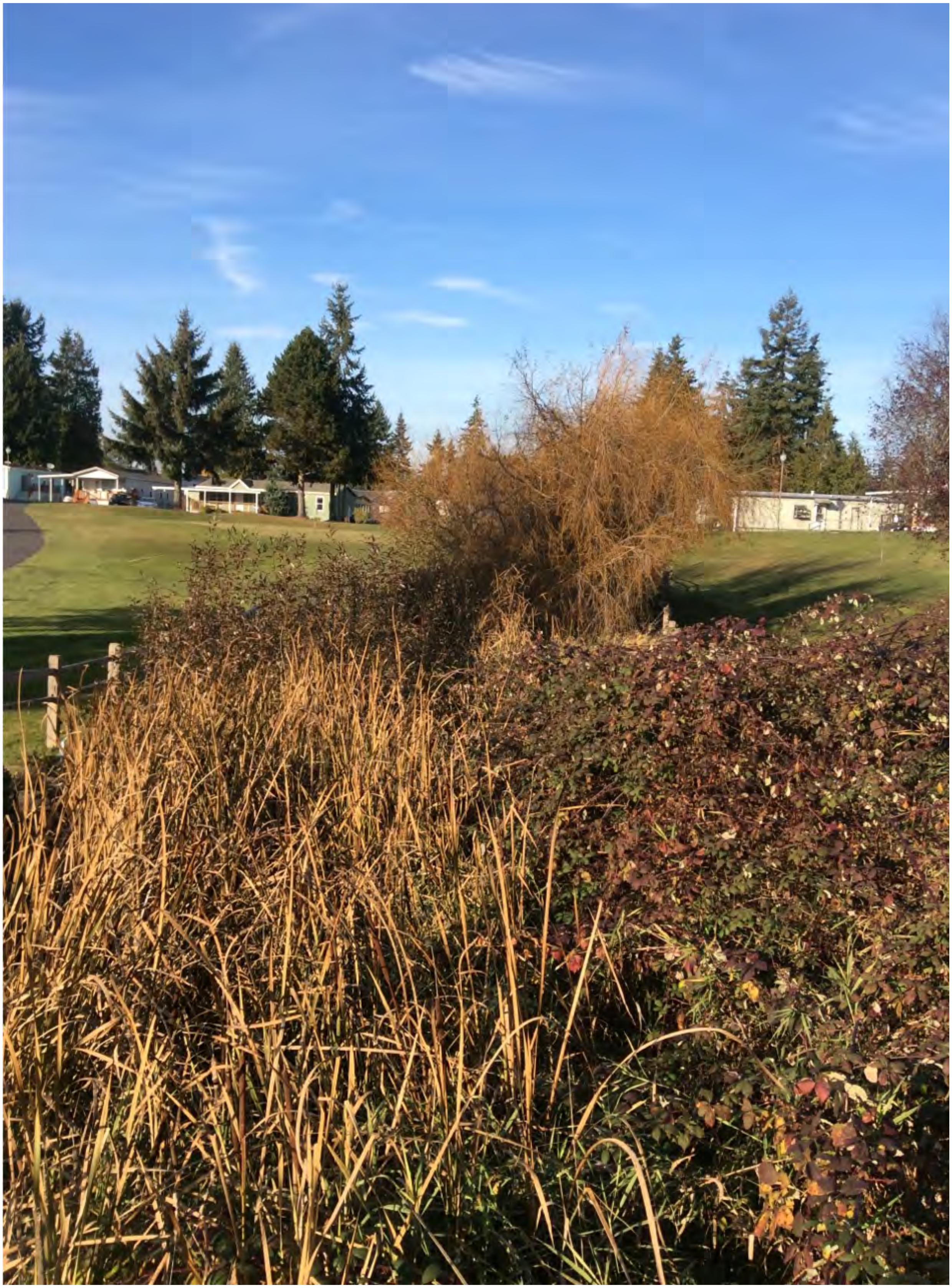


Photograph 13 PSS Wetland WFW-6, 10/10/2019



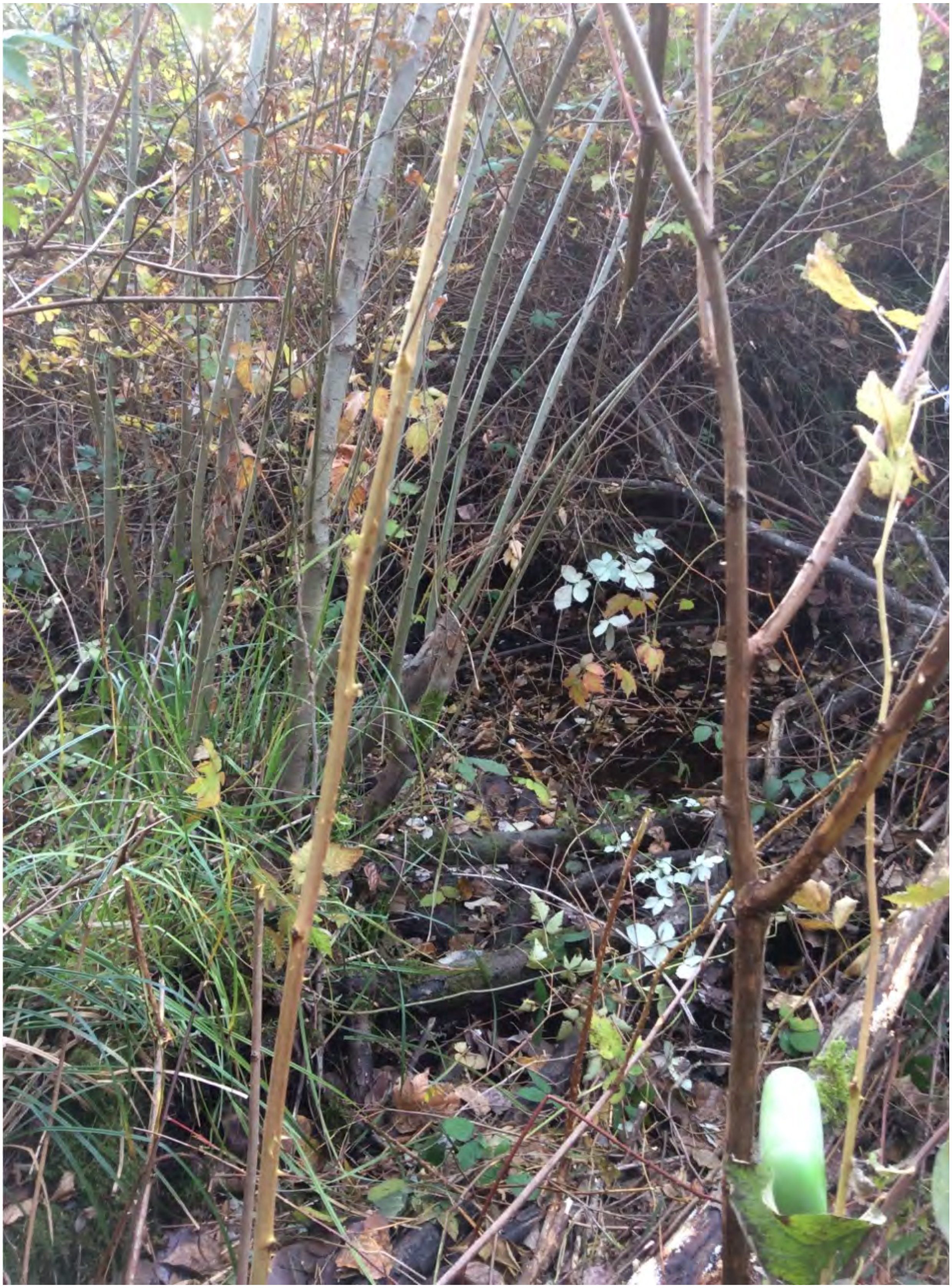
Photograph 14 PFO component of Wetland WFW-7 photographed from East Fork Hylebos Creek Tributary 0016A facing upstream, 11/6/2019

Photograph 15 PSS component of Wetland WFW-7 photographed from East Fork Hylebos Creek Tributary 0016A facing west, 11/4/2019

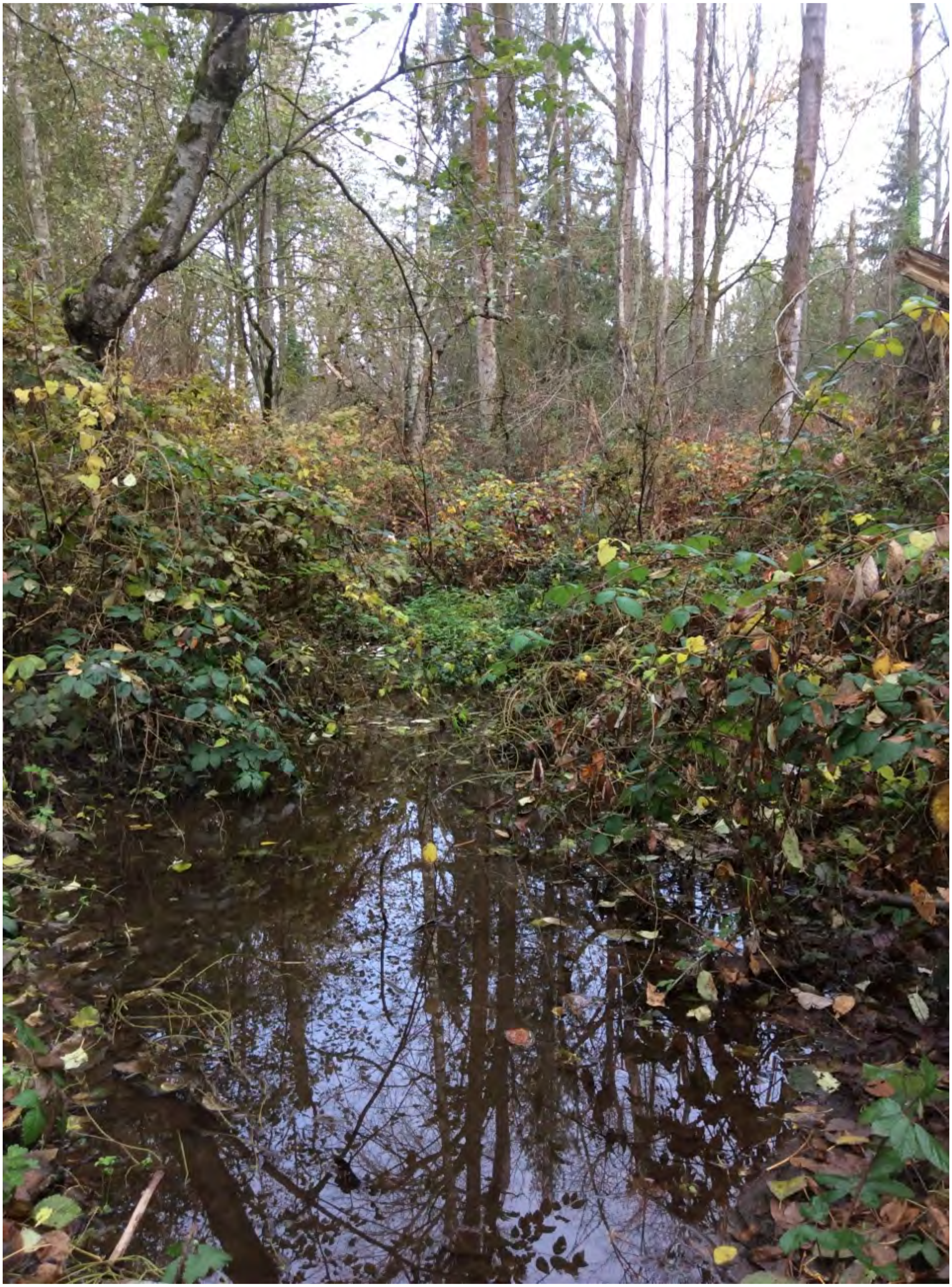


Photograph 16 Wetland WFW-8 photographed from south end of wetland. East Fork Hylebos Creek Tributary 0016A flows through constructed facility with wetlands on both sides of the channel with PEM wetland sections on west side and PSS sections on the east, 11/4/2019

Photograph 17 Wetland WFW-8 photographed from north end of constructed facility, East Hylebos flows through the middle of the wetland north to south, 11/19/2019

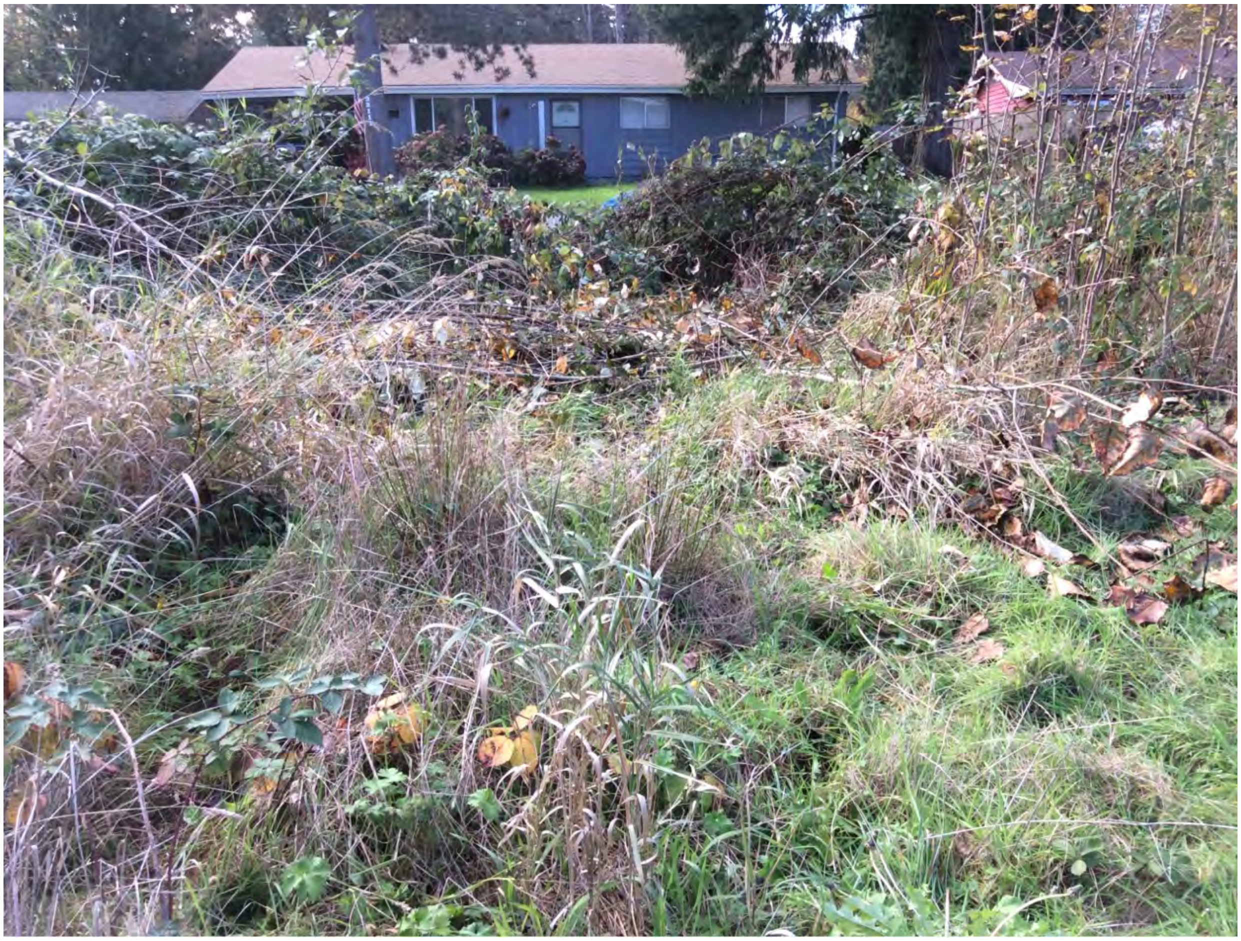


Photograph 18 PSS component of Wetland WFW9 within ordinary high water mark of East Fork Hylebos tributary 0016a, 11/06/2019

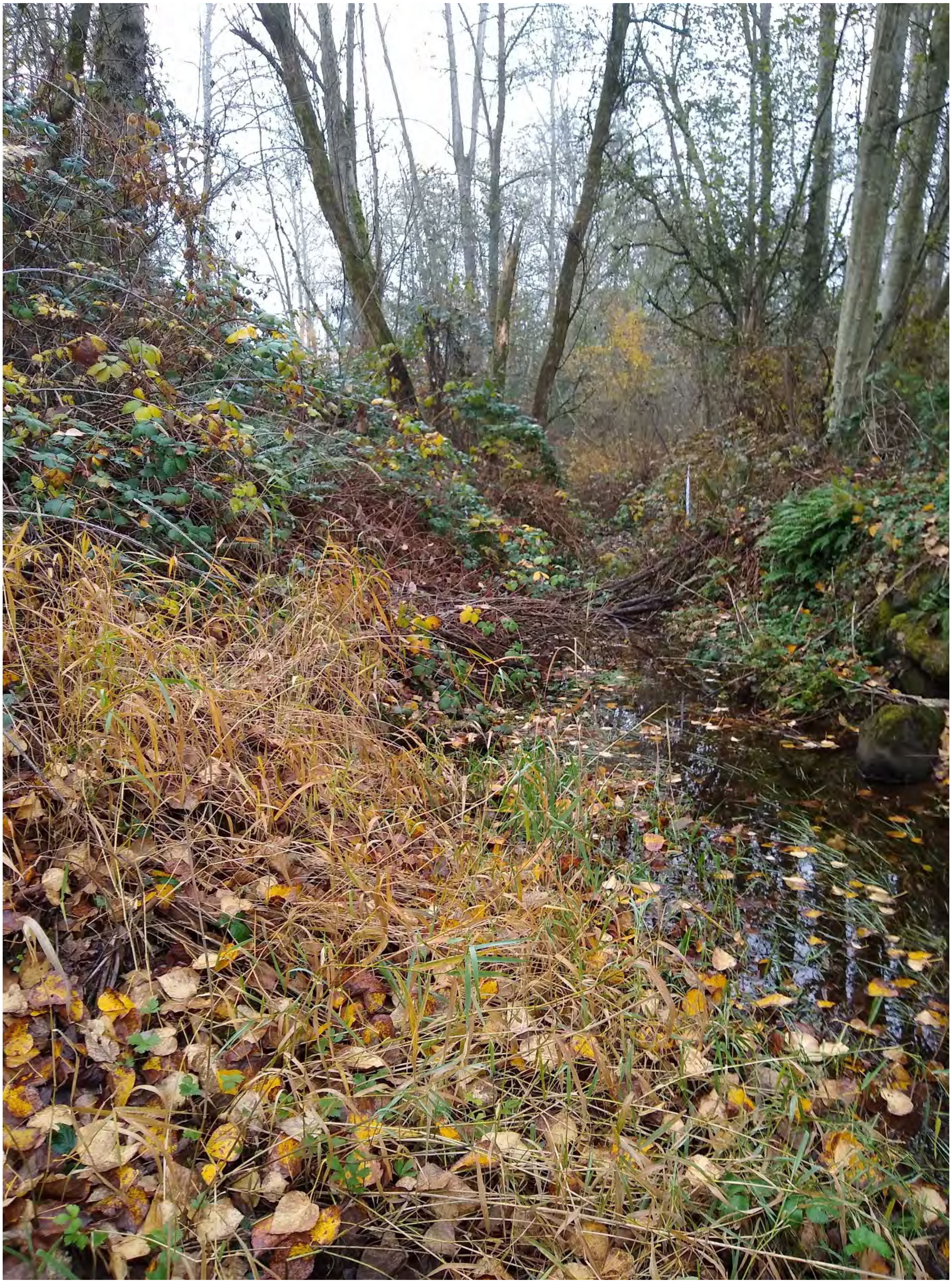


Photograph 19 PFO portion of Wetland WFW10 Unit B, 11/14/2019

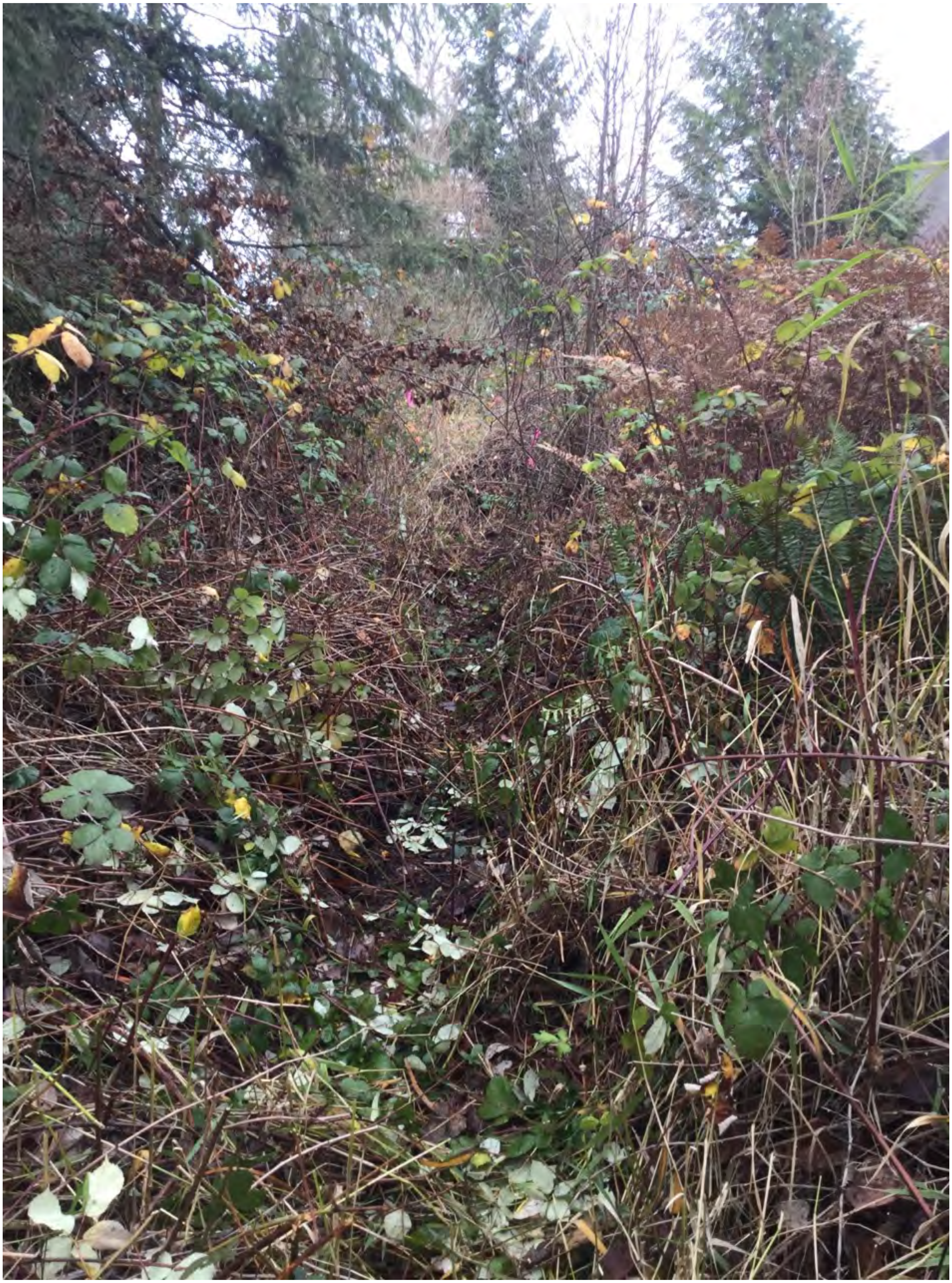
Photograph 20 PFO component of Wetland WFW-11 facing northeast, 11/14/2019



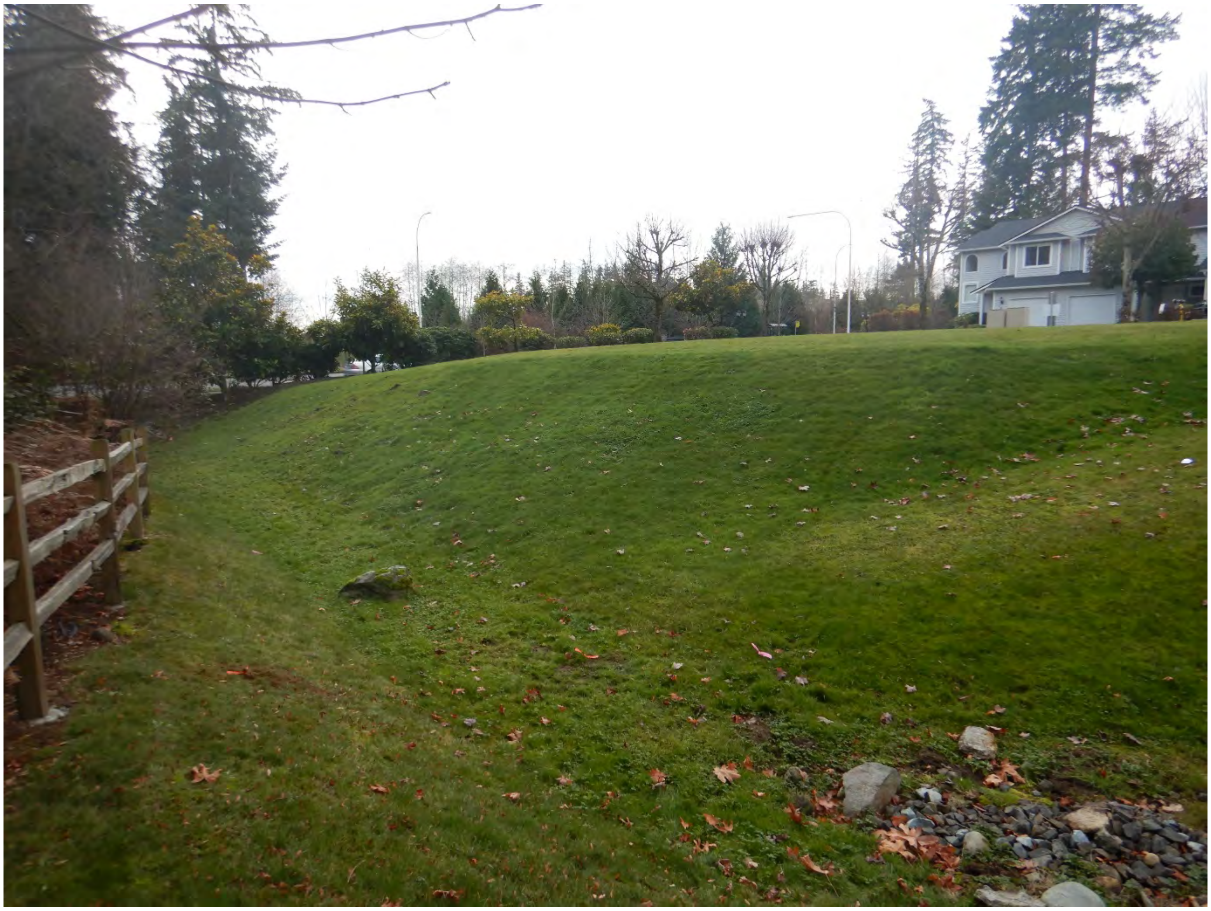
Photograph 21 PEM component of Wetland WFW-11 facing west toward 24th Avenue S, 11/01/2019



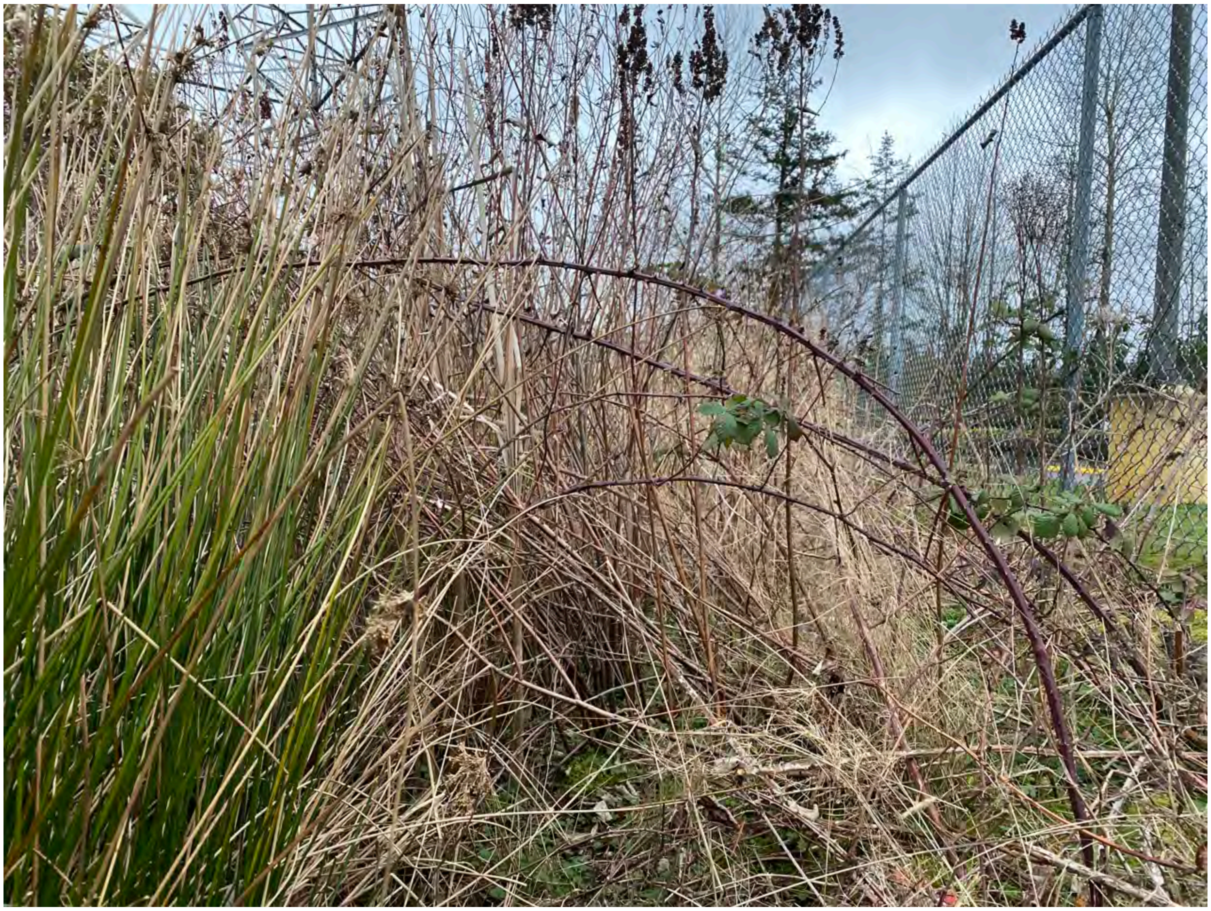
Photograph 22 Southern view of Wetland WFW-12 depicting PEM, PSS, and PFO Cowardin plant communities, 12/18/2019



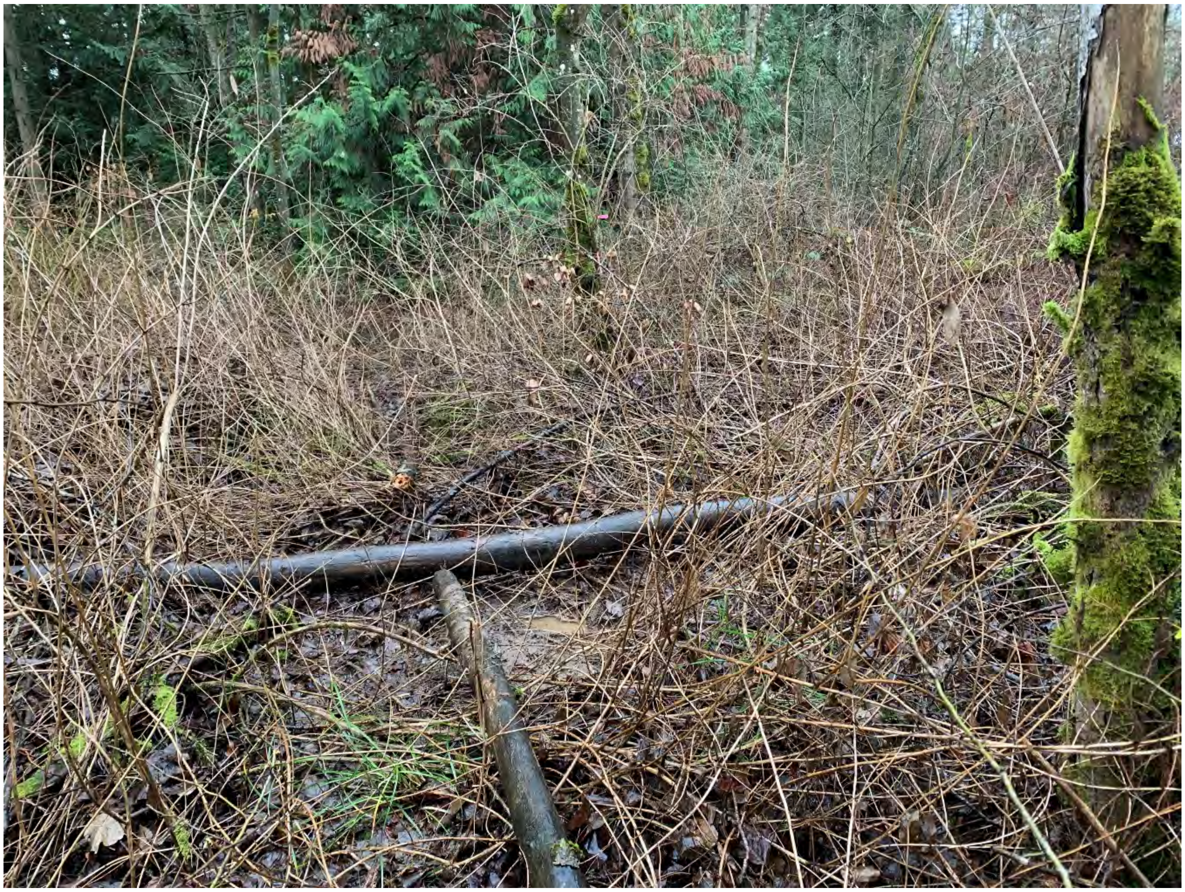
Photograph 23 PSS Wetland WFW-13 facing north, 11/26/2019



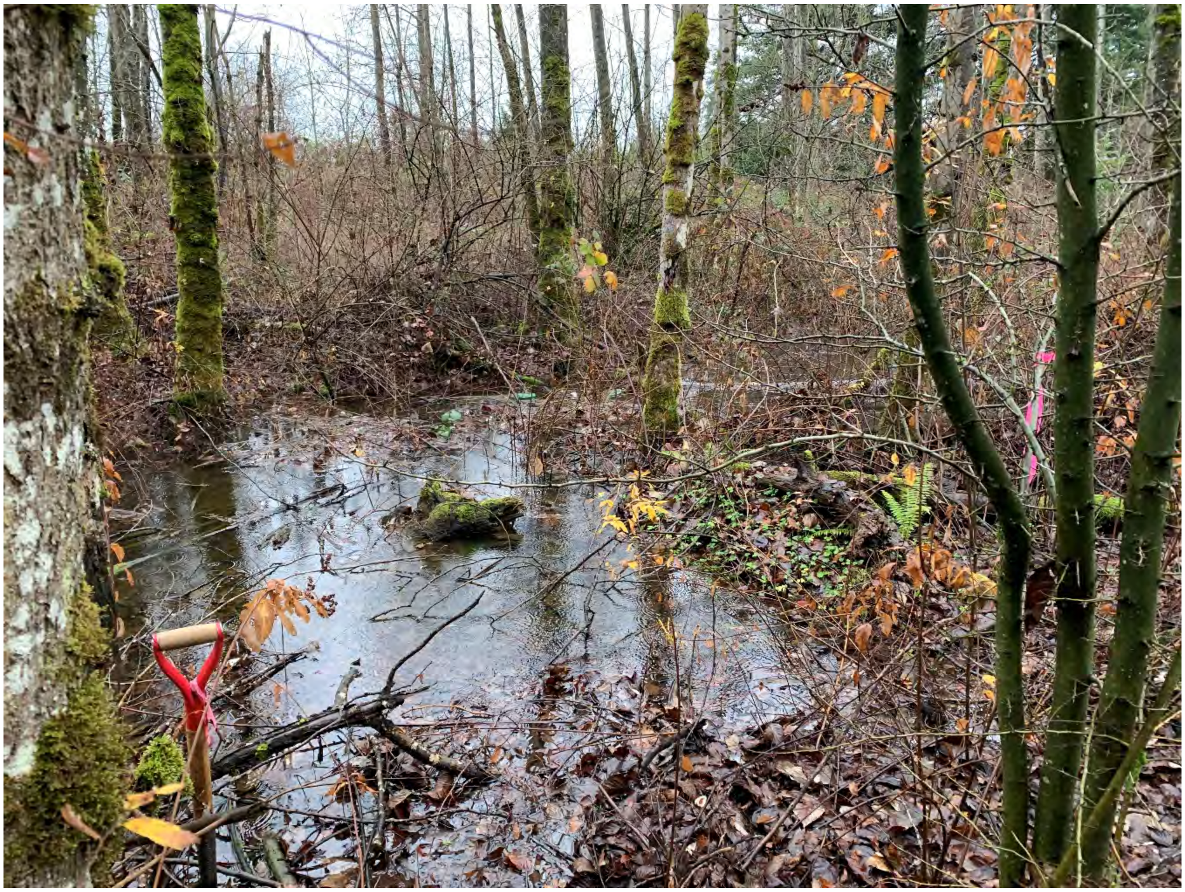
Photograph 24 PEM Wetland WFW-14 facing south, 12/03/2019



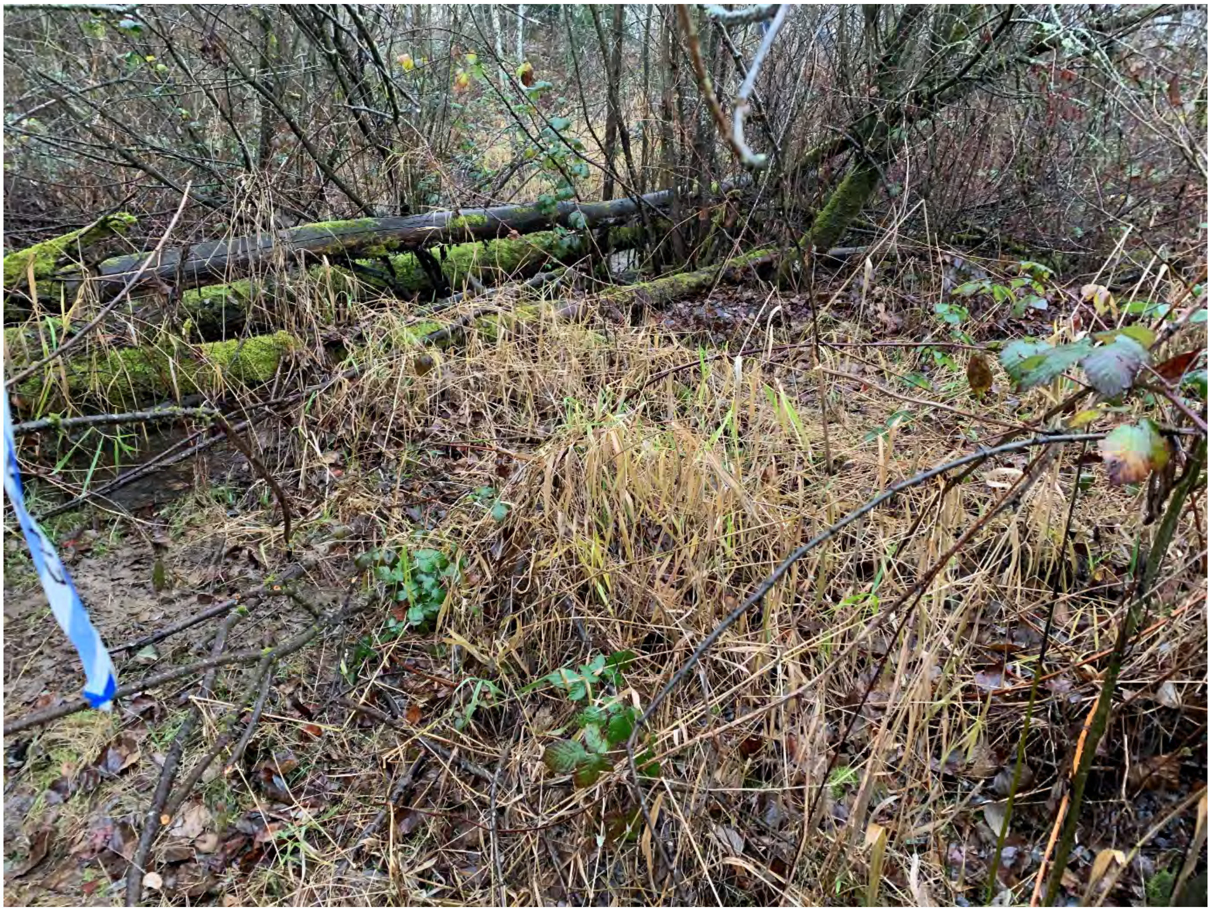
Photograph 25 Wetland WFW-16, facing east, 3/2/2020



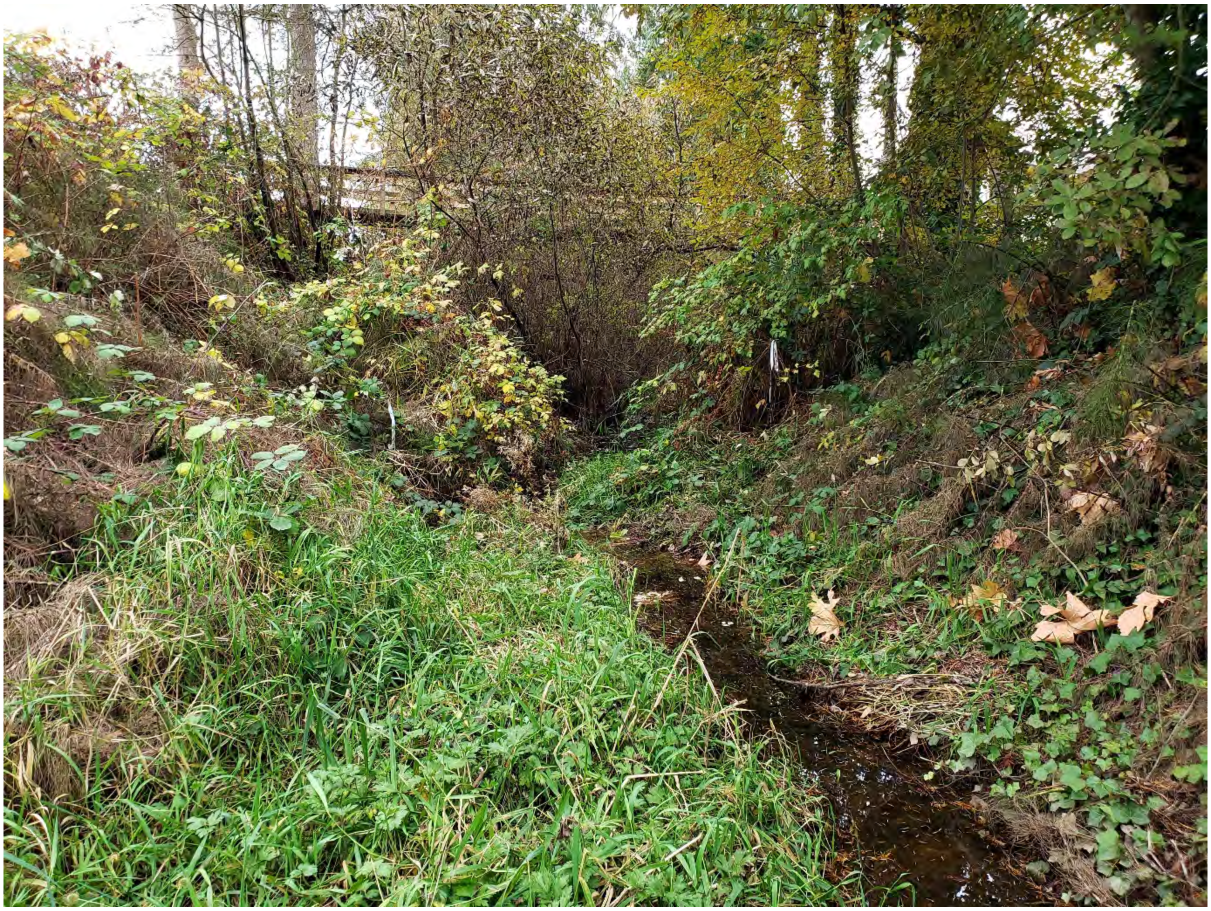
Photograph 26 Wetland WFW-17 facing west, 12/19/2019



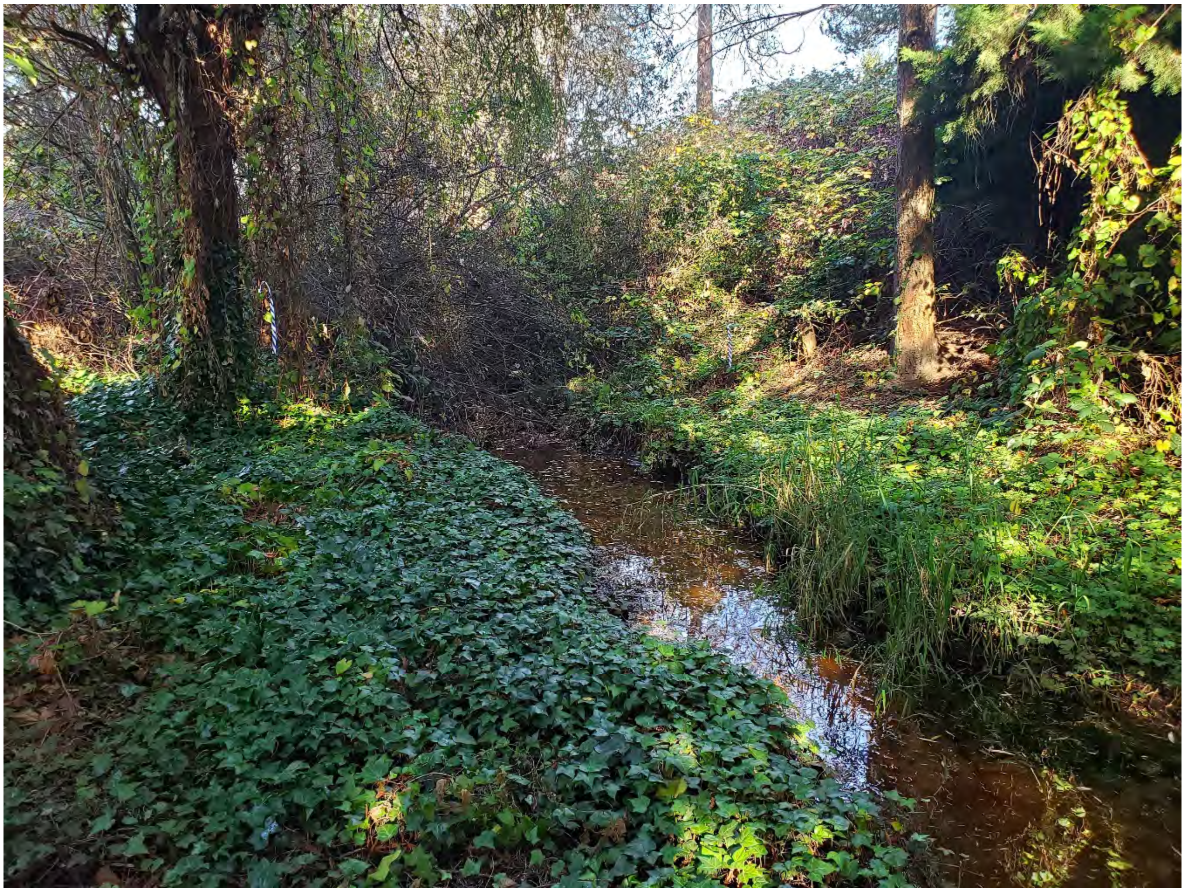
Photograph 27 Wetland WFW-17 facing southeast, 12/19/2019



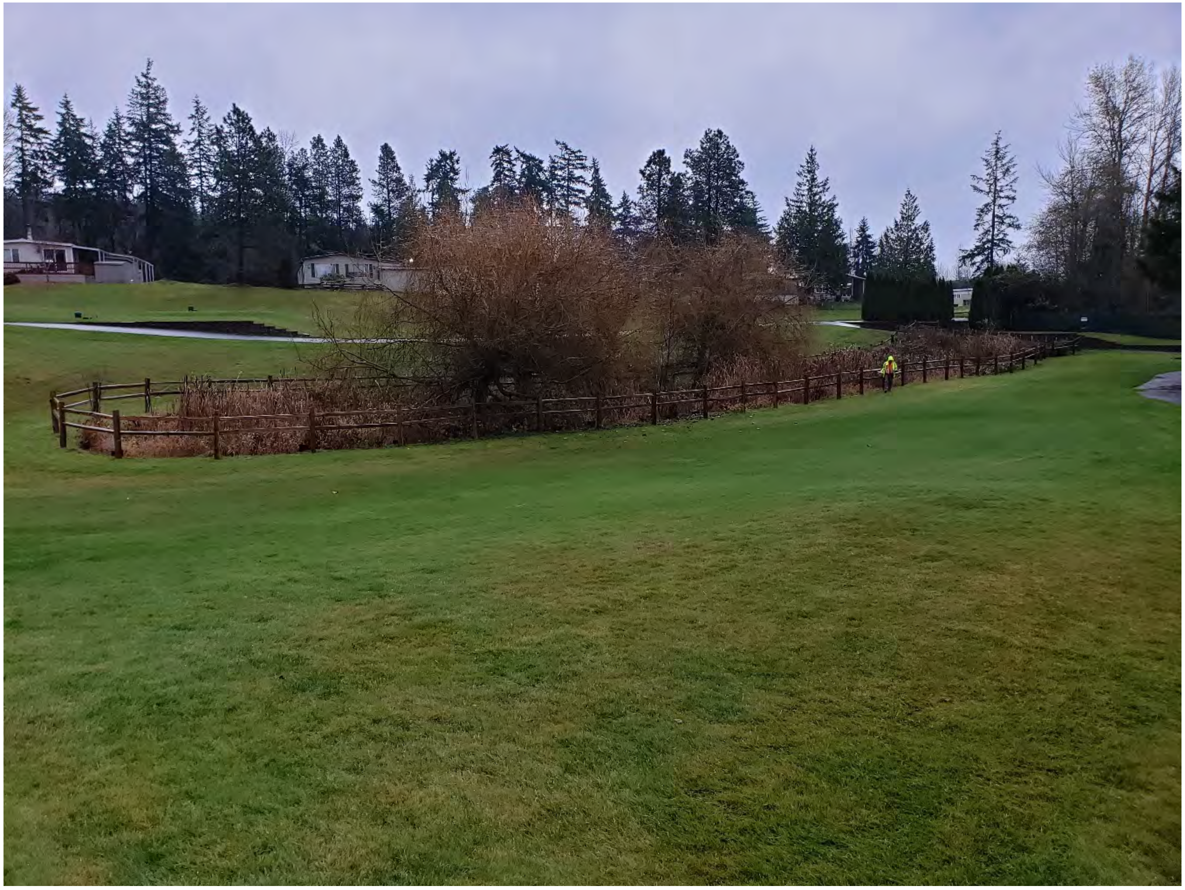
Photograph 28 Wetland WFW-18 facing southeast, 12/19/2019



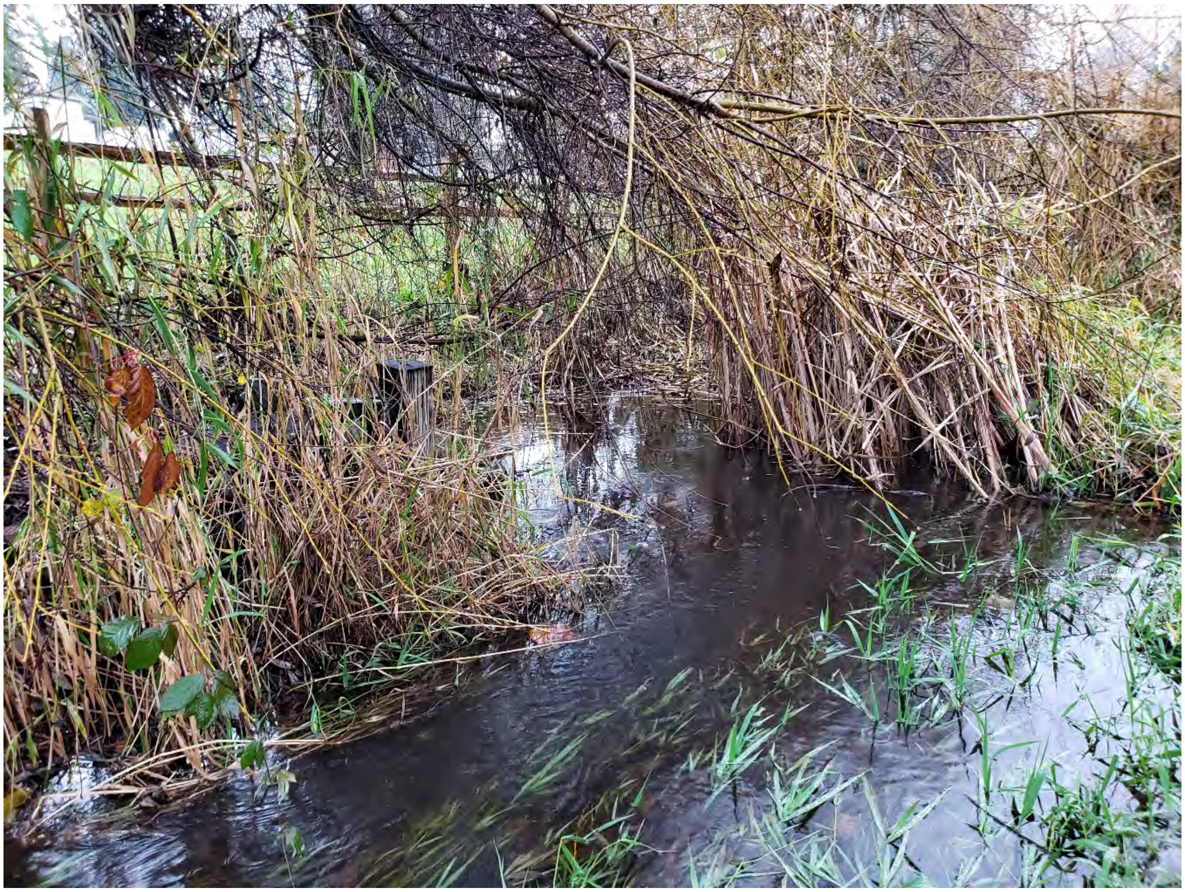
Photograph 29 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A at headwaters in Belmor Park Golf Course, facing downstream, 11/06/2019



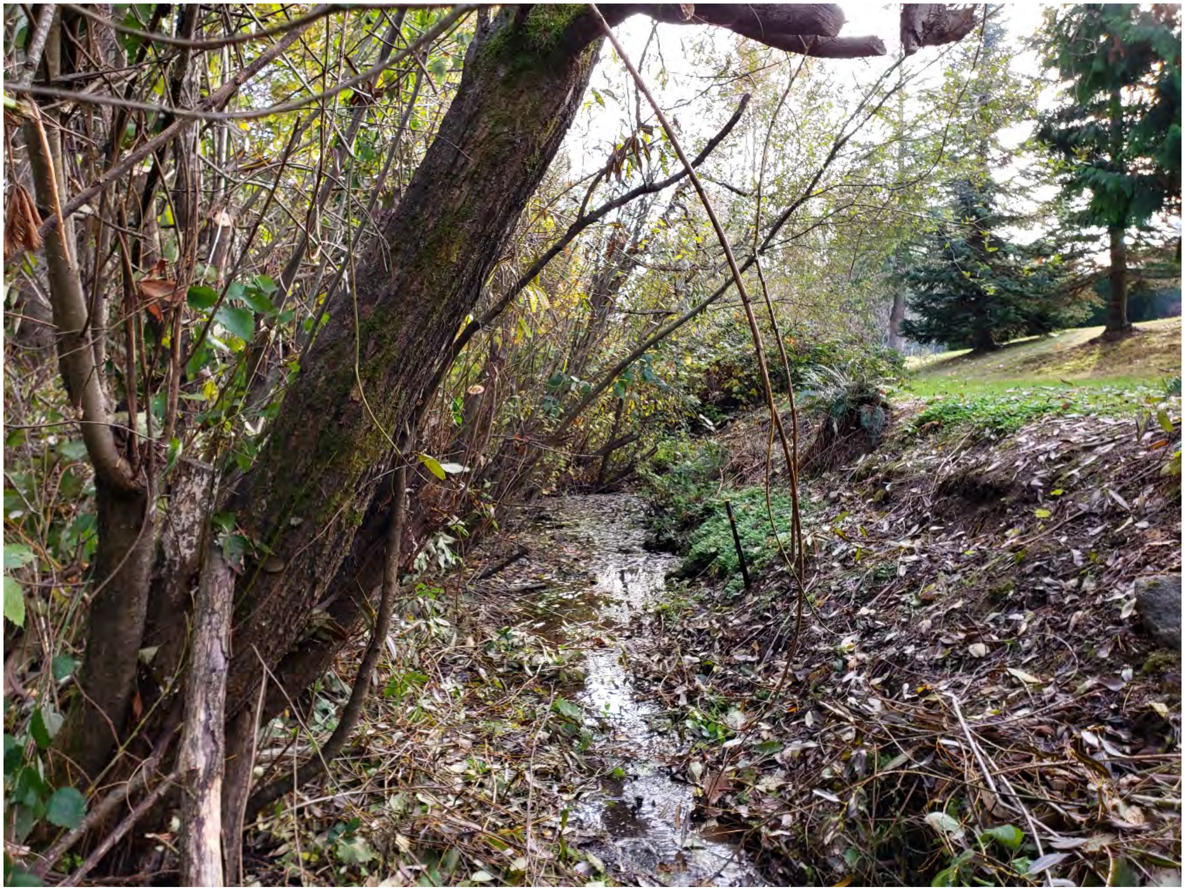
Photograph 30 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A at headwaters looking upstream from culvert beneath Burning Tree Boulevard, 11/04/2019



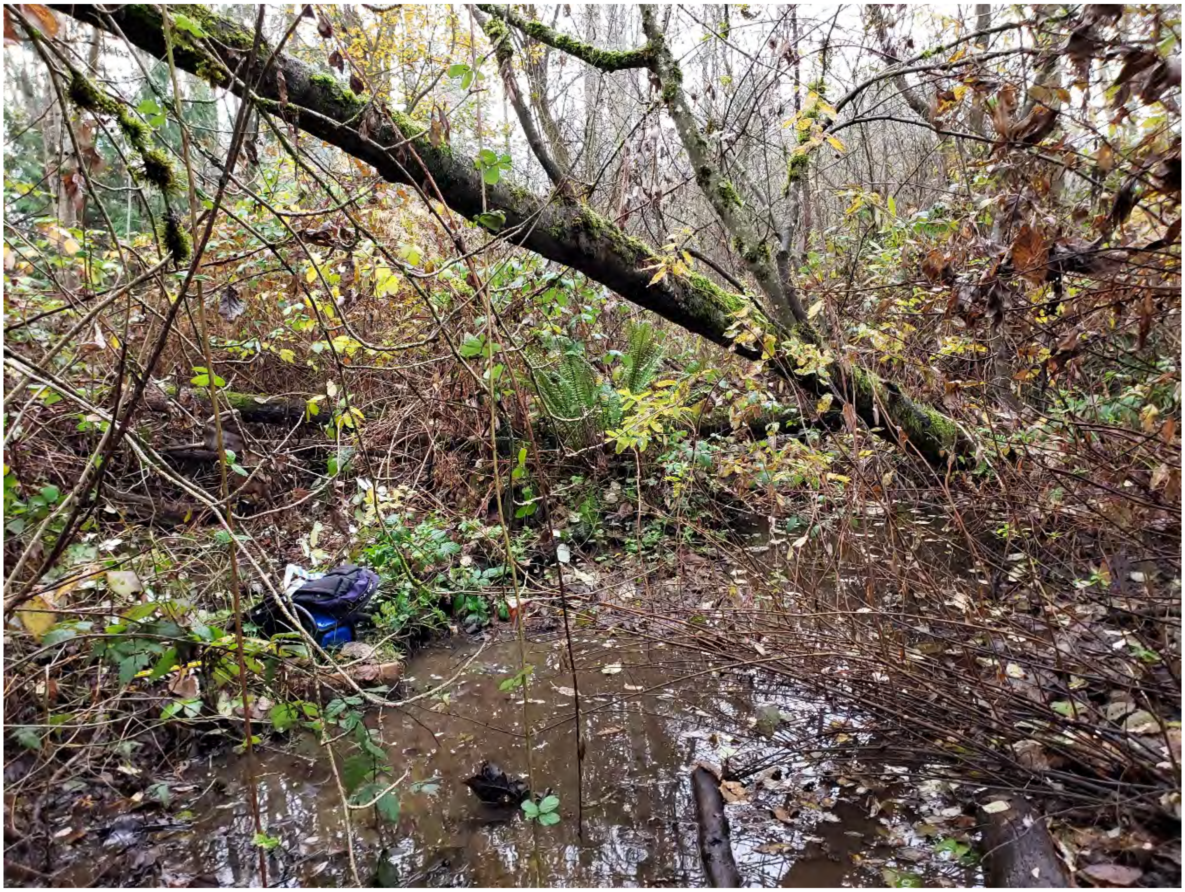
Photograph 31 Looking at East Fork Hylebos Creek Tributary 0016Ain stormwater facility downstream of Buring Tree Boulevard in Belmor Park Golf Course, 11/19/2019



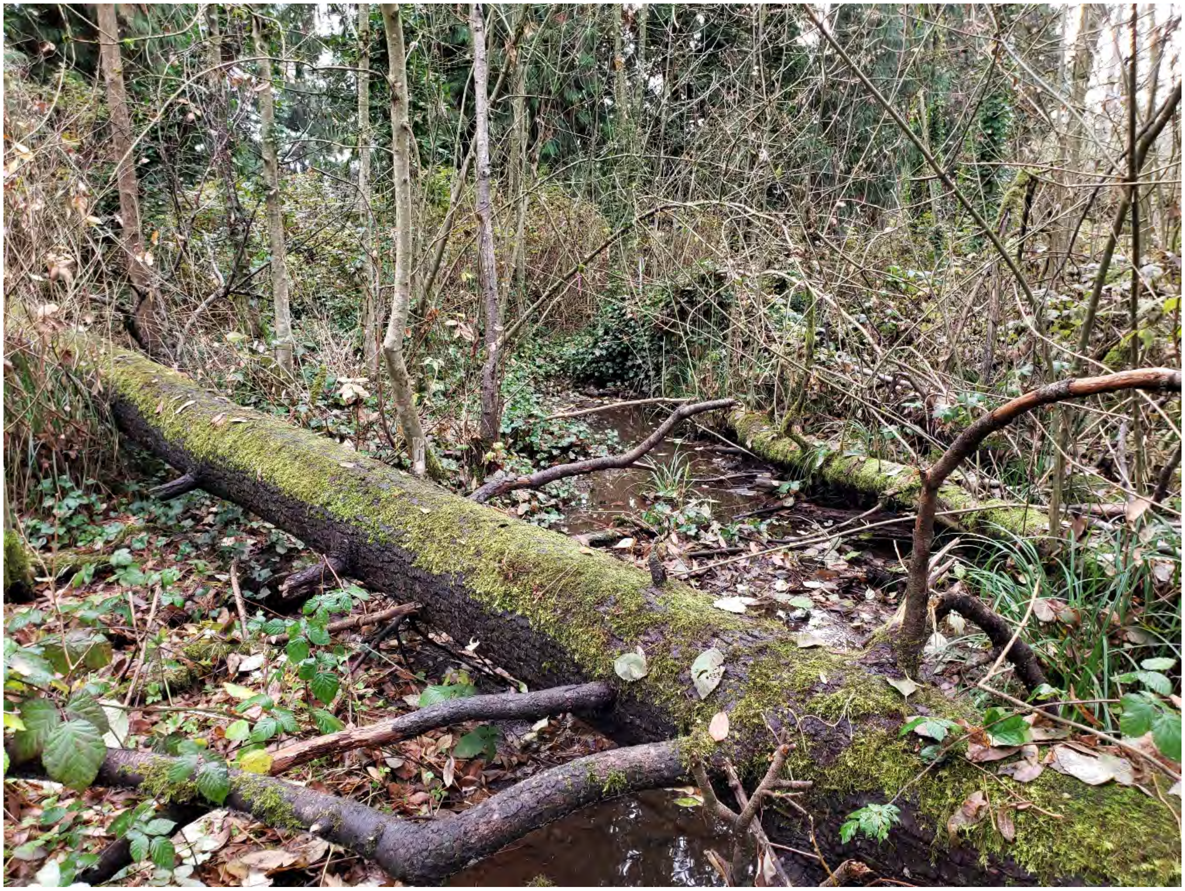
Photograph 32 Channel conditions of East Fork Hylebos Creek Tributary 0016A in stormwater facility in Belmor Park Golf Course, 11/19/2019



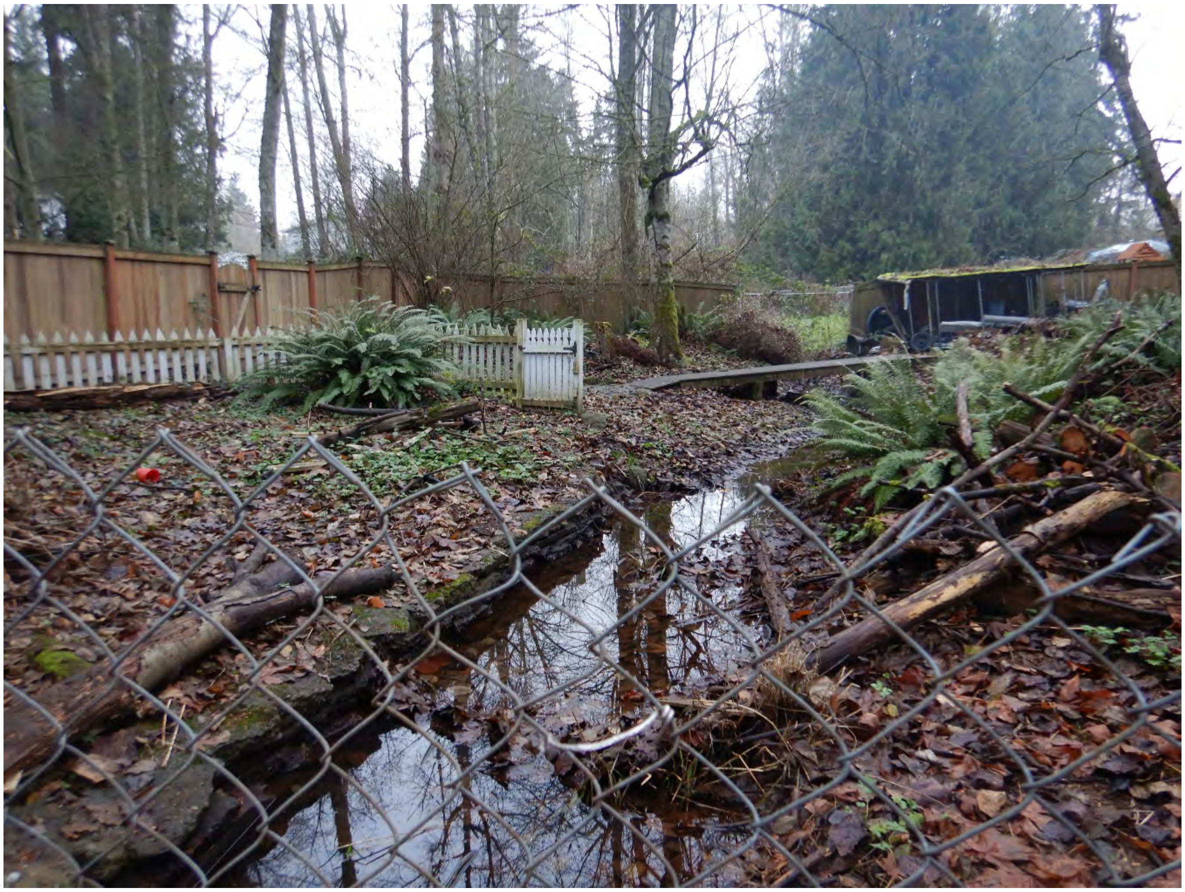
Photograph 33 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A between Belmor Park Golf Course and South 330th Street, 11/06/2019



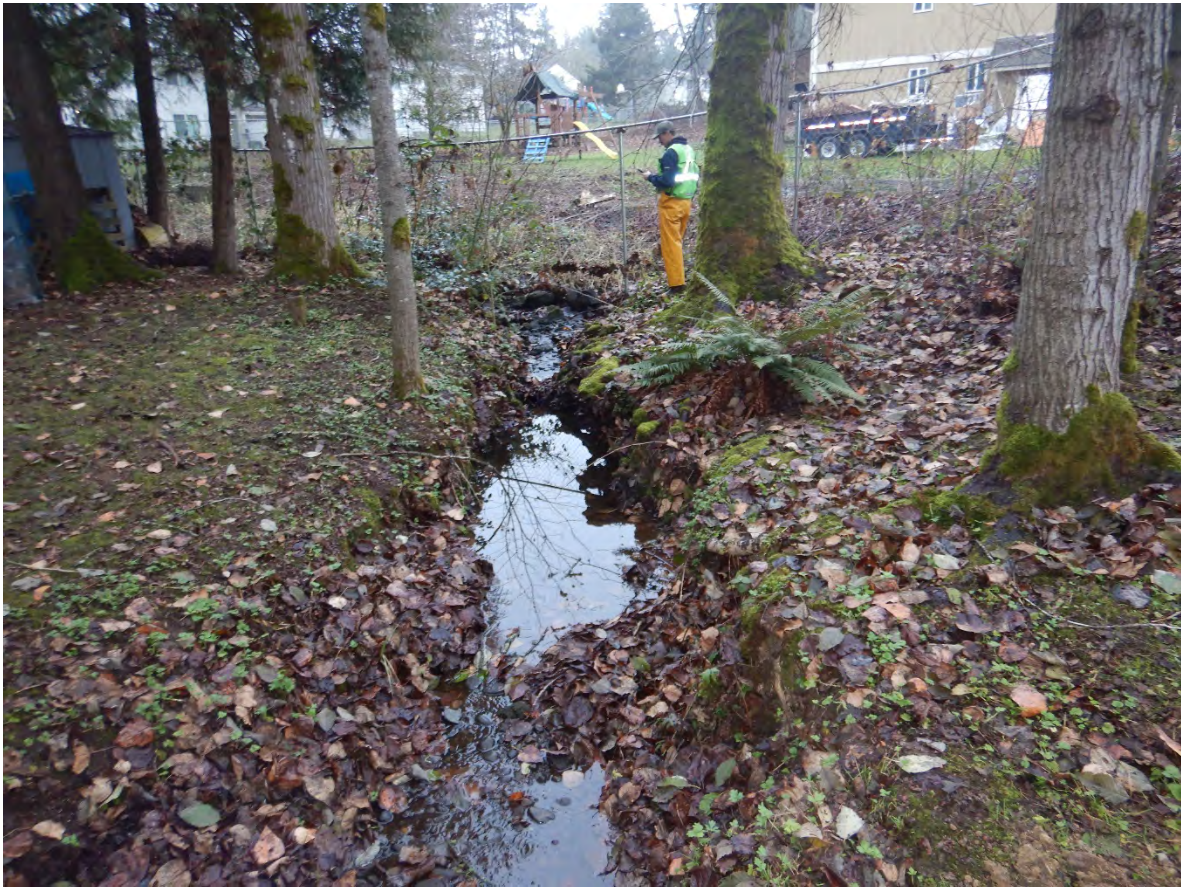
Photograph 34 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A between Belmor Park Golf Course and South 330th Street, 11/14/2019



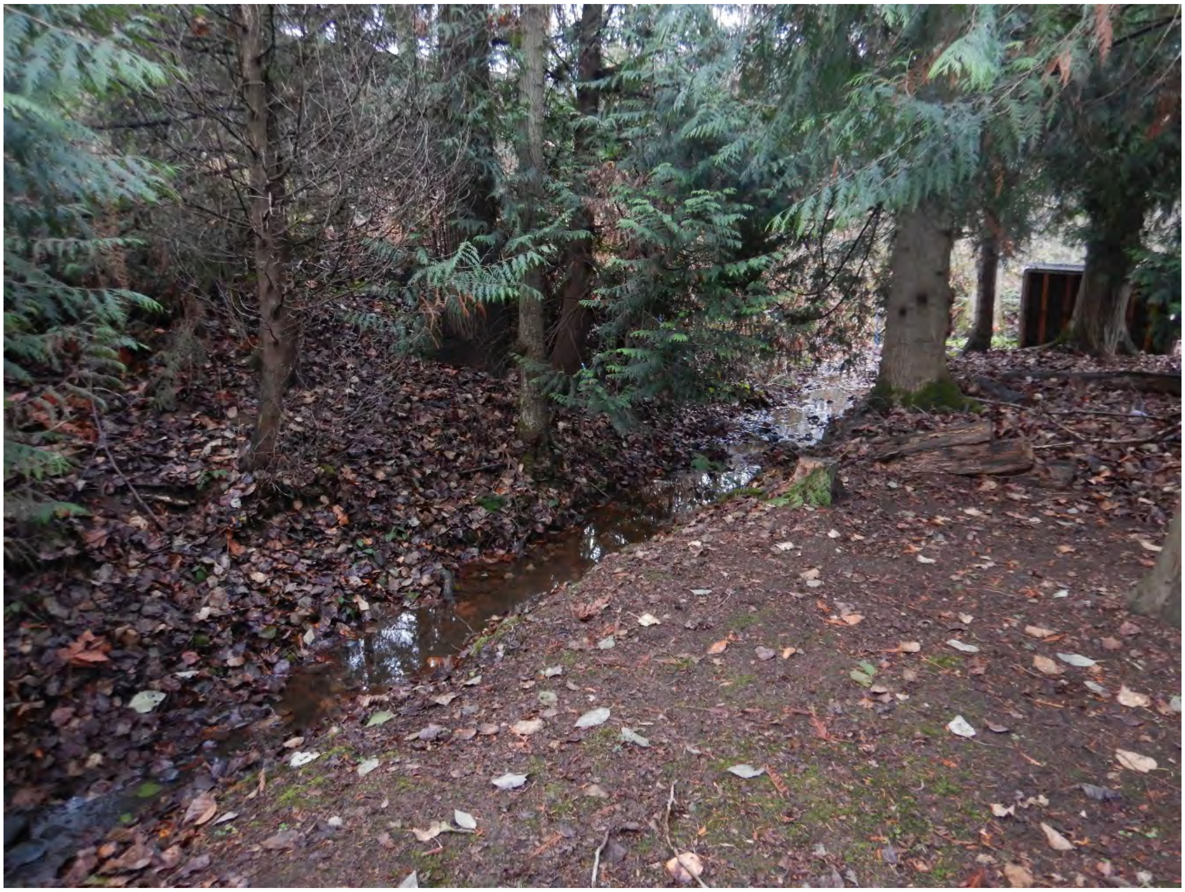
Photograph 35 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A between South 330th Street to South 333rd Street, 11/14/2019



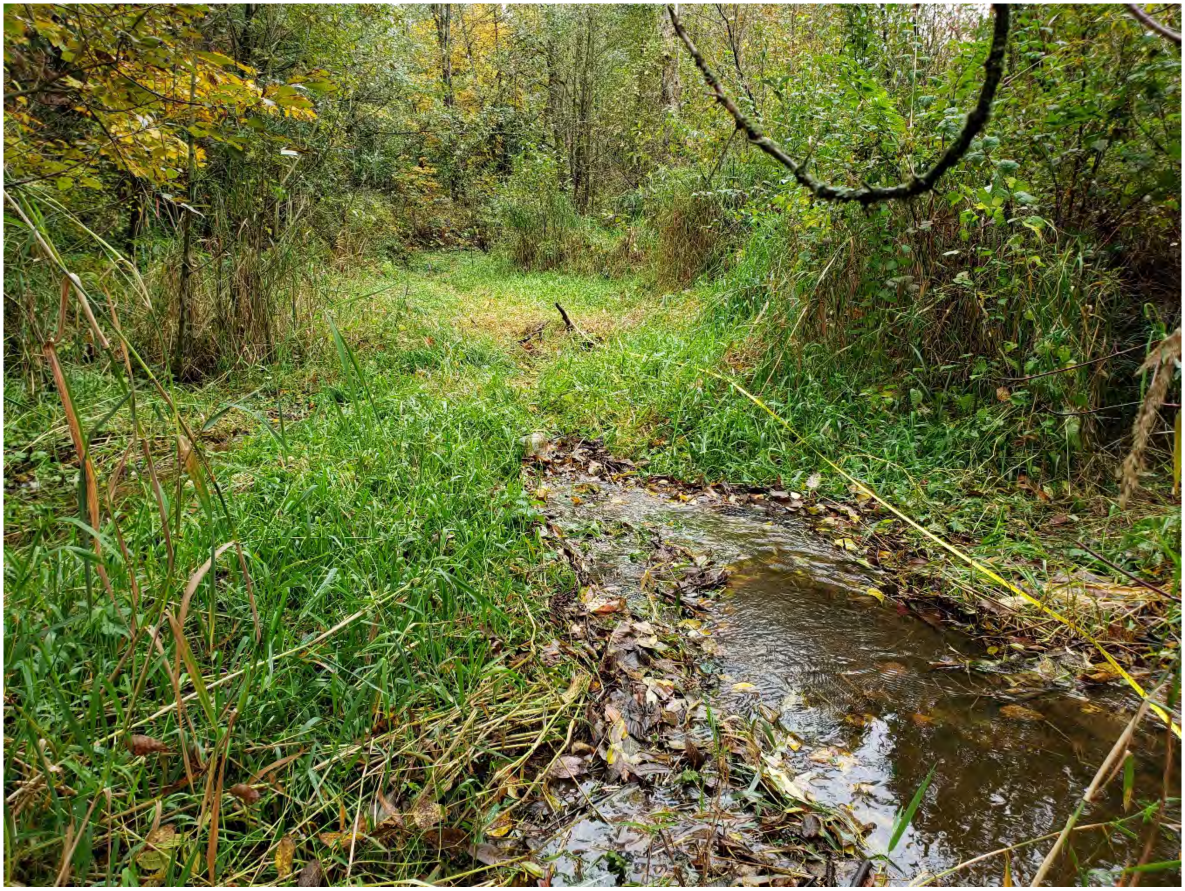
Photograph 36 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A through residential area between South 330th Street and South 333rd Street, 12/05/2019



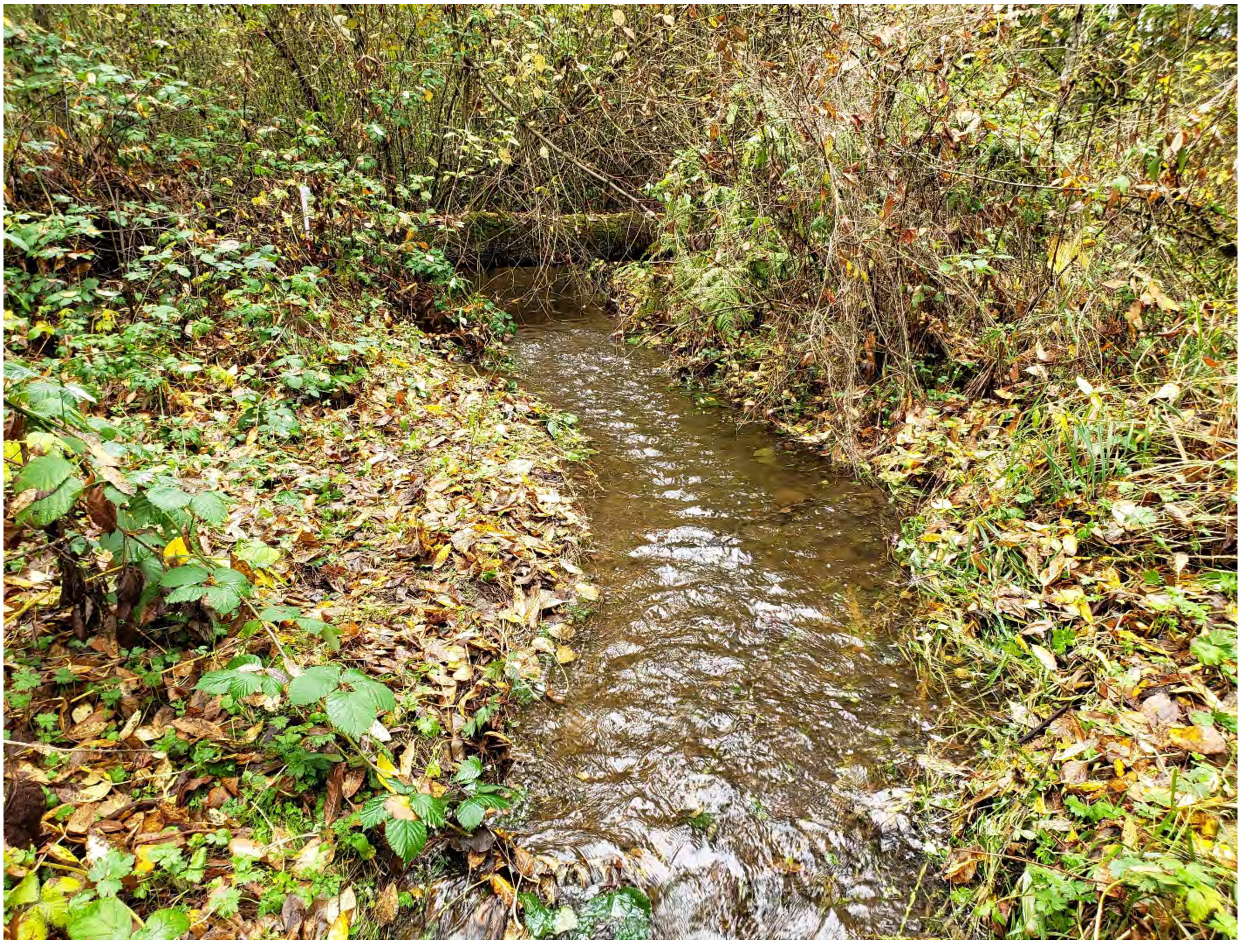
Photograph 37 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A through residential area between South 333rd Street and South 336th Street, 12/05/2019



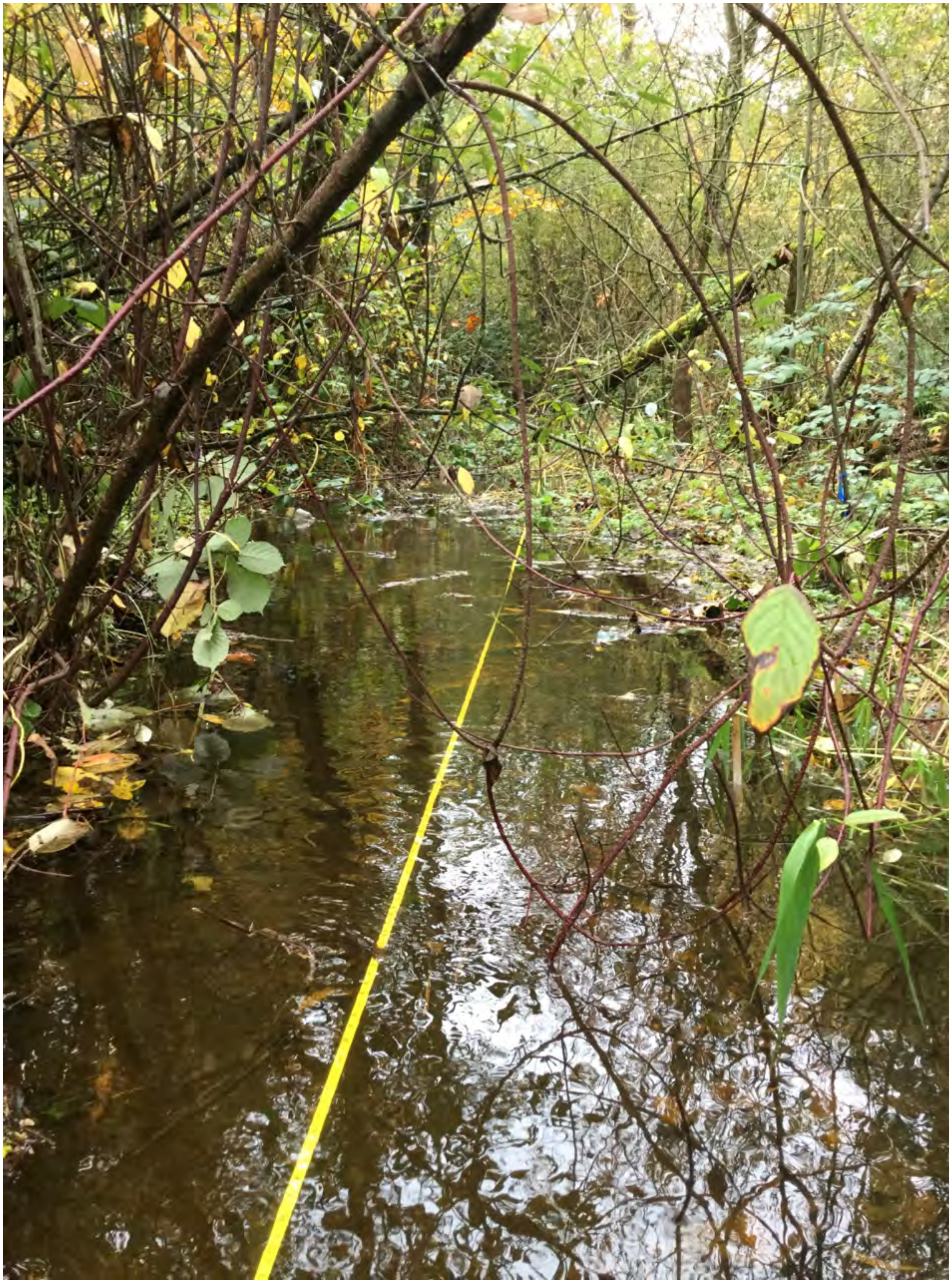
Photograph 38 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A through residential area between South 333rd Street and South 336th Street, 12/05/2019



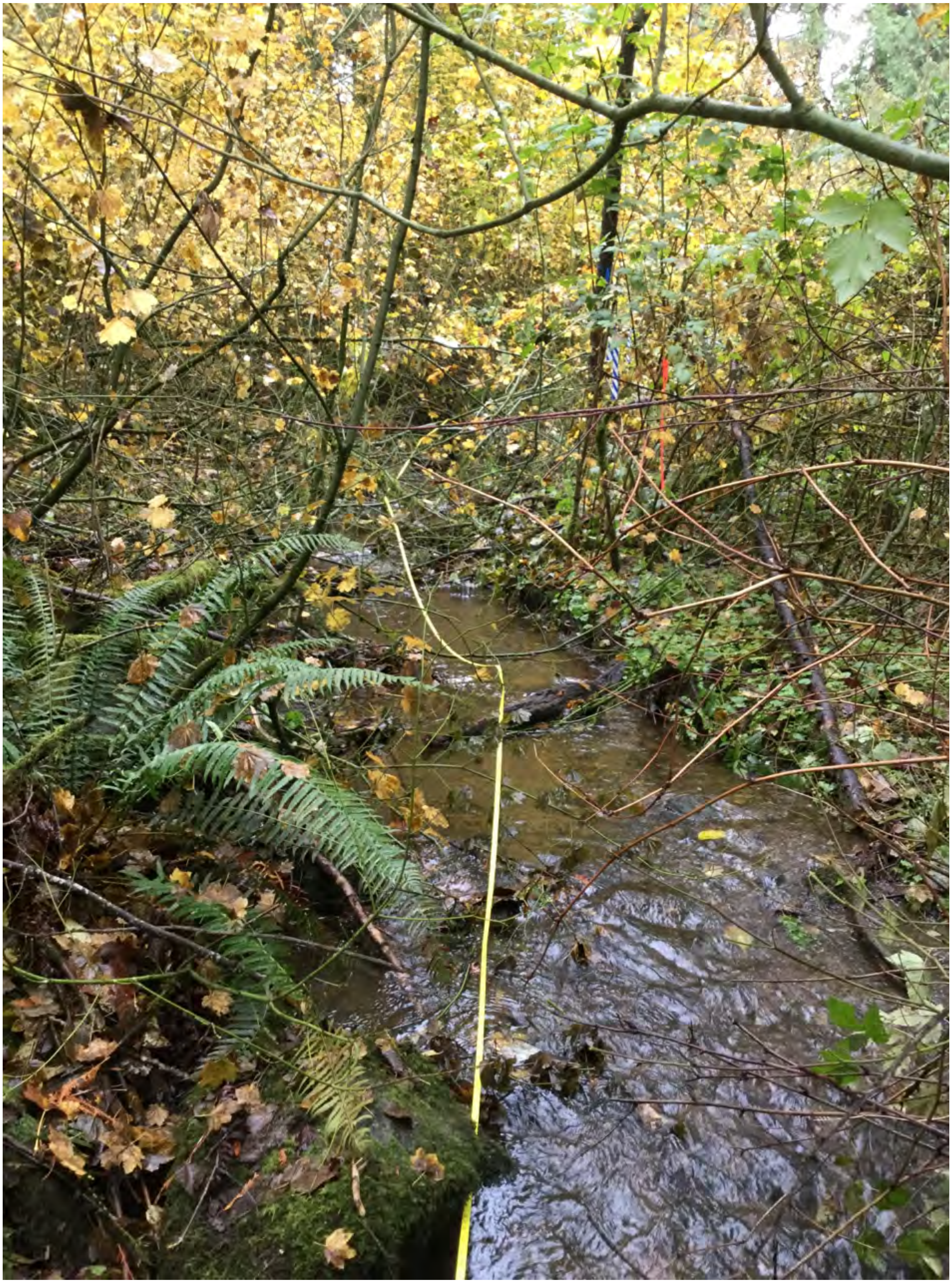
Photograph 39 East Fork Hylebos Creek Tributary 0016A as it flows into wetland (WFW-1) through residential area between South 336th Street and South 344th Street, 10/22/2019



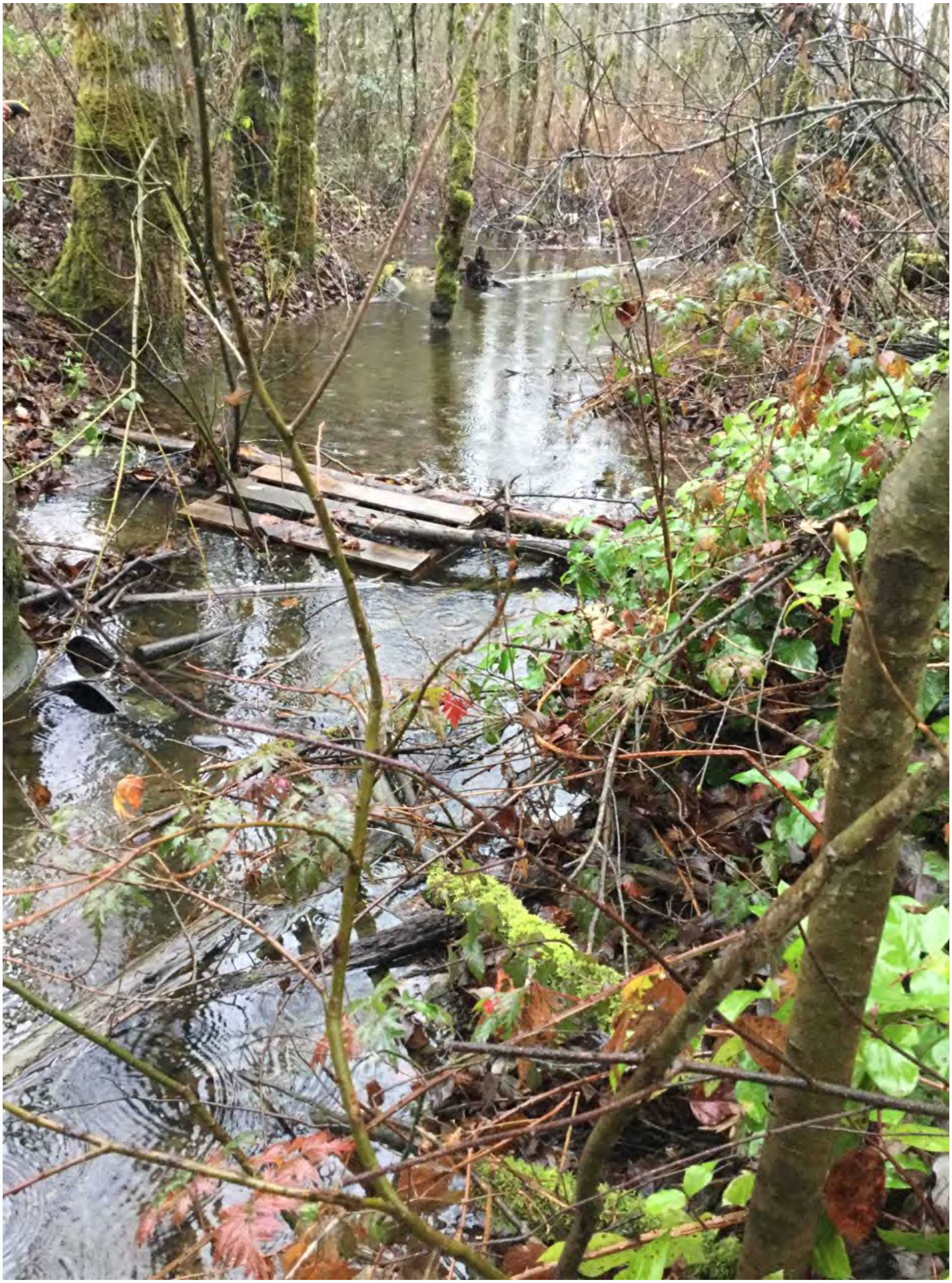
Photograph 40 Riffle habitat in East Fork Hylebos Creek Tributary 0016A between South 336th Street and South 344th Street looking upstream, 10/22/2019



Photograph 41 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A through residential area between South 336th Street and South 344th Street, 10/22/2019



Photograph 42 Typical channel conditions of East Fork Hylebos Creek Tributary 0016A through residential area between South 336th Street and South 344th Street, 10/22/2019



Photograph 43 East Fork Hylebos Creek Tributary 0016A between South 344th Street and southbound I-5 to SR 18, facing upstream, 12/19/2019

Photograph 44 Commercial cover type at South 336th Street Site Alternative dominated by invasive species such as Himalayan blackberry and English ivy

Photograph 45 Residential cover type near South 344th and 336th Street Site Alternatives vegetated with mowed lawn, Himalyayan blackberry, and Douglas fir

Photograph 46 Grassland cover type at South 344th Street Site Alternative dominated by fescues, velvetgrass, and bluegrass

Photograph 47 Invasive brush cover type at Midway Landfill Site Alternative dominated by Himalayan blackberry

Photograph 48 Native forest cover type at South 336th Street Site Alternative dominated by Hooker's willow, Douglas fir and Western red cedar

Photograph 49 Non-native forest cover type at South 336th Street Site Alternative dominated by volunteer honey locust

Photograph 50 Stream channel cover type: East Fork Hylebos Creek Tibutaty 0016A between S 336th Street and S 344th Street

Photograph 51 Storm water pond cover type at South 336th Site Alternative dominated by cattail, smart weed, rushes, and sedges

Photograph 52 Wetland cover type near South 344th and 336th Street Site Alternatives, showing a forested cover class

Operations and Maintenance Facility South

ATTACHMENT G3-7

Common and Scientific Names of Plant and Animal Species

Federal Transit Administration

SOUNDTRANSIT

Animals

Common Name	Scientific Name
Fish	
Bull Trout	*Salvelinus confluentus*
Chinook Salmon	*Oncorhynchus tshawytscha*
Chum Salmon	*Oncorhynchus keta*
Coho Salmon	*Oncorhynchus kisutch*
Coastal Cutthroat Trout	*Oncorhynchus clarki clarki*
Pink Salmon	*Oncorhynchus gorbuscha*
Sculpin	*Cottus* spp.
Sockeye Salmon	*Oncorhynchus nerka*
Steelhead/Rainbow Trout	*Oncorhynchus mykiss*
Western Brook Lamprey	*Lampetra richardsoni*
Wildlife	
American Crow	*Corvus brachyrhynchos*
American Kestrel	*Falco sparverius*
American Robin	*Turdus migratorius*
Band-tailed Pigeon	*Patagioenas fasciata*
Barn Swallow	*Hirundo rustica*
Barrow's Goldeneye	*Bucephala islandica*
Bewick's Wren	*Thryomanes bewickii*
Big brown Bat	*Eptesicus fuscus*
Black-capped Chickadee	*Poecile atricapillus*
Brant	*Branta bernicla*
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Goldeneye	*Bucephala clangula*
Common Loon	*Gavia immer*
Cooper's Hawk	*Accipiter cooperii*
Coyote	*Canis latrans*
Deer (Black-tailed)	*Odocoileus hemionus columbianus*
Eastern Gray Squirrel	*Sciurus carolinensis*
Ensatina	*Ensatina eschscholtzii*
European Starling	*Sturnus vulgaris*
Gray Wolf	*Canis lupus*
Great Blue Heron	*Ardea herodias*
Great Horned Owl	*Bubo virginianus*

Common Name	Scientific Name
Hooded Merganser	*Lophodytes cucullatus*
House Sparrow	*Passer domesticus*
Marbled Murrelet	*Brachyramphus marmoratus*
Meadow Vole	*Microtus pennsylvanicus*
Myotis (Mouse-eared) Bats	*Myotis* spp.
North American Wolverine	*Gulo gulo*
Northern Flicker	*Colaptes auratus*
Northern Harrier	*Circus cyaneus*
Oregon Vesper Sparrow	*Pooecetes gramineus affinis*
Pileated Woodpecker	*Dryocopus pileatus*
Raccoon	*Procyon lotor*
Red-breasted Nuthatch	*Sitta canadensis*
Red-tailed Hawk	*Buteo jamaicensis*
Rock Pigeon	*Columba livia*
Savannah Sparrow	*Passerculus sandwichensis*
Sharp-shinned Hawk	*Accipiter striatus*
Song Sparrow	*Melospiza melodia*
Spotted Towhee	*Pipilo maculatus*
Steller's Jay	*Cyanocitta stelleri*
Streaked Horned Lark	*Eremophila alpestris strigata*
Swallowtail Butterfly	*Papilio* spp.
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Townsend's Mole	*Scapanus townsendii*
Trumpeter Swan	*Cygnus buccinator*
Tundra Swan	*Cygnus columbianus*
Vaux's Swift	*Chaetura vauxi*
Virginia Opossum	*Didelphis virginiana*
Voles	*Microtus* spp.
Western Grebe	*Aechmophorus occidentalis*
Western Toad	*Anaxyrus boreas*
White-crowned Sparrow	*Zonotrichia leucophrys*
Wood Duck	*Aix sponsa*
Yellow-billed Cuckoo	*Coccyzus americanus*

Plants

Common Name	Scientific Name[a]
American Vetch	*Vicia americana*
Austrian Pine	*Pinus nigra*
Beaked Hazelnut	*Corylus cornuta*
Bentgrass	*Agrostis* sp.
Bigleaf Maple	*Acer macrophyllum*
Bird Cherry	*Prunus avium*
Black Cottonwood	*Populus trichocarpa* (syn: *P. balsamifera* ssp. *trichocarpa trichocarpa*[b] ; *P. balsamifera*[c])
Bluegrass	*Poa* sp.
Bermuda grass	*Cynodon dactylon*
St. John's-wort	*Hypericum perforatum*
Cattail	*Typha latifolia*
Colonial Bentgrass	*Agrostis capillaris*
Common Rush	*Juncus effusus*
Common Snowberry	*Symphoricarpos albus*
Common Spikerush	*Eleocharis palustris*
Common Velvetgrass	*Holcus lanatus*
Creeping Buttercup	*Ranunculus repens*
Cutleaf Blackberry (also, Evergreen Blackberry)	*Rubus laciniatus*
Douglas-fir	*Pseudotsuga menziesii*
Douglas Spiraea (also, Hardhack, Rose Spiraea)	*Spiraea douglasii*
English Ivy	*Hedera helix*
Eurasian Water Milfoil	*Myriophyllum spicatum*
European Hawthorn	*Crataegus monogyna*
European Mountain Ash	*Sorbus aucuparia*
Giant Horsetail	*Equisetum telmateia*
Golden Paintbrush	*Castilleja levisecta*
Grand Fir	*Abies grandis*
Himalayan Blackberry	*Rubus bifrons* (syn: *R. armeniacus*[b, c])
Black Locust	*Robinia pseudoacacia*
Hooker's Willow	*Salix hookeriana*

Common Name	Scientific Name[a]
Kentucky Bluegrass	*Poa pratensis*
Lady Fern	*Athyrium filix-femina* ssp. *cyclosorum* (syn: *A. cyclosorum*[c])
Lombardy Poplar	*Populus nigra*
Norway Maple	*Acer platanoides*
Orange-eye Butterfly-bush	*Buddleja davidii*
Oregon Ash	*Fraxinus latifolia*
Osoberry	*Oemleria cerasiformis*
Pacific Madrone	*Arbutus menziesii*
Pacific Willow	*Salix lasiandra* (syn: *S. lucida* ssp. *lasiandra*[b])
Red Alder	*Alnus rubra*
Red Elderberry	*Sambucus racemosa*
Red Fescue	*Festuca rubra*
Red-osier Dogwood (also, Red Twig Dogwood	*Cornus occidentalis* (syn: *C. sericea*[b], *C. alba*[c])
Reed Canarygrass	*Phalaris arundinacea*
Salal	*Gaultheria shallon*
Salmonberry	*Rubus spectabilis*
Scotch Broom	*Cytisus scoparius*
Scouler's Willow	*Salix scouleriana*
Shore Pine	*Pinus contorta*
Sitka Spruce	*Picea sitchensis*
Sitka Willow	*Salix sitchensis*
Slough Sedge	*Carex obnupta*
Soft-stem Bulrush	*Schoenoplectus tabernaemontani*
Sword Fern	*Polystichum munitum*
Swamp Smartweed	*Persicaria hydropiperoides*
Tall fescue	*Schedonorus arundinaceus*
Twinberry	*Lonicera involucrata*
Violet	*Viola* sp.
Vine Maple	*Acer circinatum*
Western Redcedar	*Thuja plicata*
Willow	*Salix sp.*

---

[a] Source: Hitchcock, C., A. Cronquist, J. Janish, J. Rumely, C. Shin, and N. Porcino. 2018. Flora of the Pacific Northwest: An illustrated manual (D. Giblin, B. Legler, P. Zika, and R. Olmstead, eds.). Seattle: University of Washington Press.

[b] USDA (U.S. Department of Agriculture), NRCS (Natural Resources Conservation Service). 2016. The PLANTS database (http://plants.usda.gov, February 14, 2020). National Plant Data Team, Greensboro, NC.

[c] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The national wetland plant list: 2016 wetland ratings. Phytoneuron 30: 1-17.

Operations and Maintenance Facility South

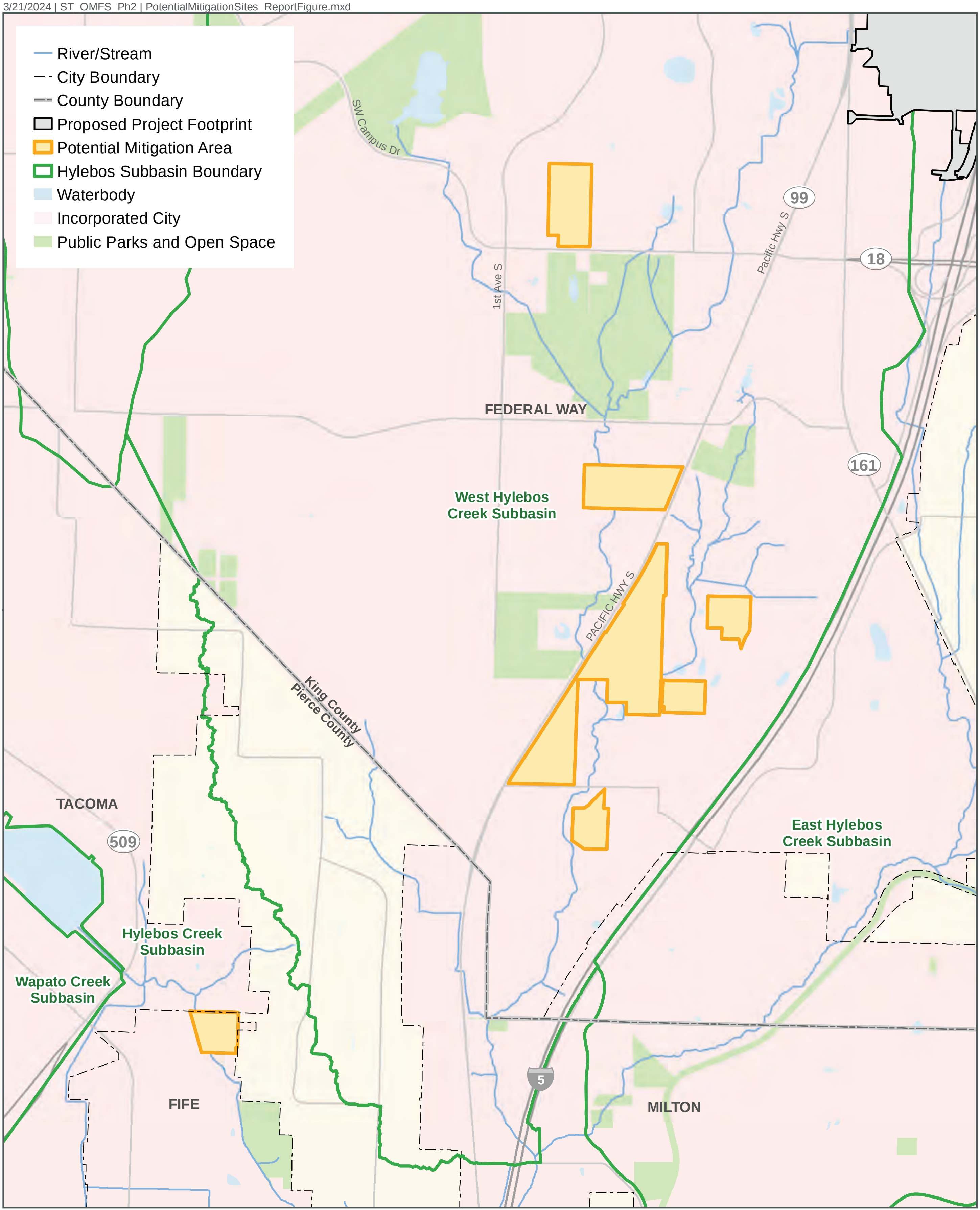
ATTACHMENT G3-8

Preliminary Potential Off-Site Mitigation Areas

Federal Transit Administration

SOUNDTRANSIT

3/21/2024 | ST_OMFS_Ph2 | PotentialMitigationSites_ReportFigure.mxd


River/Stream
City Boundary
County Boundary
Proposed Project Footprint
Potential Mitigation Area
Hylebos Subbasin Boundary
Waterbody
Incorporated City
Public Parks and Open Space
SW Campus Dr
1st Ave S
Pacific Hwy S
99
18
FEDERAL WAY
161
West Hylebos Creek Subbasin
PACIFIC HWY S
King County
Pierce County
TACOMA
509
East Hylebos Creek Subbasin
Hylebos Creek Subbasin
Wapato Creek Subbasin
5
FIFE
MILTON

Data Sources: King and Pierce Counties; Cities of Federal Way, Fife, Milton, Tacoma; WA DNR; NWI.

FIGURE 1
Preliminary Potential Off-Site Mitigation Areas

N

0 0.5 1 Miles

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix G4: Historic and Archaeological Resources Technical Report

SOUND TRANSIT
TRANSIT
SOUND
140A
154B
Link

Federal Transit Administration

SOUNDTRANSIT

June 2024

Summary

The Central Puget Sound Regional Transit Authority (Sound Transit) proposes to construct and operate an operations and maintenance facility in its South Corridor to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound. The Operations and Maintenance Facility South (OMF South) would be used to store, maintain, and deploy approximately 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which in southern King County is the Federal Way Link Extension. The length and location of these connecting tracks varies by alternative. Three site alternatives for the proposed project were evaluated in a State Environmental Policy Act (SEPA) Draft Environmental Impact Statement (EIS) published on March 5, 2021: two in Federal Way and one in Kent. These alternatives are named the Preferred Alternative, South 344th Street Alternative, and Midway Landfill Alternative, respectively.

After publication of the 2021 SEPA Draft EIS, Sound Transit identified potential funding opportunities with the Federal Transit Administration (FTA). Subsequently, FTA issued a notice of intent to prepare an EIS under the National Environmental Policy Act (NEPA) in the Federal Register on July 19, 2023. To reduce duplication of process, FTA and Sound Transit prepared a combined NEPA/SEPA document that served as a Draft EIS under NEPA and a Draft Supplemental EIS under SEPA. This report is an appendix to the Final EIS.

As lead agency under SEPA, Sound Transit commissioned a cultural resource study for the three alternatives within the Area of Potential Effects (APE). Project tasks included the preparation of a methods memorandum and Cultural Resources Survey Plan, which were provided to the Washington State Department of Archaeology and Historic Preservation and coordinating Tribes for review. Those Tribes consisted of the Muckleshoot Indian Tribe, the Nisqually Indian Tribe, the Puyallup Tribe of the Puyallup Reservation, and the Confederated Tribes and Bands of the Yakama Nation. This report includes results of the cultural resources survey conducted for the project and recommendations.

The three OMF South site alternatives were surveyed for archaeological resources over multiple field sessions. No archaeological resources within the APE have previously been determined eligible for or listed in the National Register of Historic Places, Washington Heritage Register, or King County Register of Historic Places. Additionally, these surveys did not identify any archaeological resources that meet the necessary eligibility criteria for those registers. Sound Transit has developed an Inadvertent Discovery Plan to guide procedures for identifying and addressing inadvertent discovery of archaeological resources prior to construction. Further investigations of the mainline sections of the Preferred and South 344th Street alternatives that overlap the Tacoma Dome Link Extension study area were conducted in 2021 after the archaeological surveys were completed for OMF South. These investigations did not identify any archaeological resources that meet the necessary eligibility criteria for the National Register of Historic Places, Washington Heritage Register, or King County Register of Historic Places.

As lead agency under NEPA, FTA initiated Section 106 consultation and requested comments on the APE in letters dated July 20, 2023 to the Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of the Puyallup Reservation, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Confederated Tribes and Bands of the Yakama Nation, State Historic Preservation Officer, and the Bonneville Power Association.

A total of 86 historic-period, built-environment resources were surveyed within the APE for the three proposed OMF South site alternatives. No historic, built-environment resources within the APE have previously been determined eligible or listed in the National Register of Historic Places, Washington Heritage Register, or King County Register of Historic Places, with the exception of the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines, determined eligible for listing in the NRHP. Under a separate evaluation, the Bonneville Power Association determined that raising the transmission lines to accommodate the OMF South project would have no adverse effect on historic properties under Section 106, a finding with which the State Historic Preservation Officer has concurred (see Attachment G4-6). Subsequently, FTA determined, and the State Historic Preservation Officer concurred, that the OMF South project would have no adverse effect on historic properties under Section 106. Additionally, the surveys did not identify any other historic, built-environment resources that met criteria necessary for being eligible for those registers.

Table of Contents

1 INTRODUCTION G4-1
1.1 Project Description G4-2
1.2 Purpose of the Report G4-8
1.3 Key Personnel G4-8
1.4 Regulatory Context G4-9
1.4.1 NRHP Requirements for Listing G4-10
1.4.2 Additional Historic Register Criteria for Listing G4-11
1.5 Agency and Tribal Coordination G4-12
1.6 Area of Potential Effects G4-14

2 PREVIOUS CULTURAL RESOURCE STUDIES AND RESULTS G4-18
2.1 Preferred Alternative G4-18
2.1.1 Cultural Resources Surveys G4-18
2.1.2 Ethnographic Places G4-20
2.1.3 Archaeological Sites G4-20
2.1.4 NRHP-Listed or Eligible Historic, Built-Environment Properties G4-20
2.1.5 King County Landmarks G4-20
2.1.6 Historic Maps and Aerial Photographs G4-21
2.2 South 344th Street Alternative G4-21
2.2.1 Cultural Resources Surveys G4-21
2.2.2 Ethnographic Places G4-22
2.2.3 Archaeological Sites G4-23
2.2.4 NRHP-Eligible or Listed Historic, Built-Environment Properties G4-23
2.2.5 King County Landmarks G4-23
2.2.6 Historic Maps and Aerial Photographs G4-23
2.3 Midway Landfill Alternative G4-24
2.3.1 Cultural Resources Surveys G4-24
2.3.2 Ethnographic Places G4-25
2.3.3 Archaeological Sites G4-26
2.3.4 NRHP-Listed or Eligible Historic, Built-Environment Properties G4-26
2.3.5 King County Landmarks G4-26
2.3.6 Historic Maps and Aerial Photographs G4-26

3 NATURAL AND CULTURAL CONTEXT G4-28
3.1 Environmental Context G4-28
3.2 Ethnohistoric Period G4-32
3.3 Historic Period G4-33
3.4 Additional Alternative-Specific, Historic Context G4-36

3.4.1 Preferred Alternative G4-36
3.4.2 South 344th Street Alternative G4-37
3.4.3 Midway Landfill Alternative G4-38

4 ARCHAEOLOGICAL EXPECTATIONS G4-40

4.1 Alternative-Specific Cultural Sensitivity Summaries G4-40
4.1.1 Preferred Alternative G4-40
4.1.2 South 344th Street Alternative G4-40
4.1.3 Midway Landfill Alternative G4-41

4.2 Expectations G4-41

5 METHODS G4-43

5.1 Archaeological Investigations G4-43
5.1.1 Areas Contaminated by Biohazards G4-44
5.1.2 COVID-19 Protocols G4-44
5.1.3 Site-Specific Investigation Methods G4-44

5.2 Built-Environment Survey and Inventory G4-45
5.2.1 Field Survey G4-46

6 RESULTS G4-47

6.1 Archaeological Survey and Results G4-47
6.1.1 Field Survey G4-47
6.1.2 NRHP Eligibility Recommendation G4-78

6.2 Historic-Period, Built-Environment Survey Results G4-80

7 CONCLUSIONS AND RECOMMENDATIONS G4-85

7.1 Preferred Alternative G4-85
7.1.1 Archaeological Recommendation G4-85
7.1.2 Historic, Built-Environment Properties Recommendations G4-85

7.2 South 344th Street Alternative G4-85
7.2.1 Archaeological Recommendations G4-85
7.2.2 Historic, Built-Environment Properties Recommendations G4-86

7.3 Midway Landfill Alternative G4-86
7.3.1 Archaeological Recommendations G4-86
7.3.2 Historic, Built-Environment Properties Recommendations G4-86

7.4 Summary of Recommendations and Effects G4-87

8 REFERENCES G4-88

Figures

Figure G4.1-1 Project Vicinity: OMF South alternatives G4-3
Figure G4.1-2 Conceptual Layout: Preferred Alternative G4-4
Figure G4.1-3 Conceptual Layout: South 344th Street Alternative G4-5
Figure G4.1-4 Conceptual Layout: Midway Landfill Alternative G4-6
Figure G4.1-5 Mainline Track Options....G4-7
Figure G4.1-6 Area of Potential Effects: Preferred Street Alternative G4-15
Figure G4.1-7 Area of Potential Effects: South 344th Street Alternative....G4-16
Figure G4.1-8 Area of Potential Effects: Midway Landfill Alternative G4-17
Figure G4.6-1 Archaeological Rights of Entry: Preferred Alternative Mainline G4-49
Figure G4.6-2 Archaeological Rights of Entry: Preferred Alternative G4-50
Figure G4.6-3 Archaeological Survey Results: Preferred Alternative Mainline G4-51
Figure G4.6-4 Archaeological Survey Results: Preferred Alternative G4-52
Figure G4.6-5 View of the wetlands catch basin from S 336th Street, OMF 152, view south G4-53
Figure G4.6-6 Paved areas partially surrounded by ornamental green space, OMF 151, view west....G4-53
Figure G4.6-7 Drainage pond with restricted access, OMF 151, view east G4-53
Figure G4.6-8 View of the levee along the western boundary of OMF 152, view north....G4-53
Figure G4.6-9 Surface conditions with extensive vegetation within OMF 179, view north....G4-54
Figure G4.6-10 Easily accessible portion of OMF 179 with a surface scatter of modern debris, view northeast G4-54
Figure G4.6-11 Archaeological Rights of Entry: South 344th Street Alternative Mainline G4-56
Figure G4.6-12 Archaeological Rights of Entry: South 344th Street Alternative G4-57
Figure G4.6-13 Archaeological Survey Results: South 344th Street Alternative Mainline G4-58
Figure G4.6-14 Archaeological Survey Results: South 344th Street Alternative....G4-59
Figure G4.6-15 Surface Conditions of the WSDOT Right-of-Way Adjacent to the Midway Landfill....G4-60
Figure G4.6-16 Archaeological Rights of Entry: Midway Landfill Alternative....G4-61
Figure G4.6-17 Archaeological Survey Results: Midway Landfill Alternative G4-62
Figure G4.6-18 Portion of the golf course at Belmor within area of potential ground disturbance, view south....G4-63
Figure G4.6-19 Marked buried natural gas pipeline (yellow paint) on the west side of 24th Avenue S, view north G4-63
Figure G4.6-20 Sports field on the Christian Faith Center parcel, view northeast....G4-63
Figure G4.6-21 Artificial wetland pond on WSDOT parcel at the east end of S 344th Street, view southeast G4-63

Figure G4.6-22 Archaeological Survey Results: OMF South and TDLE Overlap Area G4-64
Figure G4.6-23 Wooded area within the WSDOT right-of-way east of the Christian Faith Center property, view north G4-65
Figure G4.6-24 Disturbed area with Himalayan blackberry cover south of S 344th Street, view north G4-65
Figure G4.6-25 Shovel Probe SP-117 at completion of excavation (85 centimeters [2.8 feet] below ground surface) G4-66
Figure G4.6-26 Shovel probe SP-78 at completion of excavation (80 centimeters [2.6 feet] below ground surface) near Hylebos Creek G4-66
Figure G4.6-27 Site 45KI1542 Investigation Results: Preferred Alternative G4-67
Figure G4.6-28 Concrete pad with disturbed perimeter foundation, view southeast G4-68
Figure G4.6-29 View of concrete basement with demolition debris, view east G4-68
Figure G4.6-30 Cleared vegetation for excavation (SP01-17), view northeast G4-68
Figure G4.6-31 1936/1937 and 1957 Historic Aerials of Site 45KI1542 ....G4-69
Figure G4.6-32 King County Tax Assessors Record, 1938 ....G4-70
Figure G4.6-33 Site 45KI1543 Investigation Results: Preferred and South 344th Street Alternatives G4-72
Figure G4.6-34 1936/1937, 1957, and 1991 Historic Aerials of Site 45KI1543 ....G4-73
Figure G4.6-35 Overview of Site 45KI1543 landform, northeast corner, view south-southwest G4-74
Figure G4.6-36 Overview of Site 45KI1543 landform with utilities and the gravel road, SP02-27, southeast corner, view north-northwest G4-74
Figure G4.6-37 Typical soil strata, brown fill over orangish-brown glacial till, SP02-06 ....G4-74
Figure G4.6-38 Metal and glass debris Strata 1, SP02-28 ....G4-75
Figure G4.6-39 Cut stone fragments identified Strata 1, SP02-28 ....G4-75
Figure G4.6-40 Mixed gravel and brick fragments Strata 1, SP02-28 ....G4-75
Figure G4.6-41 Glass and brick debris Strata 2, SP02-01 ....G4-75
Figure G4.6-42 Typical debris concentration encountered in shovel probes across the site, SP02-28 ....G4-75
Figure G4.6-43 Detail of typical debris scatter strata with a low, sharply defined stratum boundary, SP02-28 ....G4-75
Figure G4.6-44 Isolate 45KI1583 location, view north/northwest G4-76
Figure G4.6-45 1966 amber glass beer bottle (Isolate 45KI1583) G4-76
Figure G4.6-46 Isolate 45KI1583 Investigation Results: OMF South and TDLE Overlap Area G4-77

Tables

Table G4.1-1 Key Personnel....G4-8

Table G4.1-2 Tribal and Agency Correspondence....G4-13

Table G4.2-1 Cultural Resource Surveys Conducted within a 1-Mile Radius of the Preferred Alternative....G4-19

Table G4.2-2 Recorded Ethnographic Places within a 1-Mile Radius of the Preferred Alternative Area of Potential Effect....G4-20

Table G4.2-3 Cultural Resource Surveys Conducted within a 1-Mile Radius of the South 344th Street Alternative....G4-22

Table G4.2-4 Recorded Ethnographic Places within a 1-Mile Radius of the South 344th Street Alternative Area of Potential Effects....G4-23

Table G4.2-5 Cultural Resource Surveys Conducted within a 1-Mile Radius of the Midway Landfill Alternative....G4-24

Table G4.2-6 Recorded Ethnographic Places within a 1-Mile Radius of the Midway Landfill Alternative Area of Potential Effects....G4-25

Table G4.6-1 Surveyed Resources in the OMF South Area of Potential Effects....G4-80

Attachments

Attachment G4-1 Historic Aerials

Attachment G4-2 Archaeological Shovel Probe Log

Attachment G4-3 Archaeological Site Forms

Attachment G4-4 Surveyed Architectural Resources

Attachment G4-5 Historic Property Inventory Forms

Attachment G4-6 Tribal and Agency Correspondence

Attachment G4-7 Inadvertent Discovery Plan

Acronyms and Abbreviations

APE	Area of Potential Effects
ATCRC	Aqua Terra Cultural Resource Consultants
BP	before present
BPA	Bonneville Power Association
Belmor	Belmor Mobile Home Park
CFR	Code of Federal Regulations
DAHP	Washington State Department of Archaeology and Historic Preservation
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
fbgs	feet below ground surface
FTA	Federal Transit Administration
FWLE	Federal Way Link Extension
GIS	geographic information system
GLO	General Land Office
GPS	global positioning system
HBC	Hudson’s Bay Company
HOV	high occupancy vehicle
HPI	Historic Property Inventory
HRA	Historical Research Associates, Inc.
IDP	Inadvertent Discovery Plan
I-5	Interstate 5
KCRHP	King County Register of Historic Places
LRV	light rail vehicle
MOW	Maintenance of Way
N/A	not applicable
NCRS	Natural Resource Conservation Service
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPL	National Priorities List
NRHP	National Register of Historic Places
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
OSHA	Occupational Safety and Health Administration
RCW	Revised Code of Washington

SEPA	Washington State Environmental Policy Act
SHPO	State Historic Preservation Officer
Sound Transit	Central Puget Sound Regional Transit Authority
SR	State Route
STP	shovel probe unit
THPO	Tribal Historic Preservation Officer
USGS	United States Geological Survey
WAC	Washington Administrative Code
WaDGER	Washington Division of Geology and Earth Resources
WHR	Washington Historic Register
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

The Central Puget Sound Regional Transit Authority (Sound Transit), in consultation with the Federal Transit Administration (FTA), proposes to expand light rail into southern King County and northern Pierce County. Sound Transit proposes to build an operations and maintenance facility (OMF) to support the light rail fleet necessary to extend light rail into Sound Transit's South Corridor, which will serve future growth in ridership systemwide. Three site alternatives for the proposed project were evaluated in a State Environmental Policy Act (SEPA) Draft Environmental Impact Statement (EIS) published on March 5, 2021: two in Federal Way and one in Kent. These alternatives are the South 336th Street Alternative (the Preferred Alternative), South 344th Street Alternative, and Midway Landfill Alternative, respectively.

After publication of the 2021 SEPA Draft EIS, Sound Transit identified potential funding opportunities with the Federal Transit Administration (FTA). Subsequently, FTA issued a notice of intent to prepare an EIS under the National Environmental Policy Act (NEPA) in the Federal Register on July 19, 2023. To reduce duplication of process, FTA and Sound Transit prepared a combined NEPA/SEPA document. Since a Draft EIS under SEPA was already published, the document served as a Draft EIS under NEPA and a Draft Supplemental EIS under SEPA, referred to as the Draft EIS herein. FTA is the lead federal agency under NEPA, while Sound Transit is the lead agency under SEPA. This report is an appendix to the Final EIS.

In support of the project, Parametrix and HDR Engineering, Inc., under contract to the Sound Transit, contracted with Aqua Terra Cultural Resource Consultants (ATCRC) and Historic Research Associates, Inc. (HRA), who jointly provided cultural resources services for the project. Project tasks included the preparation of a methods memo and a Cultural Resources Survey Plan, which were reviewed by the State Historic Preservation Officer (SHPO) and coordinating tribes. These tribes consist of the Puyallup Tribe of the Puyallup Reservation (Puyallup Tribe of Indians), the Muckleshoot Indian Tribe, the Nisqually Indian Tribe, and the Confederated Tribes and Bands of the Yakama Nation. This report includes the results of background review, field investigation, and the evaluation of identified archaeological and historic-period, built-environment resources within the Area of Potential Effects (APE) for each alternative.

The results of the cultural resource investigations were used to inform the alternatives analysis for historic and archaeological resources in the 2021 SEPA Draft EIS. Resources that were constructed in 1985 or earlier were included in the built-environment survey and inventory. For the 2021 SEPA Draft EIS Sound Transit evaluated 86 historic-period, built-environment resources for National Register of Historic Places (NRHP) eligibility and coordinated with staff from the Washington State Department of Archaeology and Historic Preservation (DAHP) to assess NRHP eligibility of the built-environment resources. Through this coordination, it was determined that none of the resources evaluated by Sound Transit were eligible for listing in the NRHP.

The project is receiving funding from the FTA and is defined as a federal undertaking. As such, the project must comply with Section 106 of the National Historic Preservation Act (NHPA); see additional discussion in Section 1.2 below. This technical report uses the research and reporting prepared for the 2021 SEPA Draft EIS and updates the regulatory context to meet the requirements of Section 106. On July 20, 2023, FTA initiated Section 106 consultation and requested comments on the APE with SHPO and the Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, and Confederated Tribes and Bands of the Yakama Nation. SHPO concurred with the APE on July 24, 2023. In October 2023, FTA determined, and SHPO concurred, that the project would have no adverse effect to resources listed on or eligible for the NRHP (See Attachment G4-6, Tribal and Agency Correspondence).

In support of this Historical and Archaeological Resources Technical Report, additional information can be found in Attachments G4-1 through G4-7.

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility in its South Corridor (OMF South) to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy approximately 144 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way (MOW) building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

Three site alternatives for the proposed project are evaluated in the Final EIS along with a No Build Alternative. The Preferred Alternative is shown in Figure G4.1-2, the South 344th Street Alternative is shown in Figure G4.1-3, and the Midway Landfill Alternative is shown in Figure G4.1-4.

OMF South would need to have tracks connecting to a light rail line that will be operating when the facility is planned to open, which in southern King County is the Federal Way Link Extension (FWLE). The length and location of these connecting tracks varies by alternative. The Preferred Alternative would require the construction of approximately 1.4 miles of mainline tracks and the South 344th Street Alternative would require approximately 1.8 miles of mainline tracks. The Midway Landfill Alternative is adjacent to FWLE and would connect by lead tracks directly to the FWLE mainline tracks. The Preferred and South 344th Street alternative mainlines include tail tracks that extend approximately 1,000 feet past the site to allow trains to turnaround and access the site from the south if the northern lead tracks were out of service.

The Preferred and South 344th Street alternative would also include a test track to prepare new vehicles for service. The test track would run east of and parallel to the mainline connecting the sites to FWLE (Figure G4.1-2 and G4.1-4). Figure G4.1-5 shows the mainline track options. The Midway Landfill Alternative would not include a test track because the varying grades of the existing mainline tracks make it infeasible. Due to this, this analysis assumes that LRV testing would occur on the mainline tracks.

In addition to the features identified above, the Preferred Alternative includes the extension of 18th Place S between S 340th Street and S 336th Street to replace the functions of 20th Avenue S, which would be vacated, and the extension of 21st Ave S south to S 344th Street to meet Federal Way code requirements.

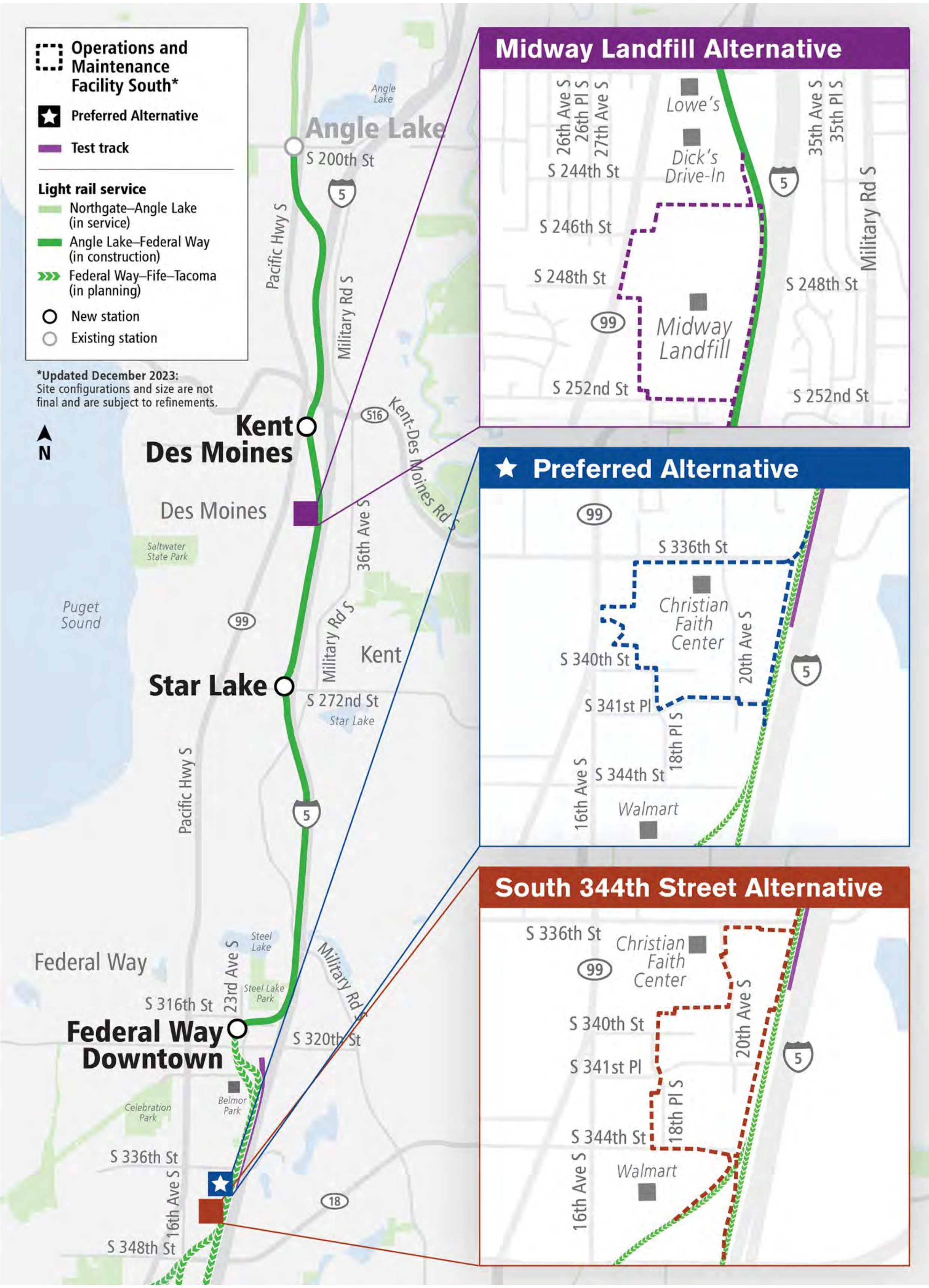
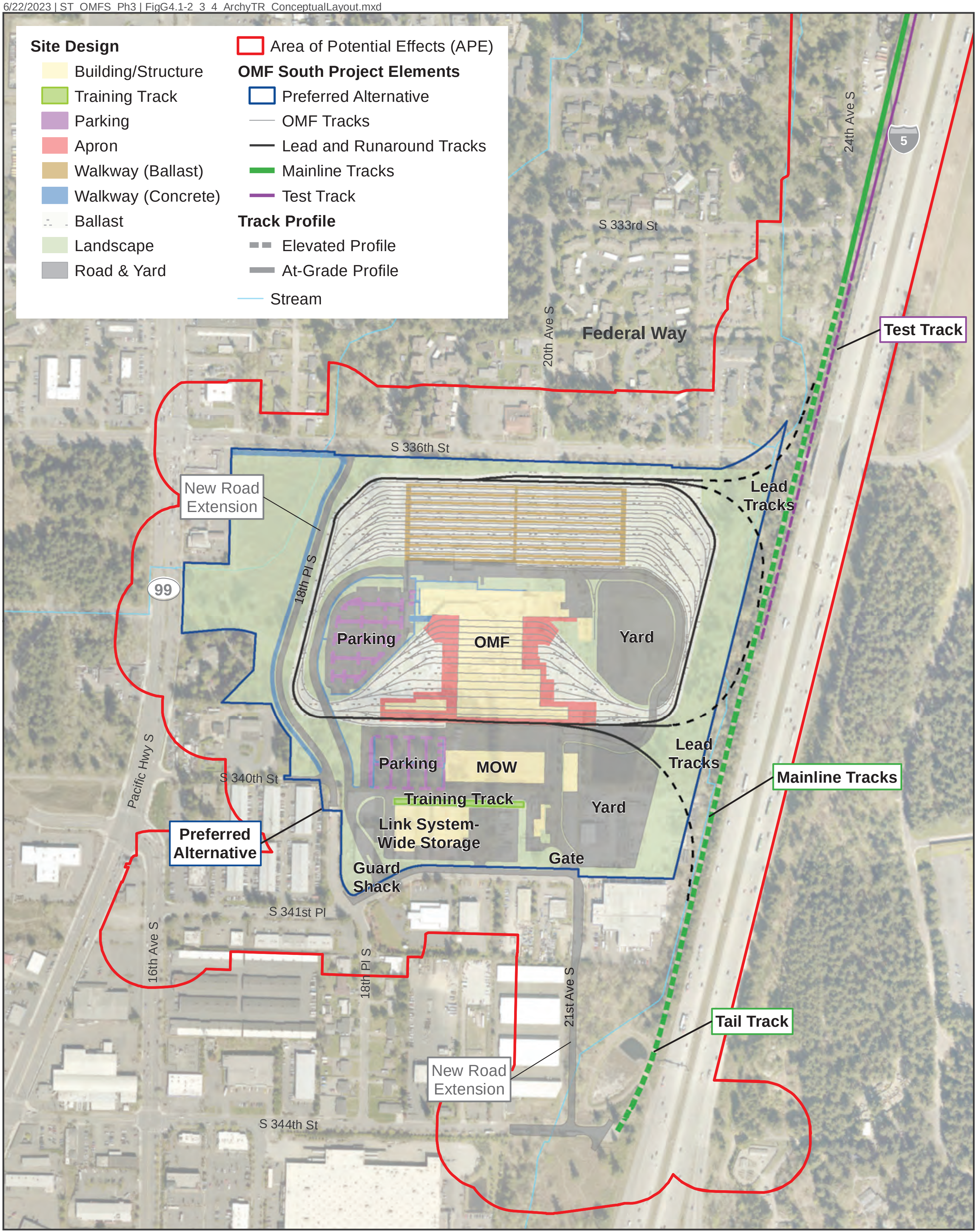

Operations and Maintenance Facility South*
Preferred Alternative
Test track
Light rail service
Northgate–Angle Lake (in service)
Angle Lake–Federal Way (in construction)
Federal Way–Fife–Tacoma (in planning)
New station
Existing station
*Updated December 2023: Site configurations and size are not final and are subject to refinements.
N
Angle Lake
S 200th St
Pacific Hwy S
Military Rd S
Kent Des Moines
Des Moines
516
Kent-Des Moines Rd S
36th Ave S
Saltwater State Park
Puget Sound
99
Kent
Star Lake
S 272nd St
5
Federal Way
Steel Lake
Steel Lake Park
Military Rd
S 316th St
23rd Ave S
Federal Way Downtown
S 320th St
Belmor Park
Celebration Park
S 336th St
16th Ave S
18
S 348th St
Midway Landfill Alternative
26th Ave S
26th Pl S
27th Ave S
Lowe's
Dick's Drive-In
35th Ave S
35th Pl S
S 244th St
S 246th St
S 248th St
Military Rd S
Midway Landfill
S 252nd St
Preferred Alternative
S 336th St
Christian Faith Center
20th Ave S
S 340th St
S 341st Pl
18th Pl S
S 344th St
Walmart
South 344th Street Alternative

Figure G4.1-1 Project Vicinity: OMF South alternatives

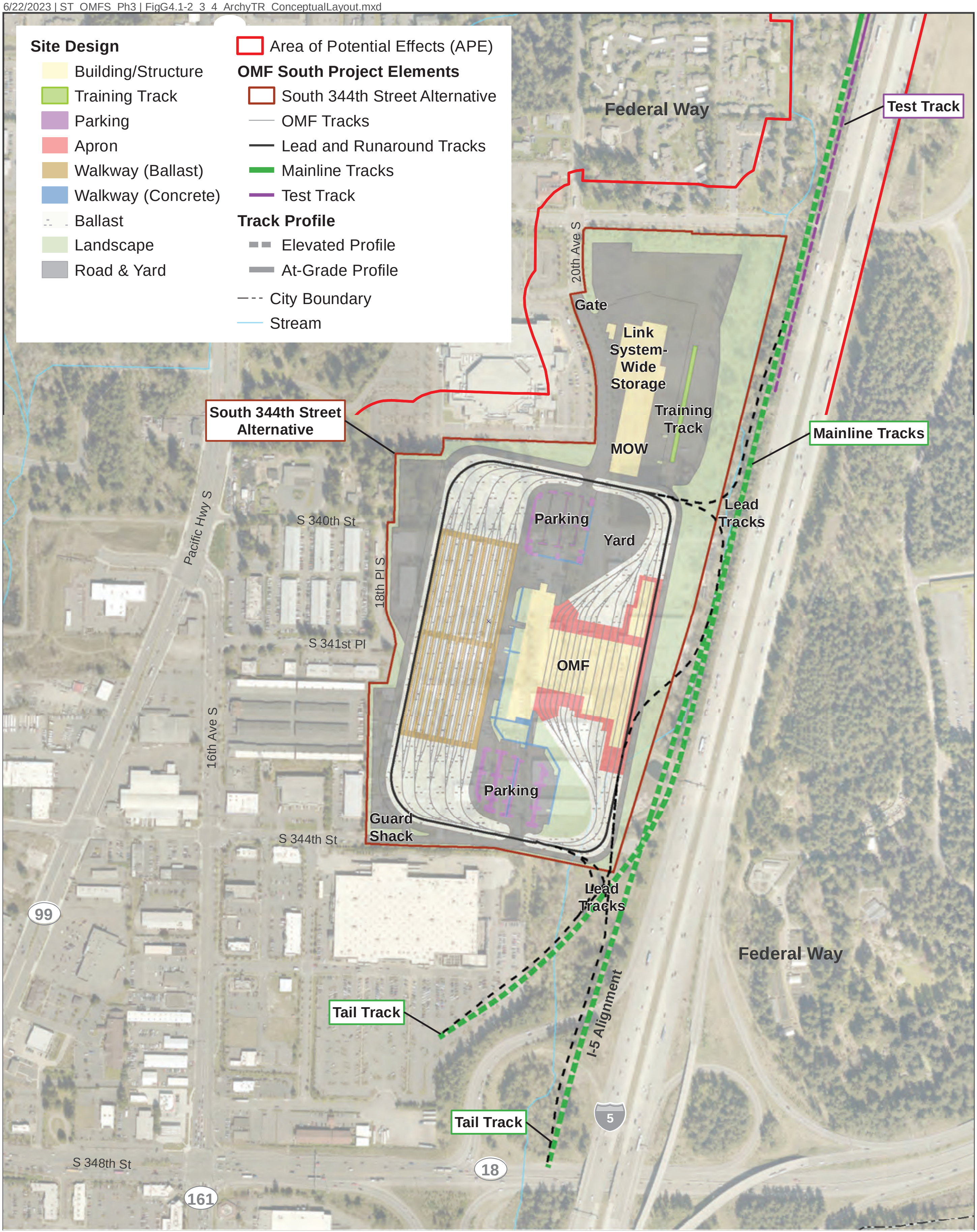

Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
Area of Potential Effects (APE)
OMF South Project Elements
Preferred Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Stream
5
24th Ave S
S 333rd St
20th Ave S
Federal Way
Test Track
S 336th St
Lead Tracks
New Road Extension
99
18th Pl S
Parking
OMF
Yard
Lead Tracks
Mainline Tracks
Pacific Hwy S
S 340th St
Parking
MOW
Training Track
Yard
Link System-Wide Storage
Preferred Alternative
Guard Shack
Gate
S 341st Pl
16th Ave S
18th Pl S
21st Ave S
Tail Track
New Road Extension
S 344th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G4.1-2
Conceptual Layout
Preferred Alternative

OMF South

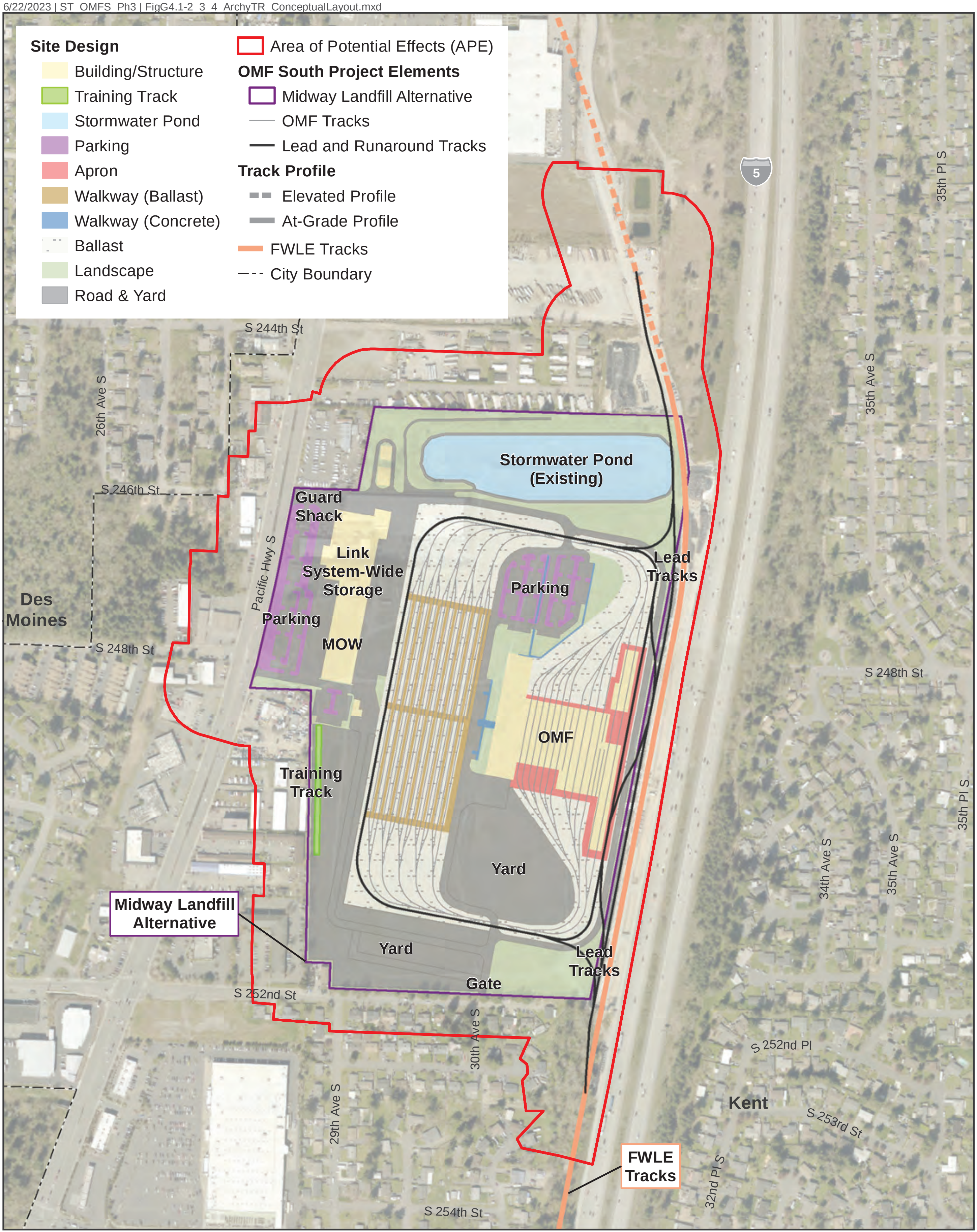

Site Design
Building/Structure
Training Track
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
Area of Potential Effects (APE)
OMF South Project Elements
South 344th Street Alternative
OMF Tracks
Lead and Runaround Tracks
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Stream
Federal Way
Test Track
20th Ave S
Gate
Link System-Wide Storage
Training Track
MOW
Mainline Tracks
South 344th Street Alternative
Pacific Hwy S
S 340th St
18th Pl S
Parking
Yard
Lead Tracks
S 341st Pl
OMF
16th Ave S
Parking
Guard Shack
S 344th St
Lead Tracks
99
Federal Way
Tail Track
I-5 Alignment
Tail Track
5
18
S 348th St
161

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G4.1-3
Conceptual Layout
South 344th Street Alternative

OMF South

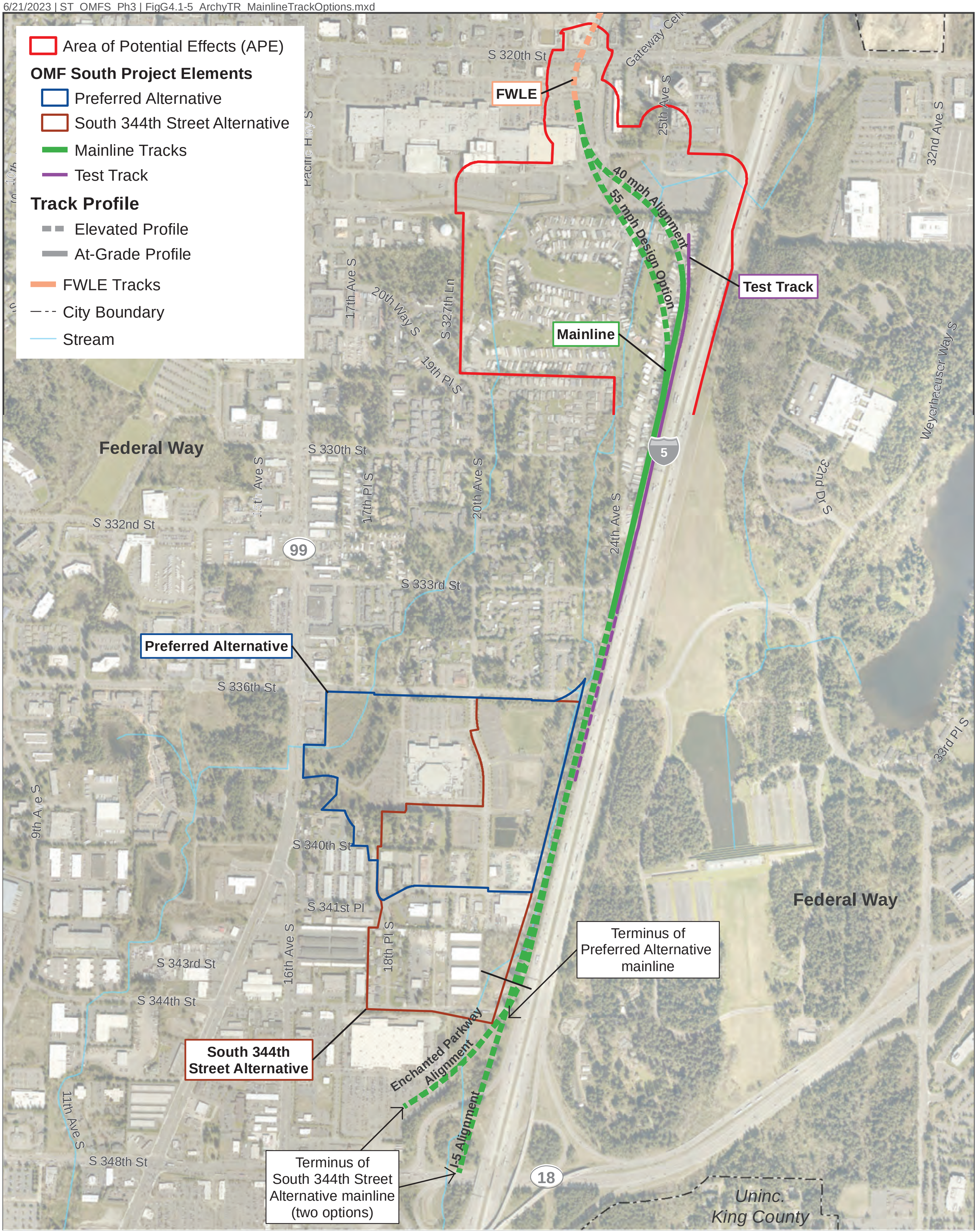

Site Design
Building/Structure
Training Track
Stormwater Pond
Parking
Apron
Walkway (Ballast)
Walkway (Concrete)
Ballast
Landscape
Road & Yard
Area of Potential Effects (APE)
OMF South Project Elements
Midway Landfill Alternative
OMF Tracks
Lead and Runaround Tracks
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
5
35th Pl S
S 244th St
26th Ave S
S 246th St
Stormwater Pond (Existing)
Guard Shack
Link System-Wide Storage
Pacific Hwy S
Parking
MOW
Des Moines
S 248th St
Lead Tracks
Parking
35th Ave S
S 248th St
OMF
Training Track
Yard
35th Pl S
34th Ave S
35th Ave S
Midway Landfill Alternative
Yard
Lead Tracks
Gate
S 252nd St
30th Ave S
S 252nd Pl
Kent
S 253rd St
29th Ave S
FWLE Tracks
32nd Pl S
S 254th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4.1-4
Conceptual Layout
Midway Landfill Alternative

OMF South

6/21/2023 | ST_OMFS_Ph3 | FigG4.1-5_ArchyTR_MainlineTrackOptions.mxd


Area of Potential Effects (APE)
OMF South Project Elements
Preferred Alternative
South 344th Street Alternative
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
FWLE Tracks
City Boundary
Stream
FWLE
S 320th St
Gateway Cen
25th Ave S
32nd Ave S
Pacific Hwy S
40 mph Alignment
55 mph Design Option
Test Track
Mainline
17th Ave S
20th Way S
S 327th Ln
19th Pl S
Weyerhaeuser Way S
Federal Way
S 330th St
5
21st Ave S
17th Pl S
20th Ave S
24th Ave S
32nd Dr S
S 332nd St
99
S 333rd St
Preferred Alternative
S 336th St
33rd Pl S
9th Ave S
S 340th St
S 341st Pl
Federal Way
S 343rd St
16th Ave S
18th Pl S
Terminus of Preferred Alternative mainline
S 344th St
South 344th Street Alternative
Enchanted Parkway Alignment
11th Ave S
I-5 Alignment
S 348th St
Terminus of South 344th Street Alternative mainline (two options)
18
Uninc. King County

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
1,000
2,000 Feet

FIGURE G4.1-5
Mainline Track Options
Preferred and South 344th Street Alternatives

1.2 Purpose of the Report

HRA and ATCRC prepared this cultural resources technical report documenting the findings of architectural and archaeological survey and inventory investigations within the defined APE for the project.

1.3 Key Personnel

Cultural resources inventory, survey work, and NRHP evaluations were performed by the consultants identified in Table G4.1-1. This document refers to this work as being conducted by Sound Transit and the NRHP eligibility recommendations as Sound Transit's recommendations.

Table G4.1-1 Key Personnel

Name	Qualifications	Roles and Responsibilities
Ron Adams, RPA	Master of Archaeology, PhD Archaeology, Senior Archaeologist	Principal Investigator, Archaeologist, Historical Research Associates, Inc.
Sarah Amell, RPA	Master of Maritime Archaeology, Principal Archaeologist	Project Manager for Archaeology Field Staff, Aqua Terra Cultural Resources Consultants
Andrew Viloudaki, M.A	Master of Anthropology, Project Archaeologist	Principal Investigator, Archaeologist, Aqua Terra Cultural Resources Consultants
Natalie Perrin	Master of Historic Preservation, Principal Architectural Historian	Architectural Historian, Historical Research Associates
Chrisanne Beckner	Master of Historic Preservation, Senior Architectural Historian	Principal Investigator and Architectural Historian, Historical Research Associates
Brent Hicks, MA, RPA	Master of Archaeology, Principal Archaeologist	Project Manager, Historical Research Associates
Michele Punke, RPA	Master of Anthropology/Geosciences, PhD Physical Geography, Senior Archaeologist and Geoarchaeologist	Principal Geoarchaeologist

HRA conducted the built-environment survey for the project. HRA Principal Investigator Chrisanne Beckner, MS, who meets the Secretary of the Interior's professional qualification standards for architectural history, conducted a field survey for the project and authored sections of this report in partnership with Natalie Perrin, HRA's principal architectural historian.

HRA, supported by an ATCRC field crew, conducted the near-surface archaeological inventory and survey for the project. HRA archaeologist Ron Adams led a field team and compiled sections of this report under project manager Brent Hicks. The ATCRC team conducted the near-surface archaeological inventory for the project and compiled sections of this report under project manager Sarah Amell.

1.4 Regulatory Context

OMF South must comply with multiple federal, state, and local environmental laws, regulations, and policies for environmental review. A brief discussion of these and their consideration of cultural resources is presented below.

FTA is the lead agency under NEPA. Under NEPA, cultural resources encompass a wide range of resources including, but not limited to, sacred sites, archaeological and built-environment resources not eligible for the NRHP, archaeological and built-environment resources eligible for the NRHP, and archaeological collections.

As federal funding is anticipated and the project is defined as a federal undertaking, it is subject to compliance with Section 106 of the NHPA, as amended, codified in 54 U.S. Code § 300101 et seq. Implementing regulations for Section 106 compliance are described in 36 Code of Federal Regulations (CFR) Part 800. Section 106 requires that federal agencies account for the effects of their undertakings on historic properties. A historic property is typically aged 50 years or older and is defined in 36 CFR § 800.16(l)(1) as follows:

> … any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Regulations at 36 CFR Part 800 require the federal agency involved in the undertaking to identify the APE, conduct an inventory of historic properties that may be located within the APE, determine whether any of the historic properties identified are eligible for listing in the NRHP, and determine whether NRHP-eligible properties will be affected by the undertaking. An APE is defined in 36 CFR § 800.16(d) as follows:

> … the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking …

In addition to Section 106, Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S. Code § 303[c]) is triggered by funding or approval from a federal agency for a project that proposes “use” of historic property. A determination of adverse effect under Section 106 generally constitutes a use under Section 4(f).

The project must also comply with SEPA. Sound Transit is the lead agency for SEPA compliance. The project is subject to other Washington state laws that address the protection of archaeological sites and Native American burials. For example, the Archaeological Sites and Resources Protection Act (Revised Code of Washington [RCW] 27.53), prohibits disturbance of known precontact and historic archaeological sites on public or private lands. The Indian Graves and Records Act (RCW 27.44) prohibits disturbance of Native American graves and provides that inadvertent disturbance through construction or other activity requires reinternment under supervision of the appropriate tribes.

Certified Local Governments are considered the experts on whether resources meet the criteria for local listing in city or county preservation registers. Consulting parties, including SHPO, provide expert opinions on whether a proposed project has the potential to adversely impact cultural resources.

The King County Register of Historic Places (KCRHP) is a Certified Local Government and has a different timeline: a historic, built-environment resource may be designated as a King County Landmark if it is more than 40 years old or, in the case of a landmark district, contains resources that are more than 40 years old. This differs from NRHP, which requires that a property be at least 50 years old unless it is exceptionally important. The King County Landmark eligibility recommendations here are based on review of the King County Landmarks Commission ordinance (King County Code Chapter 20.62; King County Policy LUD 16-1 [AEP]). The cities of Federal Way and Kent have both adopted this section of the King County Code concerning the protection and preservation of landmarks.

Other local regulations that were reviewed during the assessment included the following:

- City of Federal Way Code Chapter 19.285, Protection and Preservation of Landmarks, which adopts King County Code Chapter 20.26.
- Kent City Code Chapter 14.12, Landmark Designation and Preservation, which adopts King County Code Chapter 20.26, under Ordinance No. 3809.

1.4.1 NRHP Requirements for Listing

1.4.1.1 Criteria for Significance

To be eligible for listing in the NRHP, a resource must meet one of four criteria for significance and possess sufficient integrity to express its significance (NPS 1995).

Sound Transit evaluates resources using the following guidelines established by the National Park Service. To be individually eligible for listing in the NRHP, a property must be significant under one of the following criteria:

- Criterion A: Under Criterion A, properties can be determined eligible for listing in the NRHP if they are associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B: Under Criterion B, properties can be determined eligible for listing in the NRHP if they are associated with the lives of persons significant in our past (i.e., persons whose activities are demonstrably important within a local, state, or national context).
- Criterion C: Under Criterion C, properties can be determined eligible for listing in the NRHP if they embody the distinctive characteristics of a type, period, or method of construction, represent the works of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., are part of a district). Discrete features, a particular building for example, may best be documented under this Criterion, though collections of resources may also have significance under Criterion C for architecture or engineering association.
- Criterion D: Under Criterion D, properties may be eligible for the NRHP if they have yielded, or may be likely to yield, information important in history. To be eligible under Criterion D, the property must have, or have had, information to contribute to our understanding of human history and that information must be considered “important” (NPS 1997). Most commonly applied to archaeological sites, buildings, structures, and objects may be eligible under Criterion D if they are the principal source of information.

1.4.1.2 Integrity

Integrity is the ability of a property to convey its significance. To be eligible for the NRHP, a property must not only be shown to be significant under NRHP criteria (A through D above), but it must also have integrity. The evaluation of integrity is grounded in an understanding of a property's physical features and how they relate to its significance. Historic properties either retain integrity (that is, convey their significance) or they do not. To retain integrity, a property will always possess several, and usually most, of the seven aspects of integrity, which are:

- Location. Location is the place where the historic property was constructed or the place where the historic event occurred.
- Design. Design is the combination of elements that create the form, plan, space, structure, and style of a property.
- Setting. Setting is the physical environment of a historic property.
- Materials. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- Workmanship. Workmanship is the physical evidence of crafts of a particular culture or people during any given period in history or prehistory.
- Feeling. Feeling is the property's expression of the aesthetic or historic sense of a particular period of time.
- Association. Association is the direct link between an important historic event or person and a historic property (NPS 1995).

1.4.2 Additional Historic Register Criteria for Listing

Under Section 106 of the NHPA, the project proponent is required to consider the effects the project might have on NRHP-eligible or listed resources. Eligibility for listing in state or local preservation registers is not considered. However, as the project passes through multiple local jurisdictions, Sound Transit has considered whether resources within the APE could qualify for state or local listing. Sound Transit has provided supplemental recommendations regarding each surveyed resource's eligibility for listing in the Washington Heritage Register (WHR) and King County Register of Historic Places, as appropriate. These recommendations for state and local listing are advisory only.

1.4.2.1 Washington Heritage Register

To be individually eligible for listing in the WHR, a property must be significant within a historic context. Sites which are listed in the NRHP are automatically added to the WHR (25-12 Washington Administrative Code [WAC]). As such, a separate nomination is not needed and, for the purposes of this report, the same four criteria utilized for the NRHP (A through D above) are used herein to evaluate for eligibility for listing in the WHR (DAHP 2020d).

1.4.2.2 King County Register of Historic Places

The KCRHP is a list of King County Landmarks. To be designated a King County Landmark (eligible for listing on the KCRHP), a resource must be over 40 years old or contain resources that are more than 40 years old that possess integrity of location, design, setting, materials, workmanship, feeling, or association, and meet one or more of the following criteria, which are based on NRHP eligibility criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of local, state, or national history; or
2. Is associated with the lives of persons significant in local, state, or national history; or
3. Embodies the distinctive characteristics of a type, period, style or method of design or construction, or that represents a significant and distinguishable entity whose components may lack individual distinction; or
4. Has yielded, or may be likely to yield, information important to prehistory or history; or
5. Is an outstanding work of a designer or builder who has made a substantial contribution to the art (KC 20.62.040).

1.5 Agency and Tribal Coordination

Several federal statutes require federal agencies to consult or coordinate with Native American Indian tribes. Key federal historic preservation and cultural resource protection statutes that require agencies to consult with tribes or accommodate tribal views and practices are summarized below:

- **The National Historic Preservation Act of 1966** (NHPA), as amended, is the basis for tribal consultation in the Section 106 review process. In particular:
    - Section 101(d)(6)(A) states that properties of religious and cultural significance to Indian tribes may be eligible for listing in the National Register of Historic Places.
    - Section 101(d)(6)(B) requires that federal agencies consult with any Indian tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.
- **The National Environmental Policy Act of 1969** (NEPA) contains language in the Council on Environmental Quality regulations mandating federal agencies to contact tribes and provide opportunities to participate in the preparation of an environmental assessment or EIS.
- **The American Indian Religious Freedom Act of 1978** contains language establishing federal government policies to protect the right of American Indians to exercise their traditional religions, ceremonials, and traditional rights including access to sites and the use and possession of sacred objects.
- **The Native American Graves Protection and Repatriation Act of 1990** directs federal agencies to consult with Indian tribes prior to removal or excavation of Native American human remains on federally managed lands.
- **Executive Order 13175**, Consultation and Coordination with Indian Tribal Governments (2000) directs federal agencies to consider tribal government, sovereignty, rights, and responsibilities whenever policies are formulated that significantly affect tribal governments.
- **Section 4(f), Department of Transportation Act of 1966**, generally prohibits U.S. Department of Transportation agencies, including FTA, from approving projects that would use certain types of property, including traditional cultural properties.

Coordination with agencies and Tribes is ongoing. Both the Puyallup Tribe of Indians and the Muckleshoot Indian Tribe have representatives on Sound Transit's OMF South Interagency Group. The Cultural Resources Survey Plan, which supported the 2021 SEPA Draft EIS, was provided to the Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, and Confederated Tribes and Bands of the Yakama Nation as well as SHPO for review on January 13, 2020. No formal comments were received on the Cultural Resources Survey Plan from Tribes or SHPO.

On July 20, 2023, FTA initiated Section 106 consultation and requested comments on the APE in letters to the Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of the Puyallup Reservation, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Confederated Tribes and Bands of the Yakama Nation, and SHPO. On October 27, 2023, FTA determined that the project would have no adverse effect to resources listed on or eligible for the National Register of Historic Places. The SHPO concurred with FTA's determination on October 31, 2023.

Table G4.1-2 lists the correspondence with Tribes and SHPO for OMF South between January 2020 and November 2023, which are included in Attachment G4-6, Tribal and Agency Correspondence. Recent Section 4(f) correspondence is included in Appendix F, Section 4(f) Evaluation.

Table G4.1-2 Tribal and Agency Correspondence

Name	Recipient	Date
Request for Comments on Cultural Resources Survey Plan	Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, Confederated Tribes and Bands of the Yakama Nation	January 13, 2020
OMF South Historic and Archaeological Resources Technical Report	SHPO	January 12, 2021
No Effect Concurrence Letter	Sound Transit	January 20, 2021
No Adverse Effect Concurrence Letter	BPA	August 19, 2021
Section 106 Initiation and APE Consultation Letter	Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Confederated Tribes and Bands of the Yakama Nation	July 20, 2023
Section 106 Initiation and APE Consultation Letter	SHPO	July 20, 2023
SHPO Response to Consultation Letter	FTA	July 24, 2023
Suquamish Indian Tribe of the Port Madison Reservation Response to Consultation Letter	FTA	July 26, 2023
Nisqually Indian Tribe Response to Consultation Letter	FTA	July 31, 2023
Squaxin Island Tribe of the Squaxin Island Reservation Response to Consultation Letter	FTA	August 1, 2023

Table G4.1-2 Tribal and Agency Correspondence (continued)

Name	Recipient	Date
Section 106 Eligibility and Effects Determination	Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, Snoqualmie Indian Tribe, Suquamish Indian Tribe of the Port Madison Reservation, Squaxin Island Tribe of the Squaxin Island Reservation, Confederated Tribes and Bands of the Yakama Nation	October 27, 2023
Section 106 Eligibility and Effects Determination	BPA and SHPO	October 27, 2023
SHPO Response to Eligibility and Effects Determination	FTA	October 31, 2023
Suquamish Indian Tribe of the Port Madison Reservation Response to Eligibility and Effects Determination	FTA	November 6, 2023

1.6 Area of Potential Effects

FTA has defined the APE in consultation with SHPO and affected Tribes. This consultation included a cultural resources inventory plan. The APE for OMF South (Figures G4.1-6 through G4.1-8) generally extends from the project elements (e.g., guideway, station locations, construction staging areas, and utility improvement and expansion areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to project elements.

The APE for a project defines the boundary within which the project has the potential to impact cultural resources. The APE includes all project elements and areas extending from the project elements, such as connecting tracks and construction staging areas, to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to project elements.

Both the Preferred and South 344th Street alternatives are located in Sections 16 and 21 of Township 21 North, Range 4 East (Figure G4.1-6, and Figure G4.1-7, respectively). The Midway Landfill Alternative is located in Sections 21 and 22 of Township 22 North, Range 4 East (Figure G4.1-8).

The vertical impacts of the project are varied across the proposed alternatives and the alternative designs. All details have not been finalized; however, basic aspects of the design have been completed for most alternatives to provide estimated height ranges for project elements. The expected depths of effect vary greatly throughout the APE due to area-specific soil and geological conditions.

The general estimated depths of impact for construction at the Preferred and South 344th Street alternatives is a minimum of 2 feet below ground surface (fbgs) to remove top soil before fill is added to the sites for stabilization, with maximum cuts of approximately 8 fbgs for the Preferred Alternative and approximately 18 fbgs for the South 344th Street Alternative anticipated during site levelling activities. The estimated depths of impact for the Midway Landfill alternative include either partially excavated cut platforms to a depth of 10 feet below ground surface (fbgs) with drilled column supports to a depth of 120 to 180 fbgs or complete excavation of the landfill.

The depths of impact for the columns supporting the elevated elements of the mainline tracks between the Federal Way Downtown Station and the Preferred and South 344th Street alternatives range from 60 to 90 fbgs.

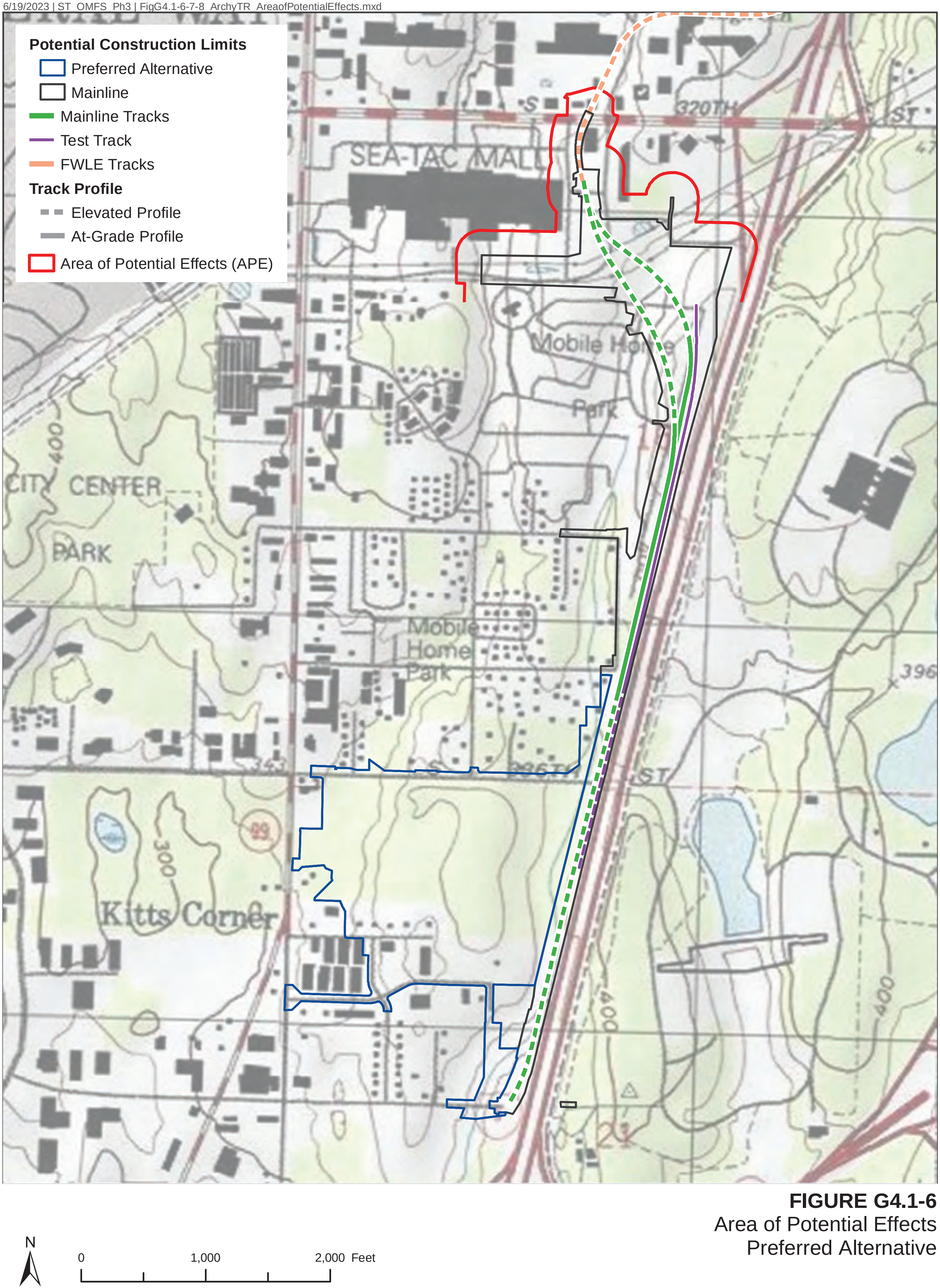

Potential Construction Limits
▭ Preferred Alternative
▭ Mainline
━ Mainline Tracks
━ Test Track
━ FWLE Tracks
Track Profile
▬ ▬ Elevated Profile
━ At-Grade Profile
▭ Area of Potential Effects (APE)
SEA-TAC MALL
S 320TH ST
47
Mobile Home Park
Mobile Home Park
CITY CENTER PARK
400
396
S 336TH ST
99
300
Kitts Corner
400
400
21
N
0
1,000
2,000 Feet

FIGURE G4.1-6
Area of Potential Effects
Preferred Alternative

OMF South

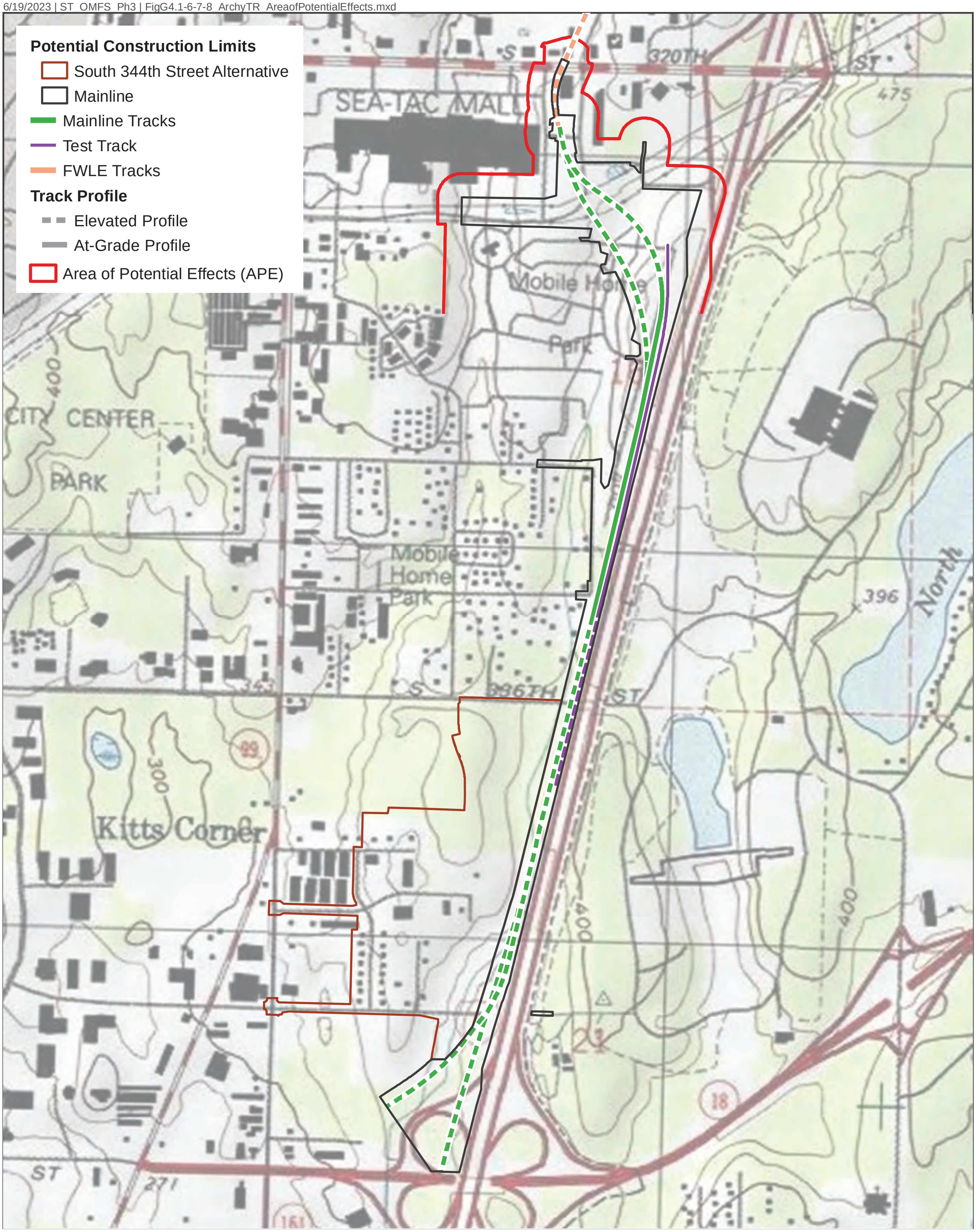

Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
S
320TH
ST
SEA-TAC MALL
475
Mobile Home Park
400
CITY CENTER
PARK
Mobile Home Park
396
North
S 336TH ST
99
300
Kitts Corner
400
400
21
18
ST
271
161
N
0
1,000
2,000 Feet

FIGURE G4.1-7
Area of Potential Effects
South 344th Street Alternative

OMF South

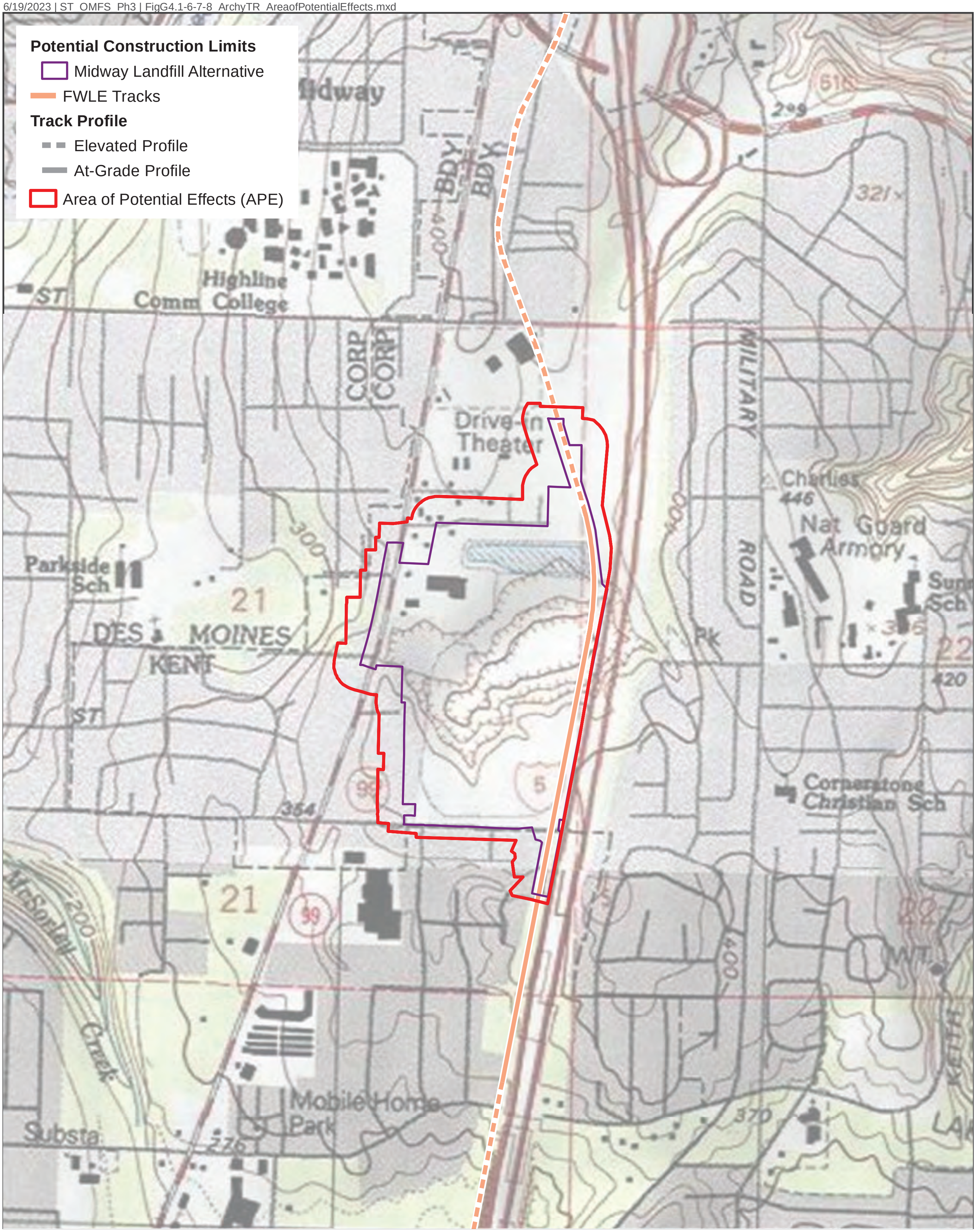

Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
Midway
Highline
Comm College
ST
CORP
CORP
BDY
BDY
400
516
299
321
Drive-In
Theater
Parkside
Sch
21
DES MOINES
KENT
300
MILITARY
ROAD
Charles
446
Nat Guard
Armory
Sun
Sch
22
420
Pk
99
5
354
Cornerstone
Christian Sch
McSorley
Creek
200
21
99
Mobile Home
Park
Substa
276
370
400
22
KEITH
N
0
1,000
2,000 Feet

FIGURE G4.1-8
Area of Potential Effects
Midway Landfill Alternative

OMF South

2 PREVIOUS CULTURAL RESOURCE STUDIES AND RESULTS

The initial electronic record search for the APE was limited to records housed in the DAHP Washington Information System for Architectural and Archaeological Records Data (WISAARD). WISAARD includes archaeological site and isolate records, cultural resource assessments, NRHP nomination forms, historic property inventory (HPI) forms, and other publicly restricted cultural resources data. ATCRC and HRA searched the WISAARD database for the location of any cultural resources within 1 mile of the APE for each alternative. Additionally, ATCRC and HRA reviewed the King County Register of Historic Places to identify any locally listed resources within 1 mile of the APE for each alternative.

In October 2019, ATCRC and HRA supplemented the information obtained from the DAHP database with publicly accessible data, such as tax parcel records, historic area maps, Sanborn Fire Insurance Maps, the King County Map Vault, and General Lands Office (GLO) maps in order to develop a better understanding of the land-use patterns of the area. This initial background assessment was updated for the 2023 Draft EIS. These record reviews were undertaken to ascertain the presence or absence of any previously documented archaeological resources, traditional cultural places, and built-environment resources that may reside within the APE.

The DAHP Statewide Predictive Model indicates that the APE intersects areas that are at varying risk for encountering precontact cultural resources ranging from very low to moderate, with the highest risk areas for precontact and historic-period archaeological sites found within the section of the Preferred and South 344th Street alternatives where the mainline track is proposed.

The results of these record searches are presented for each of the APE below.

2.1 Preferred Alternative

The Preferred Alternative is located in Federal Way. The alternative begins with a mainline track leading from the Federal Way Downtown Station south along the western boundary of I-5 to the proposed OMF South location at the present Christian Faith Center, which extends south into an area of residential and light industry properties (Figures G4.1-5). A test track would run parallel to the east side of the mainline from S 324th Street to just south of S 336th Street. Note that the location overlaps with the South 344th Street Alternative APE, leading to similar background research results (Figure G4.1-6).

2.1.1 Cultural Resources Surveys

Prior to the commencement of the field surveys for the 2021 SEPA Draft EIS, a Cultural Resources Survey Plan was prepared for review by the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, the Confederated Tribes and Bands of the Yakama Nation, and SHPO. This plan was distributed to the aforementioned Tribes by Sound Transit under its authority as lead agency for SEPA. No formal comments were received from Tribes or SHPO.

The field survey included a historic-period, built-environment resources survey and inventory for previously undocumented or unevaluated buildings, structures, and objects constructed in 1985 or earlier, as well as an archaeological survey that included pedestrian transects and subsurface archaeological investigations (shovel probes and hand auger cores).

There have been at least 14 other previous cultural resource assessments conducted within 1 mile of the Preferred Alternative APE, five of which were conducted in response to infrastructure improvement projects (Table G4.2-1). None of these surveys identified any cultural resources within the APE.

Table G4.2-1 Cultural Resource Surveys Conducted within a 1-Mile Radius of the Preferred Alternative

Source	Title	Proximity to APE and Direction	Cultural Resources Identified within APE
Larson Anthropological Archaeological Services Limited (2000a)	Regional Express/Federal Way and Star Lake Project Cultural Resource Assessment Federal Way Alternative	Within	None
Luttrell (2003)	Cultural Resources Investigations for Washington Department of Transportation’s SR 161: Milton Way to South 360th Street Project	0.80 mile south	None
Earley (2005)	Cultural Resources Assessment of the Thompson Park Project, Federal Way	Adjacent	None
Luttrell (2005)	Letter to Kimberly Farley Regarding I-5: Pierce County Line to Tukwila Stage 4 HOV Project	Within	None
Luttrell (2006)	Cultural Resources Investigations for the Washington Department of Fish and Wildlife’s Lake Dolloff Access Redevelopment Project	1 mile northeast	None
Bard (2006)	Final Report: Cultural Resources discipline Report for I-5 SR 161/SR 18 Triangle Improvements	0.65 mile south	None
Tingwall (2008)	Cultural Resources Report, Pacific Highway South (SR 99) Phase IV Improvements Project, Federal Way.	0.70 mile north	None
Chambers (2009)	Cultural Resources Assessment for the city of Edgewood, Meridian Avenue Sewer LID No. 1 Improvement Project	0.85 mile south	None
Baldwin (2014)	Cultural Resources Assessment for the Pacific Highway South HOV Lanes Phase V (S 340th Street to S 359th Street) Project, Federal Way	Within	None
Stripe (2016)	Weyerhaeuser Property Cultural Resource Investigation	0.45 mile east	None
HDR Engineering, Inc. and CH2M Hill (2016)	Federal Way Link Extension: Historical and Archaeological Technical Report	Overlaps	None
Stripe (2017)	Talasaea Consultants Project No. TAL-1572F, Federal Way Development Project	0.50 mile west	None
Willamette Cultural Resources Associates (2019)	Creekside Commons Development (In Progress)	0.1 mile north	None
Elliott, Chidley, and Sterner (2020)	Draft: Federal Way Link Extension, Additional Cultural Resources Inventory, King County Washington	0.50 mile north	None

2.1.2 Ethnographic Places

There are no known Tribal villages within 1 mile of any of the project alternatives. However, there are several places within 1 mile that have historic and mythical links to Native American populations. Both "*Biskwa'd1s*" (Steel Lake) and "*B1skwa'dis*" (Lake Doloff) are approximately 0.95 to 1 mile north of the APE. One additional ethnographic place, *Tso'Lkob1d*, is linked to Steel Lake by mythology (Table G4.2-2).

Table G4.2-2 Recorded Ethnographic Places within a 1-Mile Radius of the Preferred Alternative Area of Potential Effect

Location	Ethnographer s Orthography	Ethnographer s Translation/Description	Source
Steel Lake	*Biskwa'd1s*	Where there are whales, the name refers to the story recounted regarding *Tso'Lkab1d*.	Hilbert et al. 2001
Lake Doloff	*B1skwa'dis*	Where there are whales, source of Mill Creek.	Hilbert et al. 2001

2.1.3 Archaeological Sites

Two historical archaeological sites (45KI719 and 45KI1481) are located within a 1-mile radius of the APE. Site 45KI719 was a historic-period building foundation located within the area of direct impacts for the Preferred Alternative APE. The site was determined not eligible for listing in the NRHP and subsequently removed by WSDOT during construction associated with I-5 improvements (DAHP 2005; Bartoy 2013). Site 45KI1481 consists of a series of historical roads related to residential development, built between 1935 and the 1950s, that was later partially demolished. It is potentially eligible for listing in the NRHP but has not been evaluated (Colon 2020). Site 45KI1481 is located approximately 0.4 mile east of the Preferred Alternative APE.

2.1.4 NRHP-Listed or Eligible Historic, Built-Environment Properties

There are no NRHP-listed resources within 1 mile of the Preferred Alternative APE.

According to DAHP's WISAARD database, there are two historic, built-environment properties determined to be eligible for the NRHP within 1-mile of the APE: the Calvary Lutheran Church and the Weyerhaeuser Headquarters (DAHP 2020b). Neither of these resources are located within the APE.

In addition, the Bonneville Power Association (BPA) conducted its own Section 106 consultation with SHPO in 2020 for the relocation of electrical transmission towers that would be impacted by the OMF South Project. These towers included those along the Tacoma-Covington Nos. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. BPA determined that the transmission lines were eligible for listing in the NRHP.

2.1.5 King County Landmarks

There are no King County Landmarks within 1 mile of the Preferred Alternative APE.

2.1.6 Historic Maps and Aerial Photographs

The Preferred Alternative APE has been extensively disturbed from the beginning of Euro-American habitation of the area when it was logged and possibly farmed.[1] This initial disturbance likely occurred following the land sales from the NPRC, which was granted the land patents to most of Section 21, Township 21 North, Range 4 East (WA004720 [1895] and WA 060199 [GLO 1894]). The lands were then sold by the NPRC in a variety of lot sizes that would promptly change hands as individual fortunes rose and fell. Over 90 percent of the APE for this alternative is located within the northwest quadrant of Section 21. The landscape history following initial land sales indicates a general dereliction of the lands within the APE, likely in favor of forestry-related endeavors given the substandard soil conditions. Initial settlements within the area began to the west and north of the APE (USGS 1897a, USGS 1897b, USGS 1900).

Development within the APE was relatively minimal prior to World War II (Attachment G4-1; King County Map Vault 1936/1937a and 1936/1937c; United States War Department 1944). Development began to intensify in the APE by 1949 with the installation of the Bonneville Power Administration (BPA) power line between 1935 and 1949, and residential development along the northern boundary (South 320th Street), the western boundary along SR 99, the central boundary of the OMF alternative at South 336th Street, and the southern edge of the APE along South 336th Place (Attachment G4-1; USGS 1949,1957,1961).

Residential and commercial development slowly expanded along these corridors through the 1950s and early 1960s (Attachment G4-1; USGS 1957 and 1961). Residential, commercial, and light industrial development within the APE accelerated following the completion of I-5 through the area in 1963, which shifted historic development patterns from SR 99 to locations with easy access to I-5 (Attachment G4-1; King County Map Vault 1965a and 1965b; USGS 1962–1968 and 1969–1972). The extensive modern land clearance and development currently in evidence within the APE did not occur until 2005 with the construction of the Christian Faith Center (Google Earth 2019).

2.2 South 344th Street Alternative

The South 344th Street Alternative is located in Federal Way. The alternative begins with a mainline track leading from the Federal Way Downtown Station south along the western boundary of I-5 to each alternative location (Figures G4.1-5). A test track would run parallel to the east side of the mainline from S 324th Street to just south of S 336th Street. The South 344th Street Alternative would be located at the east of the present Christian Faith Center, overlapping the Preferred Alternative and extending south into an area of residential and light industry properties (Figure G4.1-7). Note that the location overlaps with the Preferred Alternative APE, leading to similar background research results.

2.2.1 Cultural Resources Surveys

There have been at least 15 previous cultural resource assessments conducted within 1 mile of the South 344th Street APE, 11 of which were conducted in response to infrastructure improvement projects (Table G4.2-3). One of these surveys identified a cultural resource, 45KI1719, within the APE.

---

[1] Due to the extensive overlap between the Preferred and South 344th Street alternatives, portions of the Historic Maps and Aerial Photograph Sections are repetitive.

Table G4.2-3 Cultural Resource Surveys Conducted within a 1-Mile Radius of the South 344th Street Alternative

Source	Title	Proximity to APE and direction	Cultural Resources Identified within APE
Larson Anthropological Archaeological Services Limited (2000a)	Regional Express/Federal Way and Star Lake Project Cultural Resource Assessment Federal Way Alternative	Within	None
Luttrell (2003)	Cultural Resources Investigations for Washington Department of Transportation's SR 161: Milton Way to South 360th Street Project	0.65 mile south	None
Earley (2005)	Cultural Resources Assessment of the Thompson Park Project, Federal Way	Adjacent	None
Luttrell (2005)	Letter to Kimberly Farley Regarding I-5: Pierce County Line to Tukwila Stage 4 HOV Project	Within	45KI719: No longer extant
Luttrell (2006)	Cultural Resources Investigations for the Washington Department of Fish and Wildlife's Lake Dolloff Access Redevelopment Project	1 mile northeast	None
Bard (2006)	Final Report: Cultural Resources discipline Report for I-5 SR 161/SR 18 Triangle Improvements	0.50 mile south	None
Tingwall (2008)	Cultural Resources Report, Pacific Highway South (SR 99) Phase IV Improvements Project, Federal Way	0.70 mile north	None
Chambers (2009)	Cultural Resources Assessment for the city of Edgewood, Meridian Avenue Sewer LID No. 1 Improvement Project	0.70 mile south	None
Baldwin (2014)	Cultural Resources Assessment for the Pacific Highway South HOV Lanes Phase V (S 340th Street to S 359th Street) Project, Federal Way	Within	None
Baldwin (2015)	Cultural Resources Assessment for the South 356th Street Roadway Improvements Project, Federal Way	0.80 mile south	None
Stripe (2016)	Weyerhaeuser Property Cultural Resource Investigation	0.45 mile east	None
HDR Engineering, Inc. and CH2M Hill (2016)	Federal Way Link Extension: Historical and Archaeological Technical Report	Overlaps	None
Stripe (2017)	Talasaea Consultants Project No. TAL-1572F, Federal Way Development Project	0.50 mile west	None
Willamette Cultural Resources Associates (2019)	Creekside Commons Development (In Progress)	0.1 mile north	None
Elliott, Chidley, and Sterner (2020)	Draft: Federal Way Link Extension, Additional Cultural Resources Inventory, King County Washington	0.50 mile north	None

2.2.2 Ethnographic Places

There are no known Tribal villages within 1 mile of any of the project alternatives. However, there are several places that have historic and mythical links to Native American populations. Both "*Biskwa'd1s*" (Steel Lake) and "*B1skwa'dis*" (Lake Doloff) are approximately 0.95 to 1 mile away north of the APE. One additional ethnographic place, *Tso'Lkob1d*, is linked to Steel Lake by mythology (Table G4.2-4).

Table G4.2-4 Recorded Ethnographic Places within a 1-Mile Radius of the South 344th Street Alternative Area of Potential Effects

Location	Ethnographer s Orthography	Ethnographer s Translation/Description	Source
Steel Lake	*Biskwa'd1s*	Where there are whales, the name refers to the story recounted regarding *Tso'Lkab1d*.	Hilbert et al. 2001
Lake Doloff	*B1skwa'dis*	Where there are whales, source of Mill Creek.	Hilbert et al. 2001

2.2.3 Archaeological Sites

Two historical archaeological sites (45KI719 and 45KI1481) are located within a 1-mile radius of the APE. Archaeological site 45KI719 is located within the southern section of the APE within the southern mainline section. The site consisted of a historic building foundation that has been determined not eligible for listing in the NRHP and was subsequently removed by WSDOT during construction associated with I-5 improvements (DAHP 2005; Bartoy 2013). Site 45KI1481 consists of a series of historic-period roads related to residential development, built between 1935 and the 1950s, that was later partially demolished. Site 45KI1481 has been determined potentially eligible for listing in the NRHP (Colon 2020). Site 45KI1481 is located approximately 0.4 mile east of the South 344th Street Alternative APE.

2.2.4 NRHP-Eligible or Listed Historic, Built-Environment Properties

There are no NRHP-listed resources within 1 mile of the South 344th Street Alternative APE.

According to DAHP's WISAARD database, there are three historic, built-environment properties within 1 mile of the APE that have been determined eligible for the NRHP. The People's National Bank, Calvary Lutheran Church, and the Weyerhaeuser Headquarters building (DAHP 2020b). None of these are located within the South 344th Street APE.

2.2.5 King County Landmarks

There are no King County Landmarks within 1 mile of the APE for the South 344th Street APE.

2.2.6 Historic Maps and Aerial Photographs

The South 344th Street APE has been extensively disturbed from the beginning of Euro-American habitation of the area when it was logged and possibly farmed.[2] This initial disturbance likely occurred following the land sales from the NPRC, which was granted the land patents to most of Section 21, Township 21 North, Range 4 East (WA004720 [1895] and WA 060199 [1894]). The lands were then sold in a variety of lot sizes that promptly changed hands as individual fortunes rose and fell. Over 90 percent of the APE is located within the northwest quadrant of Section 21. The landscape history following initial land sales indicates a general dereliction of the lands within the APE, likely in favor of forestry-related endeavors given substandard soil conditions. Initial settlements within the area began to the west and north of the APE (USGS 1897a, USGS 1897b, USGS 1900).

---

[2] Due to the extensive overlap between the Preferred and South 344th Street alternatives, portions of the Historic Maps and Aerial Photograph Sections are repetitive.

Development within the APE was relatively minimal prior to World War II (Attachment G4-1; United States War Department 1944). Development began to intensify in the APE by 1949 with the installation of the BPA power line between 1935 and 1949 (Attachment G4-1), and residential development along the northern boundary (South 320th Street), the western boundary along SR 99, South 341st Place, and South 344th Street (Attachment G4-1; USGS 1949,1957,1961).

Residential and commercial development slowly expanded along these roadways through the 1950s and early 1960s (Attachment G4-1; USGS 1957 and 1961). Residential, commercial, and light industrial development accelerated within the APE following the completion of I-5 through the area in 1963, although the development shifted from historic development patterns around SR 99 and South 344th Street to locations with easy access to I-5, particularly South 320th Street and South 348th Street (Attachment G4-1; King County Map Vault 1965a and 1965b; USGS 1962–1968 and 1969–1972). The extensive modern land clearance and development currently in evidence within the APE did not occur until the 1980s (Attachment G4-1; USGS 1981–1991).

2.3 Midway Landfill Alternative

The Midway Landfill Alternative is located in the Kent, south of S 246th Street, west of I-5, and is situated on the capped Midway Landfill at 24808 Pacific Highway S (Figures G4.1-8).

2.3.1 Cultural Resources Surveys

There have been at least 14 previous cultural resources surveys conducted within 1 mile of the APE for the Midway Landfill (Table G4.2-5). One ineligible cultural resource, 45KI1476, was documented within the APE.

Table G4.2-5 Cultural Resource Surveys Conducted within a 1-Mile Radius of the Midway Landfill Alternative

Source	Title	Proximity to APE and Direction	Cultural Resources Identified within APE
Larson Anthropological Archaeological Services Limited (2000b)	Regional Express/ Federal Way and Star Lake Project Cultural Resource Assessment Star Lake Alternative	1 mile South	None
Iversen et al. (2001)	Pacific Highway South HOV Lanes Cultural Resources Assessment	Adjacent	None
Rooke (2002)	Letter Report: Procedures and Results of a Cultural Resources Survey of Cingular Wireless Tower Site WA-645 (Lake Fenwick)	0.65 mile SE	None
Scott (2008)	Historic Resources Survey and Inventory, Kent	Within	None
Mishkar et al. (2009)	North Twin Bridge Assessment, Des Moines	0.8 mile West	None
Goodwin (2014)	Archaeological Survey for the Proposed SC1996 Midway South Telecommunications Facility	0.3 mile East	None

Table G4.2-5 Cultural Resource Surveys Conducted within a 1-Mile Radius of the Midway Landfill Alternative (continued)

Source	Title	Proximity to APE and Direction	Cultural Resources Identified within APE
Chambers and Amell (2014)	Cultural Resources Assessment for the Saltwater State Park Bridge Rehabilitation Project, Des Moines	1 mile West	None
Mather and Arthur (2015)	Archaeological Survey and Assessment of the Proposed Lakeridge Highline View Estates Subdivision (TPN 6929603575), Des Moines	0.55 mile NW	None
HDR Engineering, Inc. and CH2M Hill (2016)	Federal Way Link Extension: Historical and Archaeological Technical Report	Overlaps	None
Artifacts Consulting, Inc. (2016)	Highline College, Cultural Resources Survey	0.8 mile NW	None
Ives (2017)	Cultural Resources Survey for the WSDOT SR 509 SeaTac to I-5 Freeway Extension Project	Within	None
Hannum (2018)	Cultural Resources Assessment for the Zenith Park Site, King County, Washington	1 mile NW	None
Elliott, Chidley, and Sterner (2020)	Draft: Federal Way Link Extension, Additional Cultural Resources Inventory, King County Washington	Overlaps	45KI1476 (Not Eligible for NRHP)
Limberg et al. (2021)	SR 509/24th Avenue South to South 188th Street – New Expressway (SR 509 Stage 2) Project, King County, Washington	Adjacent	None

HOV = high occupancy vehicle; SR = State Route

2.3.2 Ethnographic Places

There are no known ethnographic Tribal villages within 1 mile of the APE. However, there are several places within 1 mile of the Midway Landfill Alternative APE that have historic and mythical links to Native American populations (Hilbert et al. 2001) (Table G4.2-6).

Table G4.2-6 Recorded Ethnographic Places within a 1-Mile Radius of the Midway Landfill Alternative Area of Potential Effects

Location	Ethnographer s Orthography	Ethnographer s Translation/Description	Source
McSorley Creek	*Tca'xgwEs*	A small creek halfway between Des Moines and Stone's Landing (Redondo).	Hilbert et al. 2001
Bank of the Green River	*Ctcagkq s*	Where a trail comes down a beach, a place on the west bank of the river, where a trail from Des Moines came over the ridge and down to the river.	Hilbert et al. 2001
Bank of the Green River	*t3ka'xwEts*	Crabapple trees / a flat in a bend in the river.	Hilbert et al. 2001
Bank of the Green River	*CugtLa'lgw1L*	Resembling a pathway; canoe trails / a side channel of the river above Henry McCabe's place.	Hilbert et al. 2001
Bank of the Green River	*bsskwEd*	Where there is a waterfall / a place formerly known as Langston's Ferry, there is also a fossil bed at this location	Hilbert et al. 2001

Note: Table is generally arranged from north to south.

2.3.3 Archaeological Sites

There is one archaeological site within this APE, the Midway Landfill (45KI1476), a landfill that was in use from 1966 to 1983. Site 45KI1476, the location of the Midway Landfill Alternative, has been determined not eligible for the NRHP by the FTA, with SHPO concurrence (DAHP 2020c).

The closest other recorded historic archaeological site (45KI208) is located approximately 1.05 miles east of the APE. The site is in the Green River Valley and consists of a broadly defined historical debris scatter and barn complex. The nearest precontact archaeological site (45KI436) is an inland shell midden located 1.35 miles west of the APE.

2.3.4 NRHP-Listed or Eligible Historic, Built-Environment Properties

There are no NRHP-listed resources within 1 mile of the Midway Landfill Alternative APE.

According to the WISAARD database, there are 24 historic, built-environment properties associated with the Highline College at 2400 S 240th Street in Des Moines, Washington, that were determined NRHP eligible by the Federal Aviation Administration (FAA) in 2013 (DAHP 2020b). Three other properties, two bridges, the North and South Twin Bridges and the State Park Log House are located within 1.0 mile of the APE and have formally been determined eligible for listing in the NRHP (DAHP 2020b). None of these resources are located within this APE.

2.3.5 King County Landmarks

There are no King County Landmarks within 1 mile of the APE for the Midway Landfill.

2.3.6 Historic Maps and Aerial Photographs

The Midway Alternative was extensively disturbed from the beginning of Euro-American habitation of the area when it was logged and possibly farmed. Initial large-scale landscape disturbance around the APE occurred between 1863 (GLO 1863) and 1897 (USGS 1897a, 1897b). The 1863 GLO maps indicate that the northwest quadrant of Section 21, Township 22 North, Range 4 East, was a prairie at that point in time (GLO 1863). It is unclear how densely forested the remainder of the section was prior to the land clearance identified in 1897 (USGS 1897a); however, all of the lands held by the Northern Pacific Railroad Company (NPRC) seem to have been managed in a similar manner.[3] The 1897 maps indicate that the APE is located within an area that was forested, then cleared by burning (whether before or after a harvest is unclear), and was in the process of being replanted (restocked) for timber harvesting at the time of the map preparation (USGS 1897a, 1897b).

The 1863 GLO maps do not identify any Native American or Euro-American features within the APE. The closest two features are both approximately 0.25 mile from the APE. The first is the state's Military Road from Seattle to Steilacoom to the east, and the second is a system of trails located north of the APE that trends east–west from the coast to the state's Military Road (GLO 1863).

---

[3] The NPRC held the patent for forested areas within Section 21 (Doc. 32, WAORAA 004720). This patent included the E ½, S ½ of the SW ¼, and the NE ¼ of the SW ¼, of Section 21, Township 22 North, Range 4 East.

The historic development of the area in and around the APE generally coincides with the further development of the transportation networks in the area. In 1897 (USGS 1897a), several homesteads are identified south and southeast of the APE, the closest being approximately 0.33 mile southeast on the intersection of the state's Military Road and what would become Reith Road South. Most development in the area was restricted to these travel corridors in the areas around the APE, until after the expansion and improvement of a dirt road across the western plateau (Kroll Map Company 1912, 1926). These expansions and improvements culminated with the completion of the White River Bypass (now SR 99) in 1928 (Seattle Times 1928).

Developments in the northwest, northeast, and southwest quadrants were subdivided and were undergoing annexation by the city of Des Moines by 1936 (Metsker 1936). The APE, in the southeast quadrant, was still owned by the Weyerhaeuser Timber Company. The developments surrounding the APE did not immediately manifest themselves as seen in 1936/1937 section aerial photographs published by King County (King County Map Vault 1936/1937b; Attachment G4-1). However, by 1957, substantial landscape changes are evident, with residential, commercial, and agricultural developments surrounding the Meade Sand and Gravel Company mine (Attachment G4-1; EarthExplorer 1957b).

3 NATURAL AND CULTURAL CONTEXT

As described in Section 2, ATCRC and HRA supplemented information obtained from DAHP's database with publicly accessible data. This background review assisted with identification of areas where context was necessary for the evaluation of the significance and NRHP eligibility of cultural resources identified with the APE per NEPA and 36 CFR 60.4 (NHPA 1966 as amended), Criteria for Evaluation, and in guidance provided in National Register Bulletin 15 (NPS 1995).

The following sections summarize the environmental, precontact, ethnographic, and historical contexts relevant to the Puget Sound region and provide the general project area setting. Following this section is a more specific history for each of the project areas of impact.

3.1 Environmental Context

The APE is located at the southern end of the Puget Lowland. The Puget Lowland is a physiographic province that was shaped by several periods of extensive glaciation during the late Pleistocene (Lasmanis 1991). The Vashon Stade of the Fraser Glaciation began around 18,000 years before present (BP) with an advance of the Cordilleran ice sheet into the lowlands (Porter and Swanson 1998). The Puget Lobe of the ice sheet flowed down into the Puget Lowland and reached its terminus just south of Olympia between 14,500 and 14,000 BP.

The Puget Lobe began to retreat shortly after reaching its terminus. Marine waters entered the lowlands that had been carved out by the glacier and filled Puget Sound. The remaining ice was floated and wasted away rapidly. Glaciomarine drift deposits were released from the melting glacial ice and deposited on the sea floor across the northern and central Puget Lowland, causing the land to rebound and relative sea levels to fall and expose glacial outwash deposits (Clague and James 2002). About 11,600 to 10,000 BP, the Cordilleran ice sheet advanced once again, leaving glacial till and outwash deposits in much of northwestern Washington (Easterbrook 2003). Sediments were deposited and often reworked as glaciers advanced and retreated, and glacial till and outwash deposits were left across much of the region at the end of the last glacial period (Snyder et al. 1973).

During the last Ice Age (the Pleistocene Epoch), the Puget Sound was covered by the thick Cordilleran ice sheet. In the last interval, known as the Fraser Glaciation, the Puget Lobe covered Puget Sound with up to 1,250 meters of ice (Thorson 1980). The Puget Lobe blocked north-flowing streams and created a system of proglacial lakes that were fed by ice-marginal and sub-glacial meltwater systems.

About 15,000 years ago, the Puget Lobe started to retreat northward toward Port Townsend, later retreating from what is now the Strait of Juan de Fuca. Remains of the glacial outwash plain, glacial moraines, kettle ponds, and old river terraces are still visible today and represent ground surfaces as old as 11,000 to 15,000 years. Lowlands formed as glacial outwash channels to both the east and south of the APE (Forsman et al. 1998; Thorson 1980). The geological foundation for the APE is continental glacial till-drift, predominantly under gravelly sandy loams with urban land and minor elements of sandy loam (NRCS 2019; WaDGER 2016).

Precontact Period

The cultural history of the Pacific Northwest and Puget Sound region has great temporal depth and encompasses the earliest periods of human settlement of North America (e.g., Kopperl et al. 2015; Kopperl et al. 2016). Given the geologic information presented above and the age of the landforms within the APE, it is possible that archaeological sites dating throughout the period of known human occupation in the region could be encountered within the APE. In order to frame an understanding of the types of sites that may be anticipated (as discussed in Section 6 below), a generalized cultural chronology adapted from that of Matson and Coupland (2009) is presented below.

Earliest Cultures (14,000+ to 10,000 BP)

The earliest documented settlement in the Puget Sound region begins about 14,000 BP (Matson and Coupland 2009). During this period, humans were continually adapting to the region, which includes a dynamic landscape of glacial retreat as well as climatic and environmental change (Matson and Coupland 2009). Between about 14,000 and 10,000 BP, it has been hypothesized that there was a general continuity in settlement, subsistence, and technologies. Archaeological evidence from this period indicates that human social groups were probably small, highly mobile, and reliant on seasonally available resources across the landscape (Ames and Maschner 1999; Matson and Coupland 2009).

Traditionally, the earliest occupation recognized in North America and the Pacific Northwest has been the Clovis culture (12,000 to 11,000 BP) with its distinctive fluted projectile points (Matson and Coupland 2009). Clovis projectile points are widely distributed in the Puget Sound region, all of them surface finds (Croes et al. 2008). There is also growing evidence of an earlier, pre-Clovis occupation in the Northwest (e.g., Paisley caves in southeastern Oregon at 14,400 BP [Gilbert et al. 2008; Beck and Jones 2010, 2012]).

Several archaeological sites provide information about the earliest period of occupation in Washington. Remains found at the Manis mastodon site near Sequim, Washington, suggest humans hunted mastodon as early as 13,800 BP (Waters et al. 2011). The Ayer Pond bison remains from Orcas Island date to approximately 14,000 BP and include evidence of human butchering (Kenady et al. 2011). The Richey-Roberts site in Wenatchee, Washington, contained a large cache of Clovis points and bone rods dated to ca 13,000 to 12,000 BP (Kirk and Daugherty 2007). Within the Puget Sound lowlands, the Bear Creek site (45KI839) in Redmond, Washington, is the only example of a stratified site dating to this earliest period of human occupation. The site contains a large, flaked stone assemblage and includes both stemmed and concave base projectile points (Kopperl et al. 2015).

The Archaic (10,000 to 5,000 BP)

The Archaic period in the Puget Sound region is one with a few distinct types of archaeological sites. These distinct site types have led archaeologists to hypothesize that occupants of the region during this period continued to follow a highly mobile settlement pattern focused on terrestrial game supplemented by plant processing and use of aquatic environments to a lesser extent (Ames and Maschner 1999). Archaeological features and faunal remains from archaic period sites are rare but when they are found they seem to indicate a well-developed land-use strategy (Chatters et al. 2011).

Archaeological sites from this period are often characterized by the presence of larger laurel-leaf shaped blades/projectile points and are part of a tradition that goes by many regional names. In the Puget Sound region, this time period is often called the Cascade Phase (Matson and Coupland 2009), and localized material culture complex names like Olcott (Kidd 1964) fall into this phase. In addition to laurel-leaf-shaped bifaces, other flaked stone tools (e.g., cobble tools), blade cores, and flaking debris are commonly found in association at Cascade sites (Carlson 1990; Miss and Campbell 1991; Matson 1985; Morgan 1999). Most commonly, sites dating to this period, especially Olcott sites, are generally found in upland settings and on higher river terraces. The sites are likely resource procurement and processing camps focused on exploitation of upland game and wild plant foods, but subsistence adaptations for this period are poorly understood. Although faunal remains for sites dating to this period are rare, mammalian and fish remains have been reported (Chatters et al. 2011). What is known about subsistence and settlement patterns from this period comes from sites like Glenrose Cannery (DgRr6) site in British Columbia, the Dalles Roadcut site (35WS8) on the Columbia River, and the Granite Falls site (45SN303) in western Washington, among others (Chatters et al. 2011; Kopperl et al. 2016). In the Puget Sound, Olcott-style points have been reported in private collections throughout the region as well as inland areas of islands in the Puget Sound (Deppen et al. 2014; Taylor et al. 2009 and 2011). Lowland sites dating to this period include the Marymoor site (45KI9), and the DuPont Southwest site (45PI172), dating ca 6,000 BP and containing the earliest shell lenses in the Puget lowlands along with other tools and evidence of shellfish processing (Kopperl et al. 2016). These sites have components into the following phase that are discussed in the following section.

Development of Coastal Lifeways (5,000 to 3,500 BP)

After about 5,000 BP, archaeological evidence suggests that distinctive regional cultures developed with settlement and subsistence patterns that differ from those of the earlier adaptations in western Washington (Kopperl et al. 2016). Throughout this period, subsistence among Puget Sound groups becomes increasingly focused on marine resources, particularly shellfish and salmon, along with exploitation of a broad spectrum of other intertidal and upland subsistence resources. Shell middens become more common during this period, and these sites provide some of the best insights into shifting subsistence regimes. During this period, settlement patterns appear to become more intensive in localized areas, indicating reduced residential mobility (*sensu* Binford 1980) through time. New technologies are also present, among them ground stone tools and bone tools (Larson and Lewarch 1995; Ames and Maschner 1999; Matson and Coupland 2009). Western red cedar becomes a dominant tree in the region during this period, and wood-working adzes appear as early as 5,000 years ago, with evidence of canoe technology and construction of large plank houses by at least 2,000 to 3,000 years ago (Hebda and Matthews 1984; Donald 2003; Matson and Coupland 2009). With the rise in sea level during this period, earlier sites in coastal settings are likely to be submerged or have eroded away (Larson and Lewarch 1995; Kopperl et al. 2016).

Several previously excavated archaeological sites dating to this time period provide information relevant to the general history of the Puget Sound lowlands. The Marymoor site (45KI9), located near the juncture of the Sammamish River and Bear Creek in King County, has cultural deposits dating from approximately 6,000 to 1,500 BP. The artifact assemblage contains flaked stone tools, stone tool manufacture, and evidence of food processing dating to both this and the preceding period (Greengo 1966; Lockwood 2016). The DuPont Southwest site (45PI72) is on a bluff overlooking the Nisqually Reach in the south Puget Sound (Wessen 1969). The site was tested and contains flaked stone artifacts along with lenses of shell and other food remains, with the oldest calibrated radiocarbon date ranging from 6,180 to 5,930 BP and the most recent at 3,000 BP. The West Point sites, 45KI428 and 45KI29, in West Seattle are shell middens that have cultural deposits dating to this period. The cultural deposits at the site contain at least five distinct camping and food processing loci dating from 4,200 to 200 BP. Material remains included faunal bone, ground stone, and flaked stone tools, and subsistence remains include sea and terrestrial mammal remains, birds, fish, and shellfish (Larson and Lewarch 1995).The Bray site (45PI1276) located on a terrace above the White River near Sumner, Washington (Jolivette and Huber 2016) dates to approximately 3,800 to 2,500 BP and includes several earth ovens, an array of dart points, microblades, ground stone, and steatite beads. The earth ovens at the Bray site appear to be similar to those used to process camas bulbs in sites in eastern Washington; however, no evidence to support such use was found.

The Northwest Coast Cultural Pattern (3,500 to 1,500 BP)

Development of the Northwest Coast cultural pattern in the Puget lowlands (ca 3,500 to 1,500 BP) is marked by continued decrease in residential mobility and is accompanied by evidence of increased social complexity (e.g., Larson and Lewarch 1995). The majority of shell midden sites in the Puget Sound region date to this and, in part, to the preceding period (Taylor et al 2011). Residential stability and logistic settlement patterns are in evidence during this period and seen by increases in lowland and upland limited activity procurement sites associated with spring and summer fishing and root-gathering areas as well as specialized base camps and permanent or semi-permanent winter villages (Kopperl et al. 2016). The latter are associated with distinct longer-term community groupings, especially in the form of large multifamily plank houses. Social stratification is seen in the archaeological record of the region, through differentiation in burial practices and wealth item distribution (Ames and Maschner 1999; Lewarch and Larson 1995).

Also distinctive from the previous period is the marked degree of subsistence intensification as shown by the presence of large-scale fish harvesting technologies (nets and weirs), large-scale storage of salmon, and winter storage of shellfish. Village sites are widely distributed in all coastal areas of Puget Sound (Nelson 1990; Ames and Maschner 1999; Matson and Coupland 2009). Fish weirs and other constructed features are often found in association with large village sites. Common artifact assemblages consist of a range of hunting, fishing, and food processing tools; bone and shell implements; and dense midden deposits. By the end of the period, wide similarities to ethnographically described contact-period cultures in the Puget Sound lowlands are evident (Ames and Maschner 1999; Matson and Coupland 2009). The Marymoor site (45KI9) has cultural deposits dated at 2,500 BP. The long-term occupations at West Point (45KI428 and 45KI29) in King County and the Bray site in Pierce County (45PI1276) contain cultural deposits that extend into this period and provide settlement and subsistence information. Dated coastal sites from this and the preceding time period appear to be relatively rare in the southern King and Pierce counties, perhaps due in part to destruction from development, or burial beneath historic land fill deposits.

Late Northwest Coast Culture (1,500 BP to ca 200 BP)

The period (1,500 to 200 BP), when European and American explorers arrived in the region, is characterized by continued enhancement of material culture and social complexity from that noted in the previous period (Nelson 1990; Ames and Maschner 1999; Matson and Coupland 2009). These include widespread occupation of permanent and semi-permanent coastal villages, continued intensive procurement and storage of salmon and shellfish resources, and hereditary inequality throughout the coastal cultures of the Pacific Northwest, including the Puget Sound region. Village sites have been identified in the Puget Sound lowlands, typically located adjacent to, or near, river or marine transportation routes (Larson and Lewarch 1995; Ames and Maschner 1999).

Common artifact assemblages consist of a range of hunting, fishing and food processing tools, bone and shell implements, and midden deposits. This period is dominated by settlement along the coastlines and along streams and rivers, with far greater specialization of technology than the preceding period. Trade goods become relatively abundant, indicating extensive trade networks up and down the coast as well as with inland plateau neighbors (Wessen 1985). As in the preceding period, salmon was among the primary food sources in this time period. Fish weirs and preserved netting dating to this period have been found at Wapato Creek in Tacoma (45PI47) and along the Green River (Ballard 1957; Munsell nd).

Three archaeological sites dating to the Late Northwest Coast Culture period are 3 to 7 miles south of the Federal Way Alternatives. All three were discovered during deep coring or excavation along the Puyallup River and tributaries. The *Xaxtl'abish* site (45PI974) is a midden deposit near the bank of Hylebos Creek north of the I-5 corridor and has been radiocarbon dated to ca 1,100 BP. Site deposits were found at a depth of 6 feet below the surface and were composed of shell, faunal remains, and fire-cracked rock (Shantry et al. 2010). Site 45PI930 is located east of I-5 on the south side of the Puyallup River. The site dates to ca 1,040 to 1,240 BP and is reported as a precontact village containing lithic, faunal, and botanical remains. Cultural deposits were found from 12 to 22 feet below ground surface on the west side of the Puyallup River (Sharpe et al. 2009). Site 45PI967, a shell midden on the south bank of the Puyallup River near Clear Creek, was found during backhoe testing approximately 8 feet below ground surface and dates to approximately 400 to 200 BP. The artifact assemblage consisted of burned and unburned fish bones, botanical remains, flaked and ground stone artifacts, and fire-cracked rock (Shufelt 2009).

This final precontact period of Northwest Coast Culture and its lifeways is characterized by dramatic changes to its cultures, lifeways, and communal organization with the influx of Euro-American material goods, diseases, and technologies throughout the Puget Sound and the Pacific Northwest (Boyd 1998; Suttles and Lane 1990). Ethnographically known villages, camps, and limited activity sites that were the loci of habitation, food processing, acquisition of riverine and upland plant and animal foods, along with other biotic and abiotic resources, have been documented throughout the Puget Sound region by Hilbert et al. (2001) and others. The ethnographic Northwest Coast cultures and traditional use areas around the APE are summarized in the following sections.

3.2 Ethnohistoric Period

The APE is located in the traditional territory of the contemporary Puyallup Tribe of Indians and the Muckleshoot Indian Tribe (Haeberlin and Gunther 1930; Ruby and Brown 1986; Smith 1940; Spier 1936; Hilbert et al. 2001). The Muckleshoot Tribe is a historic conglomerate of traditional Upper Puyallup, Upper Duwamish, and other “Inland” groups, such as the Sitkamish and the Smulkamish of the Upper White River reaches and the Yilalkoamish and the Skopamish of the Upper Green River reaches (Hodge 1910; Spier 1936; Smith 1940; Suttles and Lane 1990). This merging of Tribes is a direct result of the Medicine Creek Treaty (1854), the Point Elliot Treaty (1855), and the Fox Island Counsel following the 1855 to 1856 conflicts.

Precontact peoples, whose descendants are now part of the Puyallup Tribe of Indians and the Muckleshoot Indian Tribe, often had settlements located along major waterways and at the heads of bays or inlets, where abundant resources of coastal, riverine, and also inland environments supported a relatively rich, diverse, and reliable subsistence base. During the winter months, they lived in large villages of cedar plank houses, while the spring and summer months were spent at seasonal encampments often constructed of reed mats while fishing, hunting, and plant and berry collecting. Salmon was a principal resource (Ruby and Brown 1986). Early economies were also supported by inland resources, such as mountain goats, deer, and elk (Haeberlin and Gunther 1930).

The Puyallup Tribe of Indians lived in villages between the Puyallup River delta and Mount Rainier; along the Carbon and Stuck Rivers; and on the shorelines of Commencement Bay, the Gig Harbor Peninsula, and Vashon Island (Smith 1940; Hilbert et al. 2001).

The Puyallup Tribe of Indians followed a seasonal settlement pattern directly tied to resource availability. Their winter villages typically consisted of one to three houses, about 9 meters wide and up to 30.5 meters long with pitched roofs. The cedar plank walls were split from standing trees, using antler wedges and then smoothed with adzes (Smith 1940; Carpenter 1986). Cedar logs were also floated downriver to desired locations to process them on shore, generally near villages located on the banks of the creeks and rivers. Many of the villages constructed of cedar involved years of labor and were relatively permanent, often used for generations. Villages were located near river mouths or where a creek joined the main river channel (Hartwich 1972) or above the tidal flats along the margins of “two streams or at the mouth of a stream where it entered the Sound” (Smith 1940). Cedar houses were generally located on high ground away from the river or stream high-water mark. The house faced the water, with the length paralleling the river or stream (Hartwich 1972).

Winter subsistence was composed of freshwater and marine fish, shellfish, game, and preserved food collected during the other seasons. In the spring months, the Puyallup Tribe of Indians moved to temporary shelters made of reed mats and spent their time searching for fish, game, roots, berries, and bulbs. The most important fish resource was the salmon, which were caught at the mouths and along the banks of fish-bearing rivers as the salmon migrated from Puget Sound to native spawning streams. Salmon were smoked or dried for the winter and provided the bulk of food consumed and exchanged in that season (Suttles and Lane 1990).

3.3 Historic Period

Historic Euro-American exploration and settlement in the Puget Sound region begins in the AD 1600s with Spanish exploration along the western coast of North America, including the Puget Sound. In response to Spanish exploration in the region’s western waters, English explorer Captain George Vancouver and his crew investigated Puget Sound in 1792. Vancouver sent Lieutenant Peter Puget and Master Joseph Whidbey on a six-day tour of the Sound in May. The pair named various landmarks, including Whidbey Island and Puget Sound itself, as well as Mount Rainier and Hood Canal. The team then returned to Britain, where Vancouver began preparing a report of his findings. He died before it could be completed (Crowley 2003a). This was followed by the Lewis and Clark expedition in 1804 to 1806 that traveled to the mouth of the Columbia River to explore the lands purchased by the United States from France and the people who lived in them (Tate 2003).

The Hudson’s Bay Company (HBC) was an 1821 partnership between the Bay Company and the North West Company, two rival fur trading operations in Canada and the United States. HBC established its first foothold in today’s Washington state in 1825, when Chief Factor John McLoughlin moved his operation at Fort George north of the Columbia River to Fort Vancouver. From there, Captain Vancouver oversaw expansion into the Puget Sound region, where his staff traveled, trapping and trading with local Tribes until they returned south to Fort Vancouver in the fall. There, the company accepted supplies from a London supply ship each fall and loaded up the empty hold with timber bound for Hawaii. When the ship returned from Hawaii, Captain Vancouver’s staff filled the hold with pelts bound for Great Britain (Nisbet and Nisbet 2011).

Competition from American fur traders increased during the 1830s. In 1833, McLoughlin sent Archibald McDonald to Puget Sound to establish a new trading post and stockade, Fort Nisqually, at today's DuPont, Washington. In 1840, Captain Vancouver established the Puget Sound Agricultural Company at Nisqually to provide crops and livestock to an increasing number of Russian-American fur traders from Alaska (Crowley 2003b; Nisbet and Nisbet 2011). While farming at Fort Vancouver and Fort Nisqually, among other locations, HBC cultivated cattle, hogs, goats, apple trees, grape vines, potato patches, and other crop gardens. Fort Vancouver's wheat harvest alone supplied the company throughout the northwest (Rowe 2018).

HBC's Fort Nisqually was the first non-Native settlement in the Pacific Northwest, and it acted as a local hub, attracting traders, providing goods, and welcoming the first waves of Euro-American settlers. As early as 1841, Congress had passed the Distribution-Preemption Act, which recognized squatter's rights and allowed settlers to buy up to 160 acres for $1.25 an acre after 14 months' residence. In 1843, the provisional government in Oregon was offering 640-acre claims to new settlers, partly to assist the United States in establishing control of the region, which it shared with Great Britain. The United States and Great Britain settled their dispute over where to draw a boundary between the United States and Canada in 1846, settling on the 49th parallel and leaving Fort Nisqually and other HBC properties on lands owned by the U.S. government. The United States continued to encourage Euro-American settlement in the region, and waves of migrating Americans arrived. Soon, relationships between Euro-American settlers and native Tribes deteriorated and the fur trade worsened. Fort Vancouver closed in 1860 and Fort Nisqually in 1870 (Nisbet and Nisbet 2011).

While the depletion of pelts, increased settlement, and worsening Tribal relations spelled the end of HBC in the Northwest, other broad trends in development began to shape the Puget Sound region. In 1849, gold was discovered in California and settlers flowed west, either to hunt for gold or to supply those who did. Concurrently, in a succession of donation land acts, the U.S. government offered free or inexpensive land in Oregon Territory (which included today's Washington state) to settlers who moved to the region and homesteaded. To protect newly arrived settlers in the wake of an attack on Fort Nisqually, the U.S. Army established Fort Steilacoom in today's Pierce County in 1849, which provided medical care and protection but also supported a local road-building program (Denfeld 2012). In 1850, Congress passed the Donation Land Claim Act, which offered 320 acres of federal land to white male adults who established residence on the property by December 1, 1851. If married, the couple could claim an additional 320 acres (Riddle 2010).

In 1853, Washington Territory was carved from the Oregon Territory. While the Donation Land Claim Act was still in effect, the rules changed in 1854, and settlers in the Northwest had to purchase land for $1.25 an acre, which remained the law until the Homestead Act was passed in 1862. The first land patents in Washington Territory were granted in Thurston and Clark counties in 1857 (Riddle 2010).

While settlement increased, the new arrivals brought with them agricultural and ranching practices that introduced new species, suppressed native species, introduced new weeds and new crop diseases, and led to the suppression of traditional life ways, including the late-summer controlled burns that Native Tribes used to prepare the land for new crops of camas and berries (Rowe 2018). While non-Native settlement grew, and tensions rose, Territorial Governor Isaac Stevenson negotiated a series of treaties with Native inhabitants, confining them to reservations away from their native homelands and further increasing tensions that eventually led to war (Rowe 2018).

The Medicine Creek Treaty (1854) and the Point Elliott Treaty (1855) were both attempts by the U.S. government to buy territory and fishing rights from the Tribes in exchange for permanent reservation lands (Ruby and Brown 1986). In late December 1854, Stevens, General George Gibbs, and local officials met with 600 Native American Tribal members, including members of the Nisqually, Puyallup, and Squaxin Tribes near She-na-nam, or Medicine Creek (now known as McAllister Creek), approximately 20 miles southwest of Tacoma, in Nisqually (Gibbs 1877). The Medicine Creek Treaty (1854) removed Native Americans from about 2.2 million acres of their traditional lands and granted three reservations for them to share. The treaty provided rights to fish, hunt, gather roots and berries, and pasture horses; provided rules of conduct; and appropriated $32,500 to be paid to the Tribes over a 20-year period. The treaties forced Native Americans to relocate to one of several reservations designated in the treaties (Ruby and Brown 1986). Of the three initial reservations defined in the Medicine Creek and Point Elliott treaties, the largest was the Puyallup, with 1,280 acres. The Puyallup Reservation was home to people who identified with the Nisqually, Cowlitz, Muckleshoot, and other local area Tribal groups (Kirk and Alexander 1990; Smith 1940; Suttles and Lane 1990).

Between 1855 and 1858, what was then called the “Indian Wars” broke out and unsettled Native American and Euro-American relations across Washington Territory, leading many homesteaders to retreat to secure locations like Fort Steilacoom and briefly limiting settlement in some locations, including Pierce County (Rowe 2018). However, with the end of hostilities, settlement soon increased again. With the success of local agriculture, the availability of timber, and access to the rivers of Puget Sound, settlers spread across the region. New advancements in transportation, including the coming of the nation’s second transcontinental railroad, further spurred development. After the Puget Sound Indian War of 1855–1858, the Nisqually, Puyallup, and White and Green River Tribes met with an American delegation led by Governor Stevens on Fox Island. Two of the resulting agreements were the enlargement of the Puyallup Reservation to 18,062 acres by executive order (Ruby and Brown 1992) and recognition of the need for a reservation in a more appropriate location for those groups culturally linked to inland areas. The reservation was to be placed between the White and Green Rivers at Muckleshoot, where a U.S. Army fort was located on the prairie of the same name.

The passage of the 1862 Homestead Act granted 160 acres to individual U.S. citizens in an effort to further encourage non-Native settlement. Eventually, commercial and residential development expanded, and citizens began to request that restrictions on reservation lands be removed to accommodate urban and industrial growth. Many Tribal landowners would eventually lose their properties through sale, auction, or approval by the government for automatic inclusion in land grants. In 1864, a land grant was provided for the construction of the Northern Pacific Railroad (NP), and a line was planned that would extend from the Great Lakes to Tacoma.

In 1873, as Northern Pacific Railroad executives toured Washington in search of a terminus for their new railroad line, cities up and down Puget Sound competed for the honor, offering perks and financial advantages, knowing that with the railroad would come industry, a growing population, and wealth. In July 1873, Northern Pacific executives announced that Tacoma’s Commencement Bay would be the railroad’s new terminus. It was undeveloped and closer to the rail line’s route along the Columbia River than Seattle. The decision set off a bitter rivalry between the two cities and kicked off decades of rail expansion in the area, thrilling entrepreneurs like Tacoma’s first promoter, Matthew McCarver, who had located the city on Commencement Bay hoping to attract the railroad to its deep-water port (MacIntosh and Wilma 1999).

3.4 Additional Alternative-Specific, Historic Context

This section of the report focuses on a more detailed context for historic developments within and near the APE for OMF South that will be constructed in King County. Because there are differences in the developmental histories within the Area of Potential, this section discusses the historical context for the Preferred Alternative, the South 344th Street Alternative, and the Midway Landfill Alternative.

3.4.1 Preferred Alternative

The Preferred Alternative would be constructed in southern King County in the city of Federal Way.

While urban centers like Tacoma and Seattle were quick to grow, today’s Federal Way was slow to develop. In the 1850s, under supervision of the U.S. Army, surveyors began to prepare a road between Fort Steilacoom in Pierce County and Fort Bellingham in King County (Meador 2014).

While the military road was designed to ease the movement of troops, the transportation corridor allowed for increased exploration in the area. By 1880, a school was established at Star Lake, approximately 6 miles north of the APE, near where the town’s first post office would be established in 1891. In 1890, Arthur Steele settled at what is now known as Steel Lake, approximately 1 mile north of the APE, which would become the site of one of the area’s first sawmills in 1890. While settlement picked up slowly, timber was plentiful. Homesteaders constructed log cabins, logged the surrounding area, and constructed skid roads to move their logs to the Sound for distribution and corduroy roads for overland travel (Historical Society of Federal Way 2015).

Not until the turn of the century did Federal Way attract much commercial development. In 1904, Charles Betts opened the first store in this rural community, which was generally limited to small farmsteads. While the area remained sparsely developed, as early as 1910, the Pacific Highway Association was meeting in Seattle to discuss how to construct a highway between Mexico and Canada. In 1915, the U.S. Army Corps of Engineers began constructing a dirt road while headquartered at Camp Lewis. In 1925, the U.S. government designated the original dirt road an interstate highway, US 99 (also called the Pacific Highway), thereby freeing up federal funds for paving the section between Tacoma and Seattle, which ran alongside the Military Road in many places and was sometimes known as the “federal way” (Givens 2017). Completed in 1930, the highway connected today’s Federal Way to the rest of the west by way of a smooth, generally straight, concrete thoroughfare, but the Great Depression, which descended in the 1930s, stalled roadside development in the area. The Depression was followed by World War II, which centered resources on the war effort, further curtailing growth in small rural hubs and concentrating new growth in Seattle and Tacoma, where ship and airplane builders were most active.

With the end of World War II, development again picked up in the area, and those traveling US 99 soon found restaurants, diners, and hotels in today’s Federal Way, along with roadside attractions and shopping centers, including the Federal Way Shopping Mall at the southwest corner of US 99 and S 312th Street, just northwest of the APE (Givens 2017; Historical Society of Federal Way 2015; Stein 2003).

Like many small communities in Washington, Federal Way saw expansion in the late twentieth century due to the construction of I-5 just 1 mile east of US 99. Soon, construction teams were building new housing developments, some of which were built to accommodate employees of a nearby Boeing plant and their families. In 1968, Weyerhaeuser began to build its corporate headquarters in Federal Way. It opened officially in 1971. In 1979, a 798-car, 5.62-acre park-and-ride lot opened off I-5 at S 320th Street. At the time, it was the largest such lot in Washington. Other large developments, including the Wild Waves Pool at Enchanted Village, which remains visible east of I-5 today; St. Francis Community Hospital and a Federal Way Costco store were constructed in the 1980s (Historical Society of Federal Way 2015; Stein 2003).

Federal Way attempted to incorporate first in 1971, then again in 1981 and 1985, but failed. In 1989, voters finally approved incorporation, and the city of Federal Way was officially incorporated in 1990 (Stein 2003).

3.4.2 South 344th Street Alternative

The South 344th Street Alternative would be constructed in southern King County in the city of Federal Way.

While urban centers like Tacoma and Seattle were quick to grow, today’s Federal Way was slow to develop. In the 1850s, under supervision of the U.S. Army, surveyors began to prepare a road between Fort Steilacoom in Pierce County and Fort Bellingham in King County (Meador 2014).

While the military road was designed to ease the movement of troops, the transportation corridor allowed for increased exploration in the area. By 1880, a school was established at Star Lake, approximately 6 miles north of the APE, near where the town’s first post office would be established in 1891. In 1890, Arthur Steele settled at what is now known as Steel Lake, approximately 1 mile north of the APE, which would become the site of one of the area’s first sawmills in 1890. While settlement picked up slowly, timber was plentiful. Homesteaders constructed log cabins, logged the surrounding area, and constructed skid roads to move their logs to the Sound for distribution and corduroy roads for overland travel (Historical Society of Federal Way 2015).

Not until the turn of the century did Federal Way attract much commercial development. In 1904, Charles Betts opened the first store in this rural community, which was generally limited to small farmsteads. While the area remained sparsely developed, as early as 1910, the Pacific Highway Association was meeting in Seattle to discuss how to construct a highway between Mexico and Canada. In 1915, the U.S. Army Corps of Engineers began constructing a dirt road while headquartered at Camp Lewis. In 1925, the U.S. government designated the original dirt road an interstate highway, US 99 (also called the Pacific Highway), thereby freeing up federal funds for paving the section between Tacoma and Seattle, which ran alongside the Military Road in many places and was sometimes known as the “federal way” (Givens 2017). Completed in 1930, the highway connected today’s Federal Way to the rest of the west by way of a smooth, generally straight, concrete thoroughfare, but the Great Depression, which descended in the 1930s, stalled roadside development in the area. The Depression was followed by World War II, which centered resources on the war effort, further curtailing growth in small rural hubs and concentrating new growth in Seattle and Tacoma, where ship and airplane builders were most active.

With the end of World War II, development again picked up in the area, and those traveling US 99 soon found restaurants, diners, and hotels in today’s Federal Way, along with roadside attractions and shopping centers, including the Federal Way Shopping Mall at the southwest corner of US 99 and S 312th Street, just northwest of the APE (Givens 2017; Historical Society of Federal Way 2015; Stein 2003).

Like many small communities in Washington, Federal Way saw expansion in the late twentieth century due to the construction of I-5 just 1 mile east of US 99. Soon, construction teams were building new housing developments, some of which were built to accommodate employees of a nearby Boeing plant and their families. In 1968, Weyerhaeuser began to build its corporate headquarters in Federal Way. It opened officially in 1971. In 1979, a 798-car, 5.62-acre park-and-ride lot opened off I-5 at S 320th Street. At the time, it was the largest such lot in Washington. Other large developments, including the Wild Waves Pool at Enchanted Village, which remains visible east of I-5 today; St. Francis Community Hospital; and a Federal Way Costco store were constructed in the 1980s (Historical Society of Federal Way 2015; Stein 2003).

Federal Way attempted to incorporate first in 1971, then again in 1981 and 1985, but failed. In 1989, voters finally approved incorporation, and the city of Federal Way was officially incorporated in 1990 (Stein 2003).

3.4.3 Midway Landfill Alternative

The Midway Landfill Alternative would be constructed in Midway, a small community in the city of Kent, located in southern King County.

As with surrounding King and Pierce counties, the community of Kent began as an agricultural community established on the cleared lands of Washington’s river valleys at the end of hostilities between Euro-American settlers and Native American Tribes (Stein 2001).

Early settlers cut timber and founded farms, providing crops including hops to an expanding market. Wildly successful for a decade, the hop market collapsed in 1891 after aphids decimated local crops, which never recovered. While hops failed, the valley’s agricultural tradition was strong, and dairying, farming, egg production, and vegetable farming grew in the region while the city of Kent established the schools, churches, and commercial developments needed to support the growing city center. Much of what the valley produced was sent to market in urban centers like Seattle and Tacoma. By 1920, the region’s successful Japanese farmers, generally first-generation Issei, were supplying half the fresh milk and more than 70 percent of the vegetables and fruits consumed in Seattle. The strength of the agricultural community helped sustain Kent through the Great Depression. However, with the beginning of World War II, the valley was forever changed. Japanese families, only some of whom were allowed to sell or otherwise negotiate the care of their lands, were interned under Executive Order 9066. The government took 1,600 acres of land and distributed it to other farmers. With the war’s end, few Japanese farmers returned to the area (Stein 2001).

It was also during the 1930s and 1940s that the area known as Midway developed. This development was prompted by the expanding transportation network between Tacoma and Seattle, particularly the White River bypass (now SR 99) in 1928 (Seattle Times 1928). Located along SR 99 and named for its location midway between Tacoma and Seattle, the area provided motels and diners for highway drivers. Beginning in 1931, however, Midway became known as an entertainment hotspot for the roadside spectacle known as the Highline Spanish Castle, a live music venue that drew people from around Puget Sound to dance to the big bands (Blecha 2002; City of Kent 2001; Seattle Times 1964).

In 1945, the Meade Sand and Gravel Company based out of Auburn, Washington, began using the alternative site as a sand and gravel mine. Originally, the mine was adjacent to a natural drainage basin that was often used as a settling pond. The drainage, located on the northeast section of the present landfill, was drained near the end of the mine’s operations; as a result, most of the landfill floor is covered in a layer of fine silts and clays. The city of Seattle leased the site in 1966 for use as a landfill. The site was primarily used as a landfill for demolition debris; however, some hazardous and industrial wastes were buried there. The placement of hazardous waste on-site was halted in 1980, and the landfill was closed in 1983 (EPA 2000).

In 1984, the landfill was nominated for inclusion on the federal National Priorities List (NPL) and then listed in 1986. This designation is commonly referred to as a “Superfund” designation. In 1990, the city of Seattle and the Washington State Department of Ecology (Ecology) entered into a Consent Decree for environmental remediation of the site. This decree required that the landfill surface be filled, graded, and capped; a stormwater detention pond be constructed with associated dewatering and discharge systems; the Linda Heights Park stormwater system be diverted; and a landfill gas control system installed (EPA 2000).

Regional growth in the area was partly due to the control of the valley’s rivers, which traditionally led to intense flooding. In 1965, the U.S. Army Corps of Engineers completed a dam for the Green River, thereby limiting flooding in Kent. Boeing was one of many industrial developers to come to Kent. I-5 was completed through Kent in 1966, and decades of growth followed. Warehouse and manufacturing plants sprung up, to be followed by a wave of high-tech development (Stein 2001).

4 ARCHAEOLOGICAL EXPECTATIONS

4.1 Alternative-Specific Cultural Sensitivity Summaries

The following section provides summaries of data presented above, as well as expectations for discovery of precontact and historic archaeological sites. The discussions below are specific to each of the alternatives: Preferred, South 344th Street, and Midway Landfill. In general, based on information presented above, the Midway Landfill Alternative has a lower likelihood of including archaeological resources than the Preferred and South 344th Street alternatives.

Within each of the APE, potential culture-bearing sediments are anticipated to be located near the surface due to the geologic setting of the OMF South project area (see Section 3).

4.1.1 Preferred Alternative

Based on DAHP’s predictive model data and assessment of the background data, the APE for this alternative has a very low to low probability for precontact archaeological materials. The location’s use as timberland and farmland as well as commercial, residential, and light industrial development has very likely destroyed any precontact archaeological materials that may have been present. The potential for precontact archaeological materials in the immediate vicinity of the Preferred Alternative is likely low based on this history of development and the glacial landform on which the APE is primarily situated. Historic land use has modified the landscape and near-surface archaeological potential. The construction of SR 99 and I-5 have also dramatically affected the landforms in the APE.

US 99 is a historic transportation corridor, completed in 1928, which provided ease of access to the area. Extensive development did not occur until the 1950s with the expansion of commercial, industrial, and residential areas. Historic archaeological potential within the APE for this alternative is moderate.

Given the scale of ground disturbances with original construction and subsequent expansions of US 99 and I-5, the Christian Faith Center, and other large landscape alternation projects, it is probable that, if precontact and historic cultural resources existed, they are disturbed and/or intermixed with historic/recent fill deposits.

4.1.2 South 344th Street Alternative

Based on DAHP’s predictive model data and assessment of the background data, the APE for this alternative has a very low to low probability for precontact archaeological materials. The location’s use as timberland and farmland as well as commercial, residential, and light industrial development has very likely destroyed any precontact archaeological materials that may have been present. The potential for precontact archaeological materials in the immediate vicinity of the South 344th Street Alternative is likely low based on this history of development and the glacial landform on which the APE is primarily situated. Historic land use has modified the landscape and near-surface archaeological potential. The construction of US 99 and I-5 have also dramatically affected the landforms in the APE.

US 99 is a historic transportation corridor, completed in 1928, which provided ease of access to the area. Extensive development did not occur until the 1950s with the expansion of commercial, industrial, and residential areas. Historic archaeological potential within the APE for this alternative is moderate.

Given the scale of ground disturbances with original construction and subsequent expansions of US 99 and I-5, and other large landscape alternation projects, it is probable that, if precontact and historic cultural resources existed, they are disturbed and/or intermixed with historic/recent fill deposits.

4.1.3 Midway Landfill Alternative

Based on DAHP's predictive model data and assessment of the background data, the APE for this alternative has a very low probability for precontact archaeological materials. The location's use as first a gravel mine and then a landfill has very likely destroyed any precontact archaeological materials that may have been present. The potential for precontact archaeological materials in the immediate vicinity of the Midway Landfill is likely low based on this history of development and the glacial landform the APE is primarily situated on. Historic land use, including agriculture and urban development, has modified the landscape and near-surface archaeological potential. The construction of US 99 and I-5 have also dramatically affected the landforms in the APE.

US 99 is a historic transportation corridor, completed in 1928, which provided ease of access to the area. Extensive development did not occur until the 1950s with the expansion of commercial, industrial, and residential areas. Historic archaeological potential within the APE for this alternative is relatively low, in large part because the landfill dominates this APE.

Given the scale of ground disturbances with initial construction of US 99 and I-5 and subsequent expansions, the historic limits of the Meade Sand and Gravel Mine, and modern filling, capping and remediation of the Midway Landfill, it is probable that, if precontact and historic cultural resources existed, they are disturbed and/or intermixed with historic/recent fill deposits.

4.2 Expectations

From an archaeological perspective, precontact and ethnographic site types that could be encountered within the APE include short-term field camps and seasonally utilized resource-procurement and processing loci. Resource procurement and processing loci represent a wide variety of activities that vary according to resource types present and environmental setting. Site functions likely varied from short-term occupation sites to task-specific processing or resource-extraction sites. Activities at these kinds of sites would include shellfish or salmonid procurement, game hunting sites, plant gathering areas, felling trees for planks, and localities where flaked and ground stone material sources exist. In addition, other site types or features would have been present in the precontact and early contact period cultural landscapes associated with occupation of upland settings. These include trails linking villages or accessing resource procurement loci, rock art, culturally modified trees, and burials among others; however, it is unlikely that the latter set of site types are extant because of modern and historic development and logging.

From the information developed in Sections 2 and 3 of this technical report, there is evidence of known historic archaeological sites that range from assumed remains of an array of commercial, governmental, and residential structures, historic trash deposits and dumps, and road beds that have been abandoned and covered by later developments, and a large array of associated features. These may include privies, storage dugouts, outbuildings, cemeteries, agricultural buildings, fields, and orchards, among others.

The risk of encountering near-surface ethnohistoric and historic archaeological materials in the APE is reduced by historic land alterations related to industrialization, development, and urban growth at all three alternative locations – in particular, the Midway Landfill Alternative. Within the Preferred Alternative and South 344th Street APE, the historic landscape alterations include historic logging and agriculture, extensive land reclamation, and development intensifying in the mid-20th century.

5 METHODS

5.1 Archaeological Investigations

All archaeological survey coverage was restricted to those parcels where a right of entry had been procured by Sound Transit and municipal and state rights-of-way (Figures G4.6-1, G4.6-2, G4.6-11, G4.6-12, and G4.6-16). Within these constraints the archaeological field investigations began with a pre-field identification of locations within the APE, as defined by the conceptual design for the project, that would be accessible for investigation. This review resulted in the identification of locations for subsequent subsurface investigation. A pedestrian survey within the anticipated area of ground disturbance was undertaken using adjacent transects spaced at 10-meter intervals (maximum). All areas not subject to pedestrian reconnaissance due to artificial surface coverage (pavement or imported fill) were identified and documented.

Shovel probes and hand augering were used to investigate areas where ground disturbance is anticipated. Shovel probes were spaced between 20 meters apart in areas of high archaeological probability and 30 meters apart in areas where the probability of encountering archaeological resources is generally low. Areas of apparent previous disturbance were identified and classified as low sensitivity areas; however, the depths of proposed impacts were considered when determining the appropriate survey method for a given landform. Prior to subsurface survey, all proposed excavation locations were cleared by utility locates.

Each shovel probe was a minimum of 30 centimeters in diameter and was excavated to approximately 20 centimeters into intact glacially deposited sediment up to 1 meter below surface where possible. In some locations, where deeper fill was anticipated or encountered, shovel probes were replaced with auger cores, which can more efficiently be used to investigate soils underlying fill. When glacially derived parent material (e.g., intact glacial till or outwash) was identified, the excavation was terminated.

All sediments/soils excavated during archaeological survey were screened through 0.25-inch wire mesh hardware cloth. Global positioning system coordinates were collected for each shovel probe and auger core and incorporated into a map layer (Figures G4.6-3, G4.6-4, G4.6-13, G4.6-14, and G4.6-17). Soil types and colors were documented using the Munsell Soil Color Chart for each shovel probe and auger core. When sediment change was observed during excavations, the depth of transition and information on whether the transition is abrupt or gradual was documented. A brief statement of stratigraphic interpretation was compiled for all geographical areas where general stratigraphic trends were identified. Each shove probe and auger core were photographed. The shovel probe log is provided in Attachment G4-3.

Archaeological survey occurred over several field sessions. The first took place in February 2020 and included a systematic 10-meter transect interval pedestrian survey of the Preferred, South 344th Street, and Midway Landfill alternatives to document existing conditions within the APE. This survey excluded the mainline segment areas of the Preferred and South 344th Street APE where they overlapped with the APE for the Tacoma Dome Link Extension (TDLE). Subsurface shovel probe surveys were limited to accessible undeveloped areas of the Preferred and South 344th Street alternatives. Field staff documented survey areas, surface conditions, and any archaeological resources that were present (Figures G4.6-3, G4.6-4, G4.6-13, G4.6-14, and G4.6-17). The second field session occurred in June 2020 and consisted of assessments of the previously identified resources (see Sections 6.1.1.4 and 6.1.1.5). The third field session for the mainline segment within the OMF South and TDLE overlap area was completed in January 2021.

5.1.1 Areas Contaminated by Biohazards

In addition to standard safety protocols and pre-fieldwork discussion of the hazards and safety methods briefing, the potential hazards presented to field crew in settings where hazardous waste was identified were mitigated by wearing eye protection, face masks, leather gloves, and using sanitizers. Site-specific fieldwork methods to mitigate the hazardous conditions, particularly from human excrement and drug-related paraphernalia, were devised. The methods employed included 1) scraping off the loose surface layer containing the majority of the hazardous material prior to excavation; 2) excavating, but not screening, the first 10-centimeter (6-inch) layer of sediment; 3) screening excavated sediments to minimize shaking with careful removal of non-modern historic artifacts, and; 4) avoiding contact with items perceived as potentially hazardous.

5.1.2 COVID-19 Protocols

Following the outbreak of COVID-19, the safety protocols observed during field investigations were amended to be consistent with the Governor's Office "Stay Home, Stay Healthy" proclamation; Governor Inslee's March 25, 2020, memorandum; Governor Inslee's Construction Working Group Recommendations (April 23, 2020); and the Center for Disease Control and Occupational Safety & Health Act of 1970 guidance. These amendments were detailed in Governor Inslee's recommendations in 30 detailed points, which included specialized safety training, contact tracing documentation, social distancing, amendments to standard personal protective equipment (PPE), standards of sanitation and cleanliness, and an overview of employee health and COVID-19 symptoms.

5.1.3 Site-Specific Investigation Methods

Two historic archaeological sites, 45KI1542 and 45KI1543, were discovered during surveys of the Preferred Alternative and South 344th Street APE. The first, 45KI1542, is in the Preferred Alternative APE and consists of the remnants of a concrete foundation and stub walls of a historic building dating to the 1930s. The second, 45KI1543, is within both the Preferred and South 344th Street APE. This site consists of a sparse scatter of modern and temporally non-diagnostic construction debris. The results of the archaeological investigations at these sites are further described in Section 6.1.

Around 45KI1542, a pedestrian survey was conducted, maintaining a constant 1-meter interval spacing across the site to identify the full extent of the foundation and any associated historical debris on the surface. Where access was possible, shovel probes were excavated at distances of 5 and 10 meters around the perimeter of the foundation (see Figure G4.6-27). The location of shovel probes was restricted due to existing ground conditions. All shovel probes were excavated using the methodology described above.

Around 45KI1543, a pedestrian survey was conducted, maintaining a constant 2-meter-interval safety spacing across the entire landform to identify any historic debris on the surface and the presence of utilities. Excavations began in the northeast corner of the landform and progressed at 3-meter intervals in cardinal directions from the initial positive shovel probes until two negative probes had been excavated, or the landform conditions restricted further testing. All shovel probes were excavated using the methodology described above.

ATCRC and HRA evaluated all surveyed resources for eligibility to the NRHP, WHR, and KCRHP (see detailed discussion of these registers and criteria below in Section 5.3). Although criteria for listing vary between national, state, and local jurisdictions, all listing criteria are based on those established for the NRHP with local nuances for WHR and local registers. Therefore, ATCRC and HRA completed evaluations under all NRHP criteria and drew its conclusions regarding state and local listing from these evaluations. DAHP does not provide determinations of eligibility for local jurisdictions (Section 5.3).

5.2 Built-Environment Survey and Inventory

From August to November 2019, HRA conducted archival research on the history of the APE. Archival research consisted of background research using King County Assessor’s records, historic maps and aerials, and previously prepared records located in DAHP’s WISAARD database. To complete historic contexts on development within the APE, HRA reviewed local histories, historic maps, newspaper archives, resources in HRA’s own library, and additional online sources, as needed.

In December 2019 and January and May 2020, HRA conducted a survey and inventory of all resources within the APE that would be 40 years old or older at the beginning of project construction, estimated to be the year 2025. By 2025, historic-period, built-environment resources built in 1985 or earlier will be 40 years old, meeting age criteria for listing as King County Landmarks but not the WHR or NRHP. Historic-period, built-environment resources that are 50 years old or older by 2025 will have reached the age at which they can qualify for listing in the WHR and NRHP. Survey and inventory were conducted to meet DAHP’s updated Standards for Cultural Resources Reporting (DAHP 2020a).

The only historic-period, built-environment resources built in 1985 or earlier that were exempted from survey were BPA transmission system elements. In 2020, as the lead federal agency for relocating the BPA transmission lines under NEPA, BPA conducted its own consultation with SHPO under Section 106 regarding the relocation of towers along the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines in association with OMF South. BPA determined that the transmission lines were eligible for listing in the NRHP but that proposed tower relocation does not constitute an adverse effect under Section 106. In a letter dated August 19, 2021, SHPO concurred with the finding (see Attachment G4-6). Subsequently, in a letter dated October 27, 2023, FTA determined that the tower relocation does not constitute an adverse effect under Section 106 and SHPO concurred in a letter dated October 31, 2023. Therefore, no additional analysis of effects on the transmission lines was warranted. Additional exemptions included all other built-environment resources already documented in DAHP’s WISAARD database and having an HPI that had received a formal determination of eligibility within the last ten years. Documentation for those resources was considered up to date, and no further documentation was required, as per DAHP’s guidelines (DAHP 2020a).

King County Assessor’s records provided dates of construction for most resources within the APE. In cases where no dates of construction were available but a review of maps or aerial photographs suggested that historic-period, built-environment resources may be present, dates of construction could not be determined by desktop research. In those instances, HRA conducted a field visit to the locations, and when historic-period, built-environment resources were present, they were added to the survey and documented and evaluated.

5.2.1 Field Survey

Field documentation included photographing all visible exterior elevations of each historic-period resource and collecting field notes on an electronic tablet, noting character-defining features, characteristics of style, materials, and evidence of alteration, as per the Washington State Standards for Cultural Resources Reporting (DAHP 2020a). All resources were surveyed from the public right-of-way, unless otherwise noted. Results from HRA's study were recorded in HPIs in WISAARD's database for all resources old enough to qualify for listing in the NRHP (Attachment G4-5). No HPIs were completed for those resources not old enough to qualify for the NRHP or those for which DAHP or a lead agency has already made a determination of eligibility.

The results of survey and inventory, paired with additional archival research, resulted in Sound Transit's initial recommendations regarding each surveyed resource's eligibility for listing in the NRHP. FTA, in consultation with SHPO, determined the NRHP eligibility of surveyed resources.

To be eligible for listing in the NRHP, a resource must meet one of four criteria for significance (NRHP Criteria A, B, C, or D) and possess sufficient integrity to express its significance (NPS 1995). See Section 1.4, Regulatory Setting.

6 RESULTS

6.1 Archaeological Survey and Results

This section details the archaeological survey sessions and the results for the APE.

6.1.1 Field Survey

The first archaeological survey session occurred over five days across the APE. Pedestrian survey with photographic recordation of surface condition, utilities, and areas of interest occurred on February 13, 14, and 19, 2020. Sub-surface survey occurred on February 24 and 25, 2020, using the methods described above (Section 5.1). During this field session, ATCRC identified two previously unrecorded historic-period archaeological sites. Additional investigations were performed at each site during the second archaeological survey session.

From June 10–12, 2020, a second archaeological survey session occurred at the historic-period archaeological sites identified within the APE in the Preferred and South 344th Street Alternatives areas. The goals of the additional targeted efforts at the site of the historic-period foundation (45KI1542) were to identify subsurface features related to the 1930s- to 1950s-era historic use of the structure, and assess the extent, content, and depositional context of any historic-period deposits. The goals for the artifact scatter (45KI1543) were to excavate radials at cardinal directions around previously excavated shovel probes that contained artifacts, thereby determining extent, content, and depositional context of the scatter subsurface cultural resources.

The survey of the OMF South and TDLE overlap area was conducted from January 4 to 21, 2021. The survey of the overlap area was conducted concurrently with other TDLE survey areas. During the survey, HRA and ATCRC identified one historic-period archaeological isolate (45KI1583). The isolate is an amber glass beer bottle dating to 1966 (Figure G4.6-45).

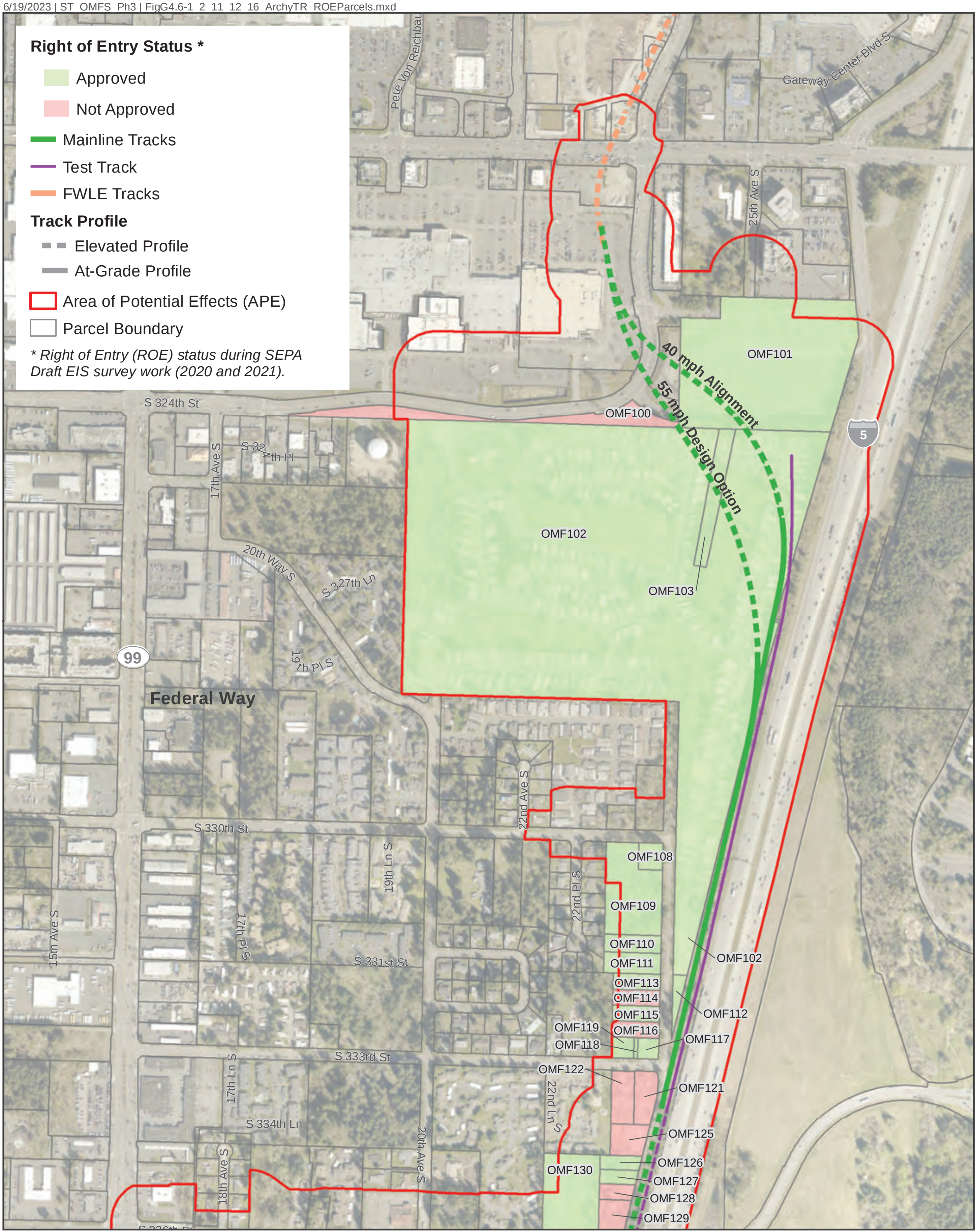
Each survey consisted of additional pedestrian transects with photographic documentation of surface conditions, utilities, etc., and a subsurface survey of each location. The survey methods for these locations vary from the standard methodology described in Section 5.1.

6.1.1.1 Preferred Alternative

Within the Preferred Alternative APE, rights of entry were acquired that centered around two large properties, the Belmor Park Golf & Country Club (Belmor) and the Christian Faith Center, and all municipal and state rights-of-way, including the WSDOT right-of-way along I-5. Those parcels within the defined APE that were not evaluated as potential subsurface survey areas because rights of entry had not been obtained are identified in Figures G4.6-1 and G4.6-2.

The survey proceeded with a pedestrian assessment and photo documentation of all accessible areas within the APE. For those parcels where a right of entry had not been obtained, the survey was conducted from the nearest public right-of-way. The survey also included a limited pedestrian survey of the wetlands located within parcel OMF 152 (Figures G4.6-4 and G4.6-5). Subsurface investigations within the APE began in OMF 151 (Figures G4.6-2 and G4.6-4). Much of the parcel has been developed with extensive paved parking lots surrounding the Christian Faith Center. These paved areas are partially surrounded by ornamental green space that were sampled where utilities were not present (Figure G4.6-6). The excavations along the northwest corner of OMF 151, adjacent to OMF 152, were along a slope composed of multiple soil types (Figure G4.6-4). These soil strata are modern fill events mixed with expected soil horizons per Natural Resource Conservation Service (NRCS) data (stratified muck) resulting from flood events within the wetlands (OMF 152) overlaying glacial till. Elsewhere on the property, fill of varying thickness was found immediately overlaying noncultural glacial deposits (Figures G4.6-4 and G4.6-7).

The far southern portion of parcel OMF 151, near OMF 180, is a large, mounded platform that has been substantially modified during and after the 1970s. The subsurface investigations on this landform identified soil containing modern bricks, glass fragments, and tile mixed with charcoal at depths ranging from 15 to 30 centimeters below surface in SPs 47A, 47B, and 51 (Figure G4.6-4 and Attachments G4-3 and G4-4). These excavations and additional adjacent excavations indicate that the platform was apparently created through multiple episodes of deposition of modern fill over glacial till deposits that were identified at depths between 35 to 45 centimeters below surface. These artifact-bearing sediments represent an archaeological deposit defined as site 45KI1543. Following discussions with Sound Transit, further investigations at site 45KI1543 were determined necessary to assess the content, subsurface extent, and context of this historic deposit (see Section 6.1.1.6 and 6.1.2.2 below; Attachment G4-4).

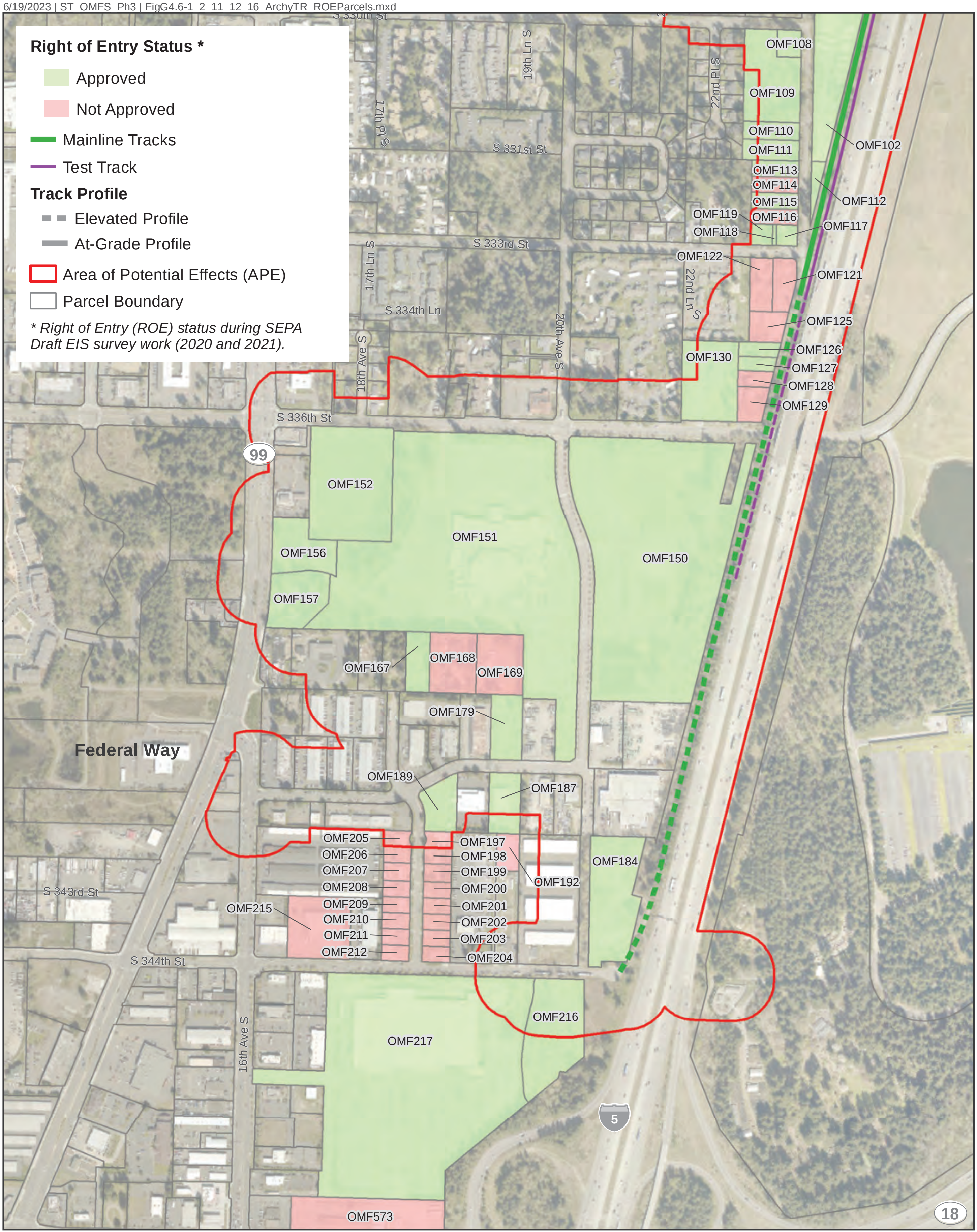

Right of Entry Status *
🟩 Approved
🟥 Not Approved
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
Parcel Boundary
* Right of Entry (ROE) status during SEPA Draft EIS survey work (2020 and 2021).
Pete Von Reichbau
Gateway Center Blvd S
25th Ave S
40 mph Alignment
55 mph Design Option
OMF101
OMF100
OMF102
OMF103
S 324th St
S 324th Pl
17th Ave S
20th Way S
S 327th Ln
19th Pl S
99
5
Federal Way
22nd Ave S
S 330th St
19th Ln S
22nd Pl S
17th Pl S
15th Ave S
S 331st St
OMF108
OMF109
OMF110
OMF111
OMF113
OMF114
OMF115
OMF116
OMF119
OMF118
OMF112
OMF117
S 333rd St
OMF122
22nd Ln S
OMF121
17th Ln S
S 334th Ln
20th Ave S
18th Ave S
OMF125
OMF126
OMF127
OMF128
OMF129
OMF130
S 336th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4.6-1
Archaeological Rights of Entry
Preferred Alternative Mainline

OMF South

6/19/2023 | ST_OMFS_Ph3 | FigG4.6-1_2_11_12_16_ArchyTR_ROEParcels.mxd

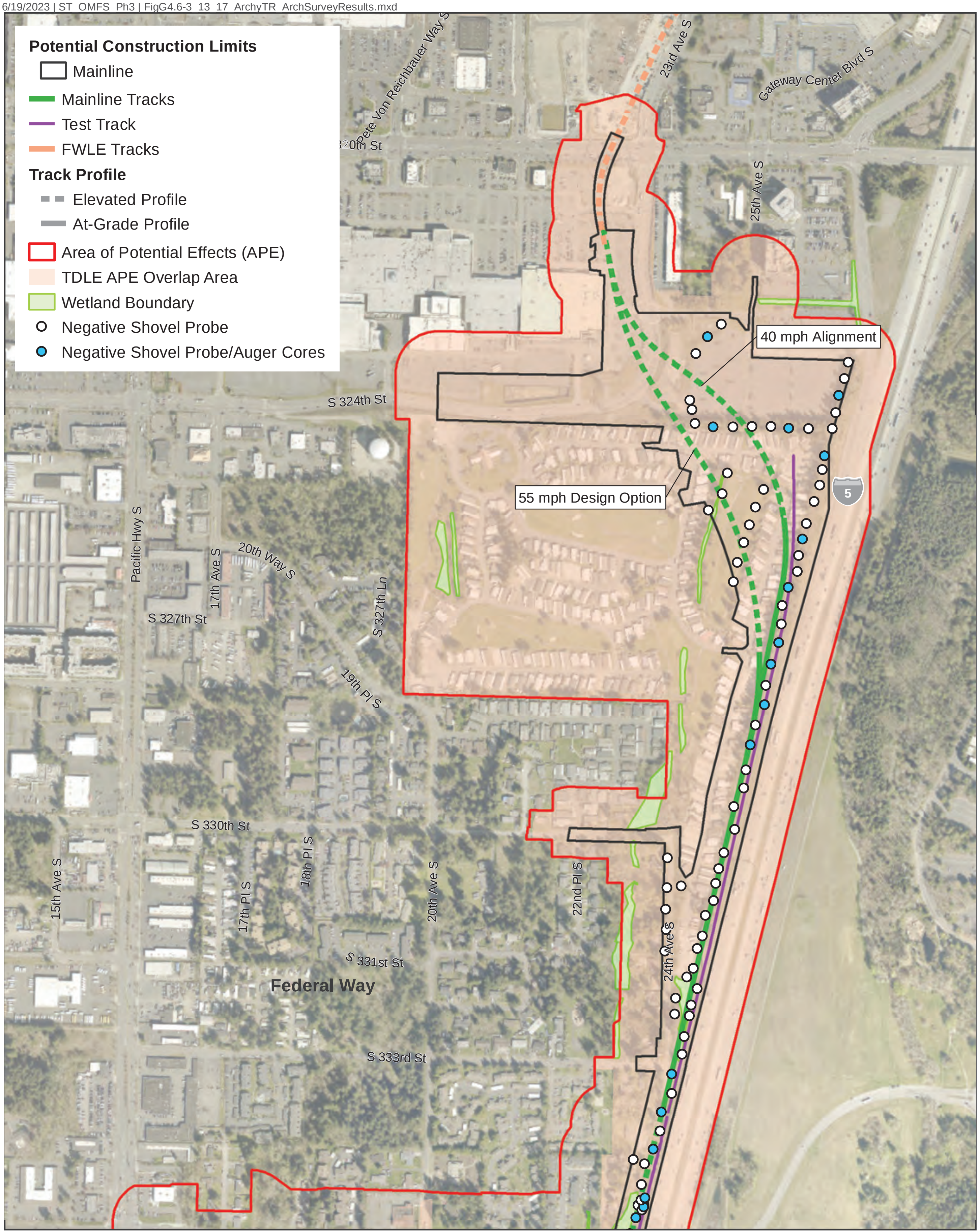


Right of Entry Status *
🟩 Approved
🟥 Not Approved
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
Parcel Boundary
* Right of Entry (ROE) status during SEPA Draft EIS survey work (2020 and 2021).
S 330th St
19th Ln S
17th Pl S
22nd Pl S
S 331st St
S 333rd St
17th Ln S
S 334th Ln
22nd Ln S
20th Ave S
18th Ave S
S 336th St
99
S 343rd St
S 344th St
16th Ave S
Federal Way
5
18
OMF108
OMF109
OMF110
OMF111
OMF102
OMF113
OMF114
OMF115
OMF116
OMF112
OMF119
OMF118
OMF117
OMF122
OMF121
OMF125
OMF126
OMF127
OMF128
OMF129
OMF130
OMF152
OMF151
OMF150
OMF156
OMF157
OMF167
OMF168
OMF169
OMF179
OMF189
OMF187
OMF205
OMF206
OMF207
OMF208
OMF209
OMF210
OMF211
OMF212
OMF215
OMF197
OMF198
OMF199
OMF200
OMF201
OMF202
OMF203
OMF204
OMF192
OMF184
OMF216
OMF217
OMF573
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4.6-2
Archaeological Rights of Entry
Preferred Alternative

OMF South


Potential Construction Limits
Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
TDLE APE Overlap Area
Wetland Boundary
Negative Shovel Probe
Negative Shovel Probe/Auger Cores
Pete Von Reichbauer Way S
23rd Ave S
Gateway Center Blvd S
S 320th St
25th Ave S
40 mph Alignment
S 324th St
55 mph Design Option
5
Pacific Hwy S
17th Ave S
20th Way S
S 327th Ln
S 327th St
19th Pl S
S 330th St
18th Pl S
15th Ave S
17th Pl S
20th Ave S
22nd Pl S
24th Ave S
S 331st St
Federal Way
S 333rd St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

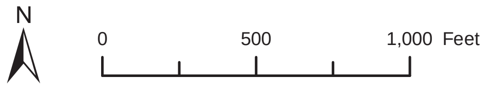
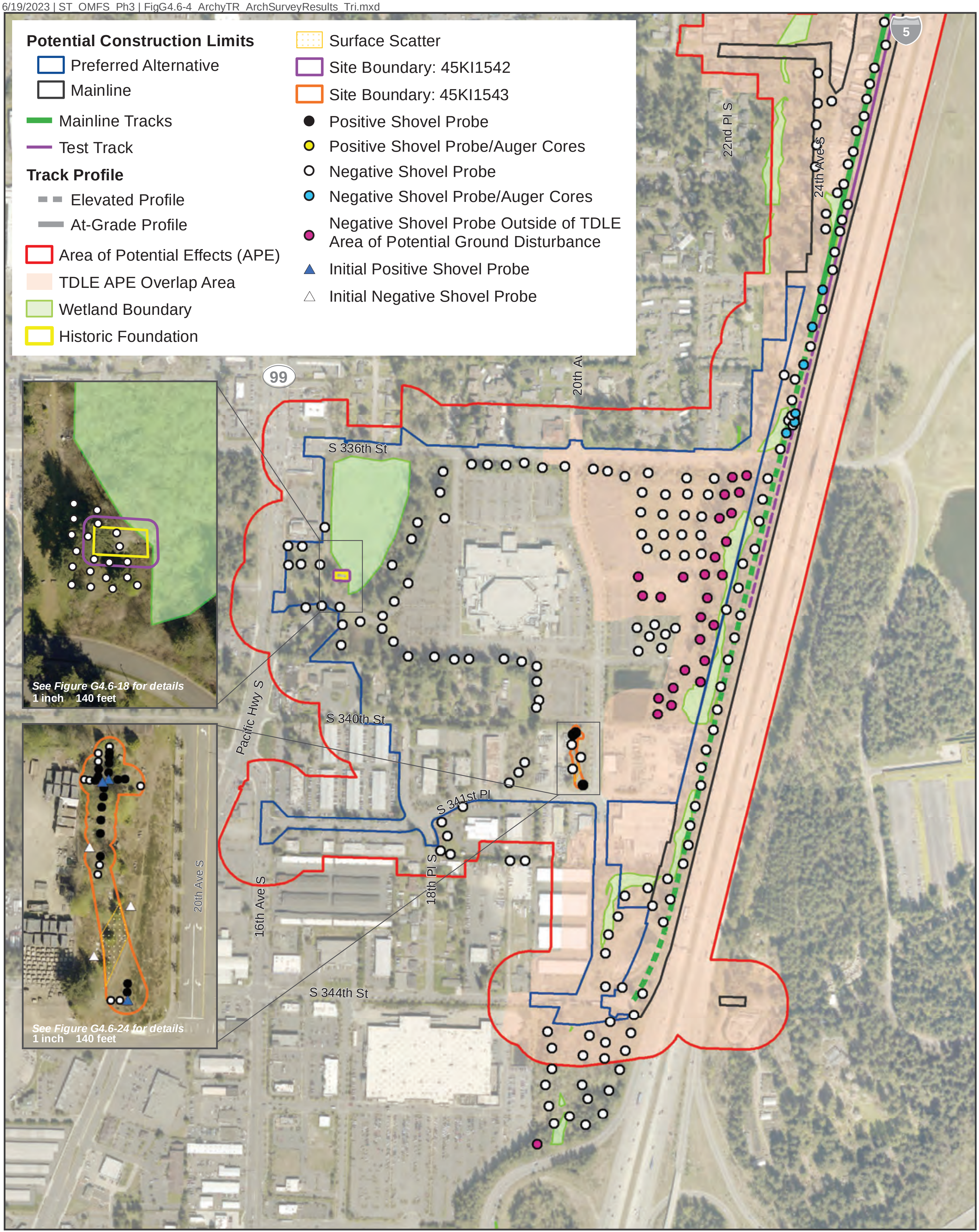

N
0
500
1,000 Feet

FIGURE G4.6-3
Archaeological Survey Results
Preferred Alternative Mainline

OMF South

6/19/2023 | ST_OMFS_Ph3 | FigG4.6-4_ArchyTR_ArchSurveyResults_Tri.mxd


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
TDLE APE Overlap Area
Wetland Boundary
Historic Foundation
Surface Scatter
Site Boundary: 45KI1542
Site Boundary: 45KI1543
Positive Shovel Probe
Positive Shovel Probe/Auger Cores
Negative Shovel Probe
Negative Shovel Probe/Auger Cores
Negative Shovel Probe Outside of TDLE Area of Potential Ground Disturbance
Initial Positive Shovel Probe
Initial Negative Shovel Probe
5
99
22nd Pl S
24th Ave S
20th Av
S 336th St
S 340th St
S 341st Pl
S 344th St
Pacific Hwy S
16th Ave S
18th Pl S
20th Ave S
See Figure G4.6-18 for details
1 inch 140 feet
See Figure G4.6-24 for details
1 inch 140 feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

N
0
500
1,000 Feet

FIGURE G4.6-4
Archaeological Survey Results
Preferred Alternative

OMF South

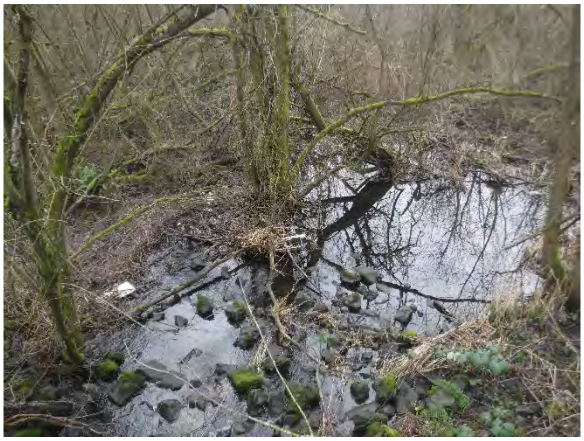


Figure G4.6-5 View of the wetlands catch basin from S 336th Street, OMF 152, view south

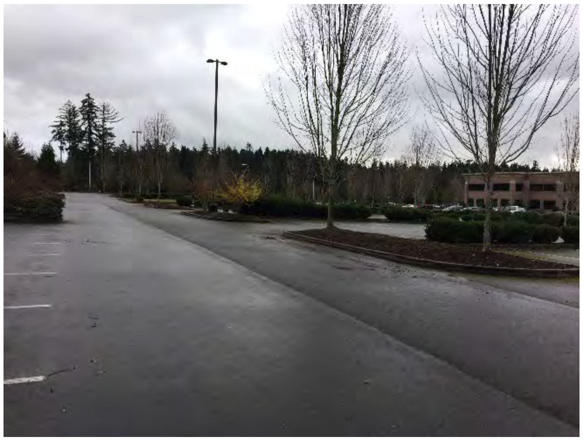


Figure G4.6-6 Paved areas partially surrounded by ornamental green space, OMF 151, view west

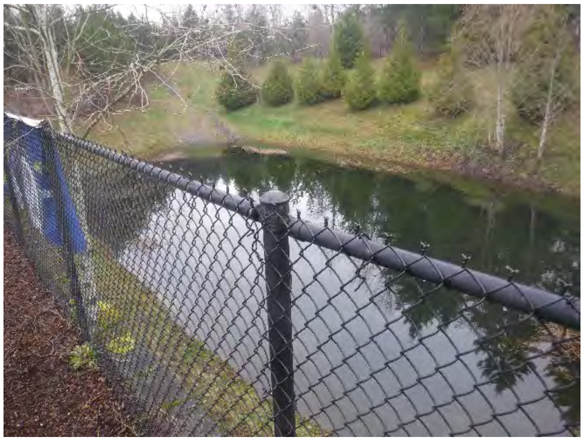


Figure G4.6-7 Drainage pond with restricted access, OMF 151, view east

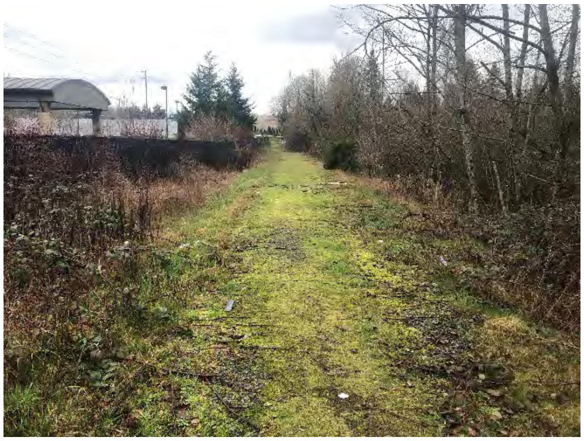


Figure G4.6-8 View of the levee along the western boundary of OMF 152, view north

Sub-surface investigations within parcel OMF 152 were predominantly restricted to the western edge and the southeast corner (Figure G4.6-4). The property is a wetland catch basin protected by Federal Way (Figure G4.6-5). The western boundary of the parcel is an overgrown raised linear earthen platform with floodgates and pumps that run north and south along the edge of the parcel (Figure G4.6-8). The wetland catch basin is composed of thick trees with standing water throughout.

Most shovel probes planned for excavation within parcel OMF 152 were canceled due to standing water and the presence of medical waste (e.g. used and uncovered hypodermic needles). The excavation of SP12 revealed soils consistent with NRCS data (stratified diatomaceous earth to muck) to a depth of 1 meter, and the excavations of SP17 and SP16 had loose, brown sandy loam fill over glacial till at a depth of 60 centimeters (Figure G4.6-4 and Attachment G4-2).

In parcel OMF 156, six shovel probes were excavated identifying variably compact brown sandy loam fill overlaying glacial till (Figure G4.6-4 and Attachment G4-2). The concrete footings of a demolished structure (45KI1542) were observed at the edge of the wetlands at the northeastern extent of the parcel adjacent to OMF 152. The footings were found to surround a concrete pad in two levels. The entire superstructure has been demolished. The entire area had been used by transient populations for camping and remains covered in garbage, including medical waste. Following discussions with Sound Transit, further investigations at this site were determined necessary to assess the potential for subsurface features related to the 1930s- to 1950s-era historic use and or occupation of the structure and to assess the extent, content, and depositional context of any historic-period deposits, if any were identified (see Section 6.1.1.4 and 6.1.2.1 below, and Attachment G4-2).

Excavations on the boundary of parcels OMF 157 and OMF 151 identified a thin topsoil overlaying glacial till (Figure G4.6-4).

ATCRC attempted to complete subsurface testing of OMF 167 (Figure G4.6-4). However, despite an approved right of entry, the property had been gated, locked, and no residents were present for surveyors to request admittance pursuant to the approved right of entry.

Parcel OMF 179 (Figure G4.6-4) is heavily overgrown with blackberry vines and other tall shrubbery to a height of 8 to 12 feet interspersed with trees (Figure G4.6-9). ATCRC used a machete to access the property and was able to excavate three shovel probes on a diagonal transect across the property (Figure G4.6-4). Car parts and other modern debris (Figure G4.6-10) have been extensively deposited on the property and shovel probes identified modern fill material to a depth of 70 centimeters before refusal due to concrete debris. Further investigations on the property were stymied due to the extensive overgrowth and modern debris.

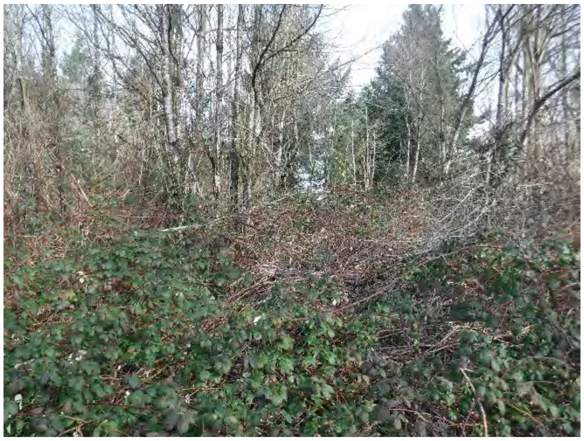


Figure G4.6-9 Surface conditions with extensive vegetation within OMF 179, view north

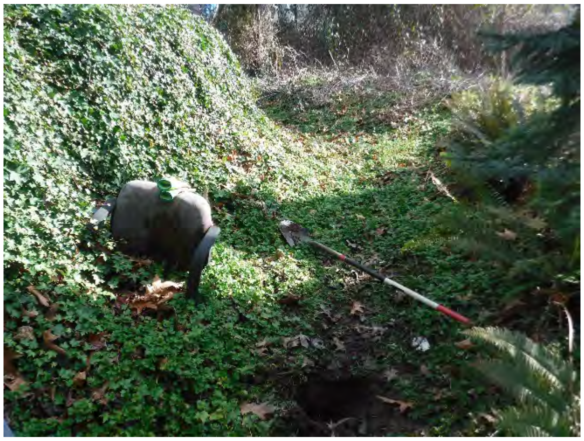


Figure G4.6-10 Easily accessible portion of OMF 179 with a surface scatter of modern debris, view northeast

6.1.1.2 South 344th Street Alternative

Within the South 344th Street Alternative, those rights of entry that were acquired centered around Belmor and the Christian Faith Center and all municipal and state rights-of-way, including the WSDOT right-of-way along I-5. Most of the properties within this APE are heavily developed with limited surface access areas, and few rights of entry were acquired for the OMF site itself (Figure G4.6-11 and G4.6-12).

The survey proceeded with a pedestrian assessment and photo documentation of all accessible areas within the APE. For those parcels where a right of entry had not been obtained, the survey was conducted from the nearest public right-of-way (Figures G4.6-13 and G4.6-14).

The area within parcel OMF 150 that does not overlap with the TDLE APE consists of a large, landscaped hill. Subsurface testing of the hill revealed that it is composed entirely of modern fill overlaying glacial till, which corresponds to aerial imagery from 2005 (Google Earth 2020).

Subsurface investigations within the APE began in parcel OMF 151 (Figures G4.6-12 and G4.6-14). Much of the parcel has been developed with extensive paved parking lots surrounding the Christian Faith Center. These paved areas are partially surrounded by ornamental green space that were sampled when utilities were not present (Figures G4.6-6 and G4.6-14). The excavations along the northwest corner of OMF 151, adjacent to OMF 152 (Figure G4.6-14), were along a slope composed of multiple different soil types. These soil strata are modern fill events mixed with expected soil horizons per NRCS data (stratified muck) resulting from flood events within the wetlands (OMF 152) overlaying glacial till. Elsewhere on the property, fill of varying thickness was found immediately overlaying sterile glacial sediment (Figures G4.6-14 and G4.6-7).

The far southern aspect of parcel OMF 151, near OMF 180, is a large, mounded platform that has been substantially modified during and after the 1970s. The subsurface investigations on this landform identified soil strata with modern bricks, glass fragments, and tile mixed with charcoal at a depth of 15 to 30 centimeters in SPs 47A, 47B, and 51 (Figures G4.6-12 and G4.6-14 and Attachments G4-3 and G4-4). These excavations and adjacent excavations indicate that the platform was created through multiple modern fill events over glacial till identified at depths between 35 to 45 centimeters. These deposits represent an archaeological deposit. Following discussions with Sound Transit, further investigations at this site (45KI1543) were determined necessary to assess the extent, content, and context of the historic-period deposit (see Section 6.1.1.5 and 6.1.2.2 below; Attachment G4-4).

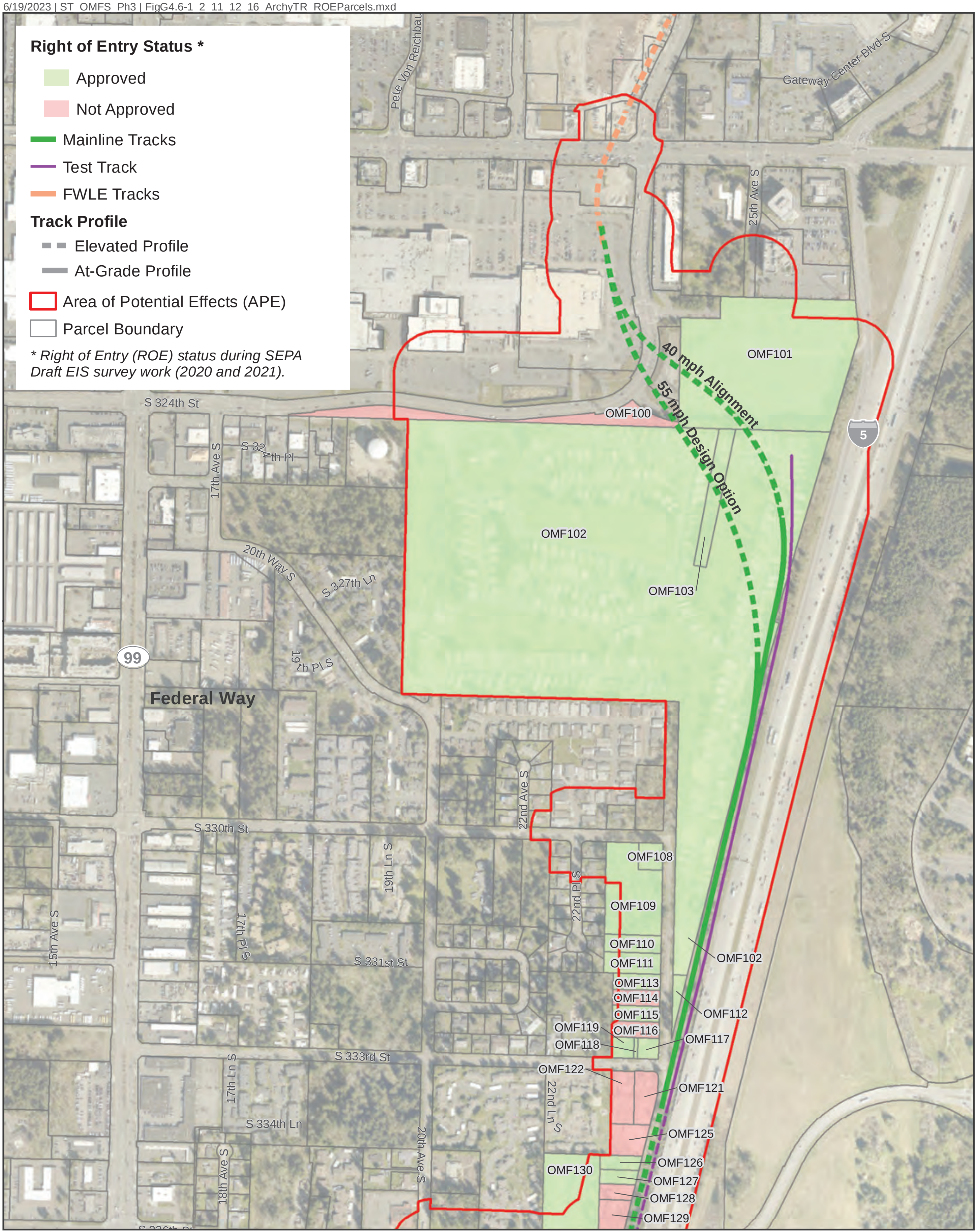
Other probes within parcel OMF 151 showed expected soils per NRCS data (gravelly-very gravelly sandy loam) and modern fill above glacial till.

ATCRC attempted to complete subsurface testing of parcel OMF 167 (Figure G4.6-14). However, despite an approved right of entry, the property had been gated, locked, and no residents were present for surveyors to request admittance.

Parcel OMF 179 (Figure G4.6-14) is heavily overgrown with blackberry vines and other tall shrubbery to a height of 8 to 12 feet, interspersed with trees (Figure G4.6-7). Three shovel probes revealed modern fill to a depth of 70 centimeters. Modern dumping was noted where portions of this parcel were accessible.

Shovel probes excavated at parcels OMF 187 and OMF 189 revealed a thin modern soil immediately overlaying glacial till (Figure G4.6-14 and Attachment G4-2).

6/19/2023 | ST OMFS Ph3 | FigG4.6-1 2 11 12 16 ArchyTR ROEParcels.mxd


Right of Entry Status *
🟩 Approved
🟥 Not Approved
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
Area of Potential Effects (APE)
Parcel Boundary
* Right of Entry (ROE) status during SEPA Draft EIS survey work (2020 and 2021).
Pete Von Reichbau
Gateway Center Blvd S
25th Ave S
40 mph Alignment
55 mph Design Option
OMF101
OMF100
S 324th St
S 324th Pl
17th Ave S
5
OMF102
20th Way S
S 327th Ln
OMF103
99
19th Pl S
Federal Way
22nd Ave S
S 330th St
OMF108
19th Ln S
22nd Pl S
OMF109
15th Ave S
17th Pl S
OMF110
OMF111
S 331st St
OMF102
OMF113
OMF114
OMF115
OMF112
OMF119
OMF116
OMF118
OMF117
S 333rd St
OMF122
17th Ln S
22nd Ln S
OMF121
S 334th Ln
OMF125
18th Ave S
20th Ave S
OMF126
OMF130
OMF127
OMF128
OMF129
S 336th St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

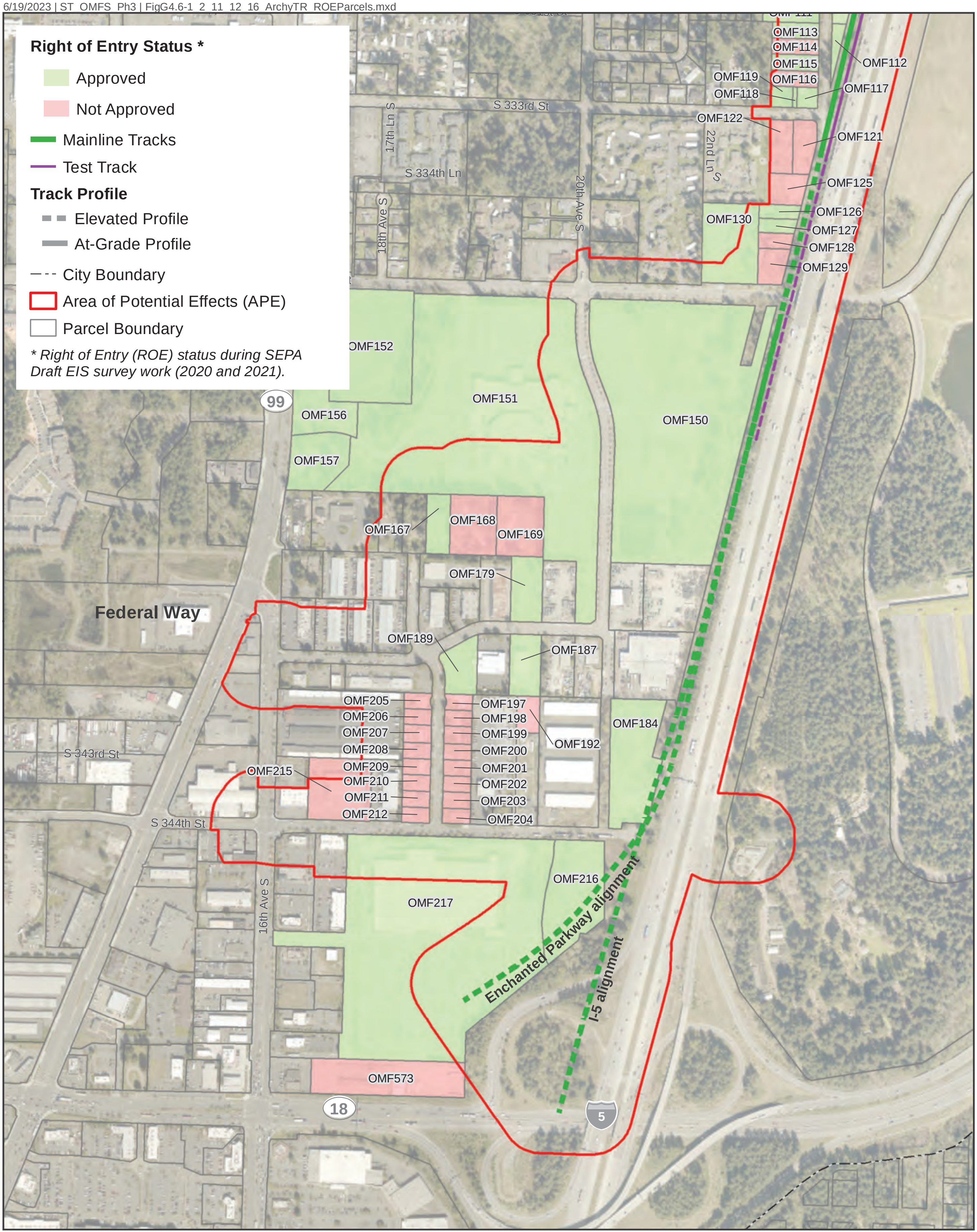
N

0 500 1,000 Feet

FIGURE G4.6-11
Archaeological Rights of Entry
South 344th Street Alternative Mainline

OMF South

6/19/2023 | ST_OMFS_Ph3 | FigG4.6-1_2_11_12_16_ArchyTR_ROEParcels.mxd

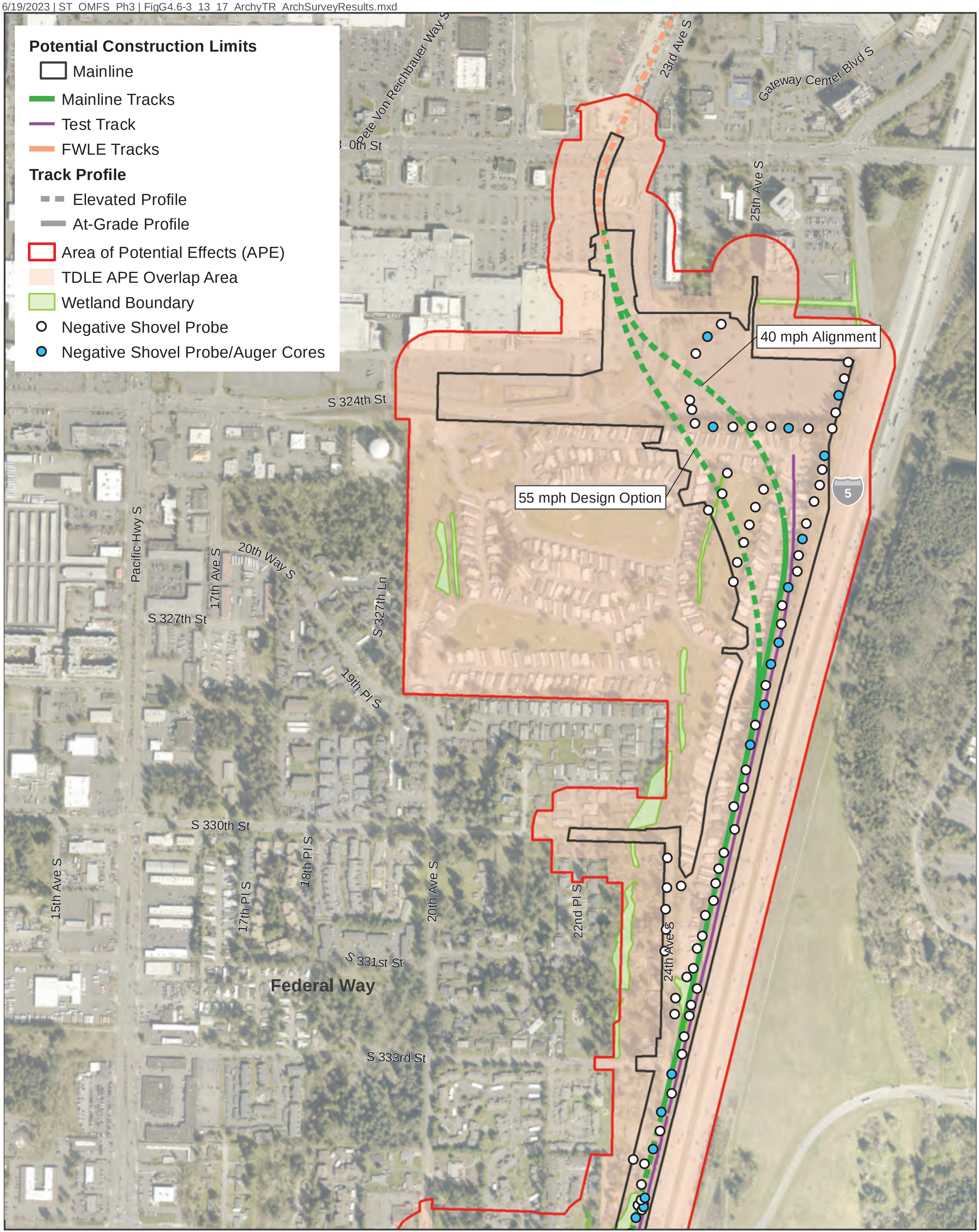

Right of Entry Status *
🟩 Approved
🟥 Not Approved
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Area of Potential Effects (APE)
Parcel Boundary
* Right of Entry (ROE) status during SEPA Draft EIS survey work (2020 and 2021).
OMF111
OMF112
OMF113
OMF114
OMF115
OMF116
OMF117
OMF118
OMF119
OMF121
OMF122
OMF125
OMF126
OMF127
OMF128
OMF129
OMF130
OMF150
OMF151
OMF152
OMF156
OMF157
OMF167
OMF168
OMF169
OMF179
OMF184
OMF187
OMF189
OMF192
OMF197
OMF198
OMF199
OMF200
OMF201
OMF202
OMF203
OMF204
OMF205
OMF206
OMF207
OMF208
OMF209
OMF210
OMF211
OMF212
OMF215
OMF216
OMF217
OMF573
S 333rd St
S 334th Ln
17th Ln S
18th Ave S
20th Ave S
22nd Ln S
S 343rd St
S 344th St
16th Ave S
99
18
5
Federal Way
Enchanted Parkway alignment
I-5 alignment

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
500
1,000 Feet

FIGURE G4.6-12
Archaeological Rights of Entry
South 344th Street Alternative

OMF South


Potential Construction Limits
☐ Mainline
Mainline Tracks
Test Track
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
🟥 Area of Potential Effects (APE)
TDLE APE Overlap Area
🟩 Wetland Boundary
○ Negative Shovel Probe
● Negative Shovel Probe/Auger Cores
23rd Ave S
Pete Von Reichbauer Way S
Gateway Center Blvd S
S 320th St
25th Ave S
40 mph Alignment
S 324th St
55 mph Design Option
5
Pacific Hwy S
17th Ave S
20th Way S
S 327th Ln
S 327th St
19th Pl S
S 330th St
15th Ave S
17th Pl S
18th Pl S
20th Ave S
22nd Pl S
24th Ave S
S 331st St
Federal Way
S 333rd St

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

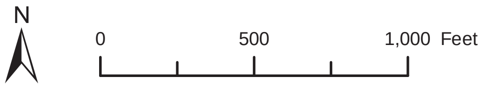
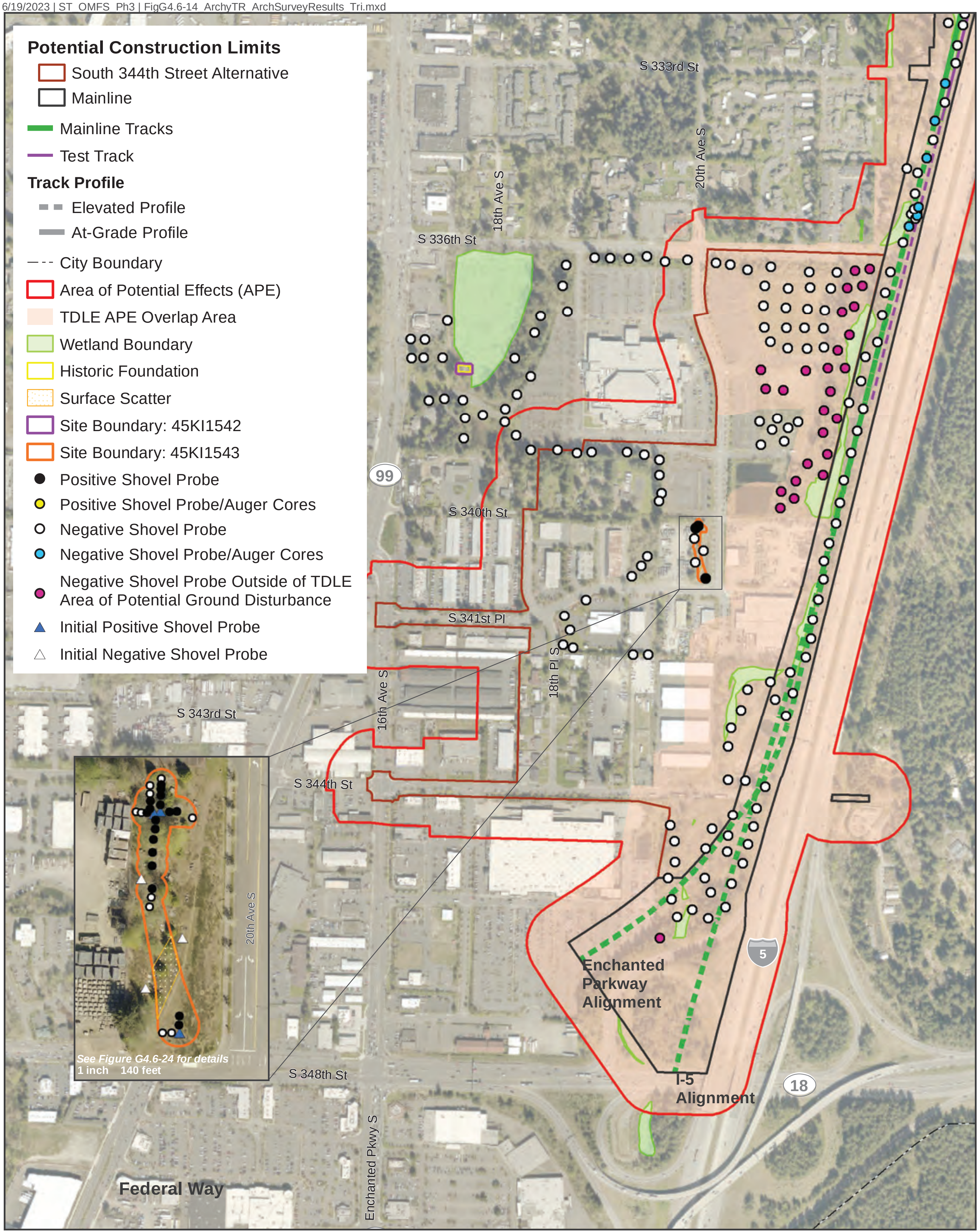

N
0
500
1,000 Feet

FIGURE G4.6-13
Archaeological Survey Results
South 344th Street Alternative Mainline

OMF South

6/19/2023 | ST_OMFS_Ph3 | FigG4.6-14_ArchyTR_ArchSurveyResults_Tri.mxd


Potential Construction Limits
South 344th Street Alternative
Mainline
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Area of Potential Effects (APE)
TDLE APE Overlap Area
Wetland Boundary
Historic Foundation
Surface Scatter
Site Boundary: 45KI1542
Site Boundary: 45KI1543
Positive Shovel Probe
Positive Shovel Probe/Auger Cores
Negative Shovel Probe
Negative Shovel Probe/Auger Cores
Negative Shovel Probe Outside of TDLE Area of Potential Ground Disturbance
Initial Positive Shovel Probe
Initial Negative Shovel Probe
S 333rd St
20th Ave S
18th Ave S
S 336th St
99
S 340th St
S 341st Pl
18th Pl S
16th Ave S
S 343rd St
S 344th St
20th Ave S
See Figure G4.6-24 for details
1 inch 140 feet
S 348th St
Enchanted Parkway Alignment
5
I-5 Alignment
18
Enchanted Pkwy S
Federal Way

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

N

0 500 1,000 Feet

FIGURE G4.6-14
Archaeological Survey Results
South 344th Street Alternative

OMF South

6.1.1.3 Midway Landfill Alternative

Within the Midway Landfill Alternative APE, rights of entry were only acquired for those municipal parcels associated with the Midway Landfill (OMF 8, 9, 24, 28, 30-34, and 43), parcels OMF 44 and OMF 47, and all municipal and state rights-of-way, including the WSDOT right-of-way along I-5 (Figure G4.6-16).

Archaeological survey of the Midway Landfill (parcels OMF 8, 9, 24, 28, 30-34, and 43) was limited to a photographic pedestrian survey of OMF 8 and OMF 9 (Figure G4.6-16). The remainder of the Midway Landfill was previously assessed under the FWLE project (Elliott et al. 2020).

All municipal rights-of-way were examined for suitability for subsurface testing during the pedestrian survey. Each potential location was discounted due to the presence of utilities.

The WSDOT right-of-way along parcels OMF 50, OMF 78, OMF 79, OMF 80, and OMF 90 seemed to be accessible from S 252nd Street (Figure G4.6-16). However, during pedestrian survey, the area proved to be a 30-degree slope covered in thick blackberry thickets, garbage, and thick shrubs (Figure G4.6-15). Due to an inability to safely excavate on a slope of this degree no subsurface testing was undertaken.

A small portion of the WSDOT right-of-way adjacent to parcels OMF 1 and OMF 8 has been previously surveyed by WSDOT (Ives et al. 2017), which identified Pleistocene sediments immediately below the sod in two shovel probes. No cultural resources were identified during this portion of the Ives et al. (2017) survey.

No surface archaeological deposits were identified during the pedestrian survey, and no locations suitable for subsurface archaeological investigations were identified within this APE (Figure G4.6-17).

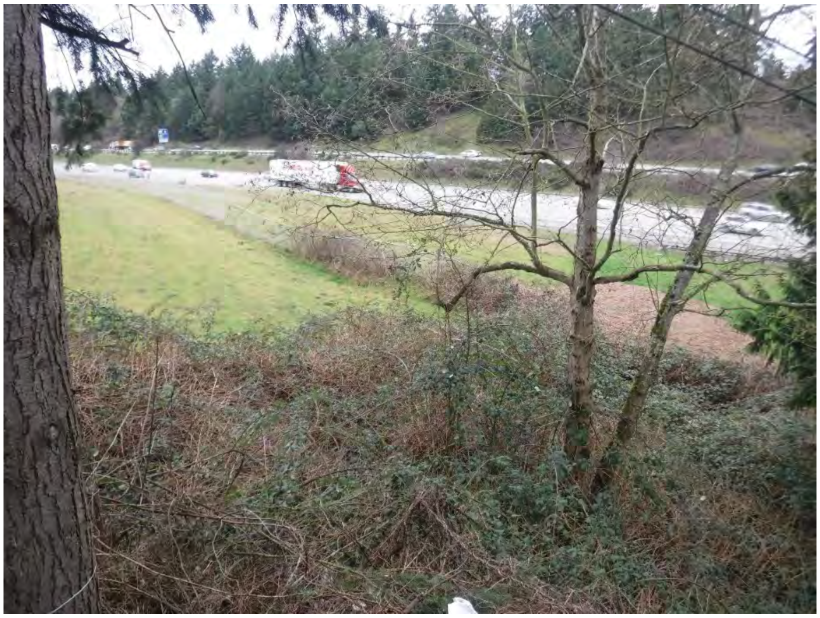
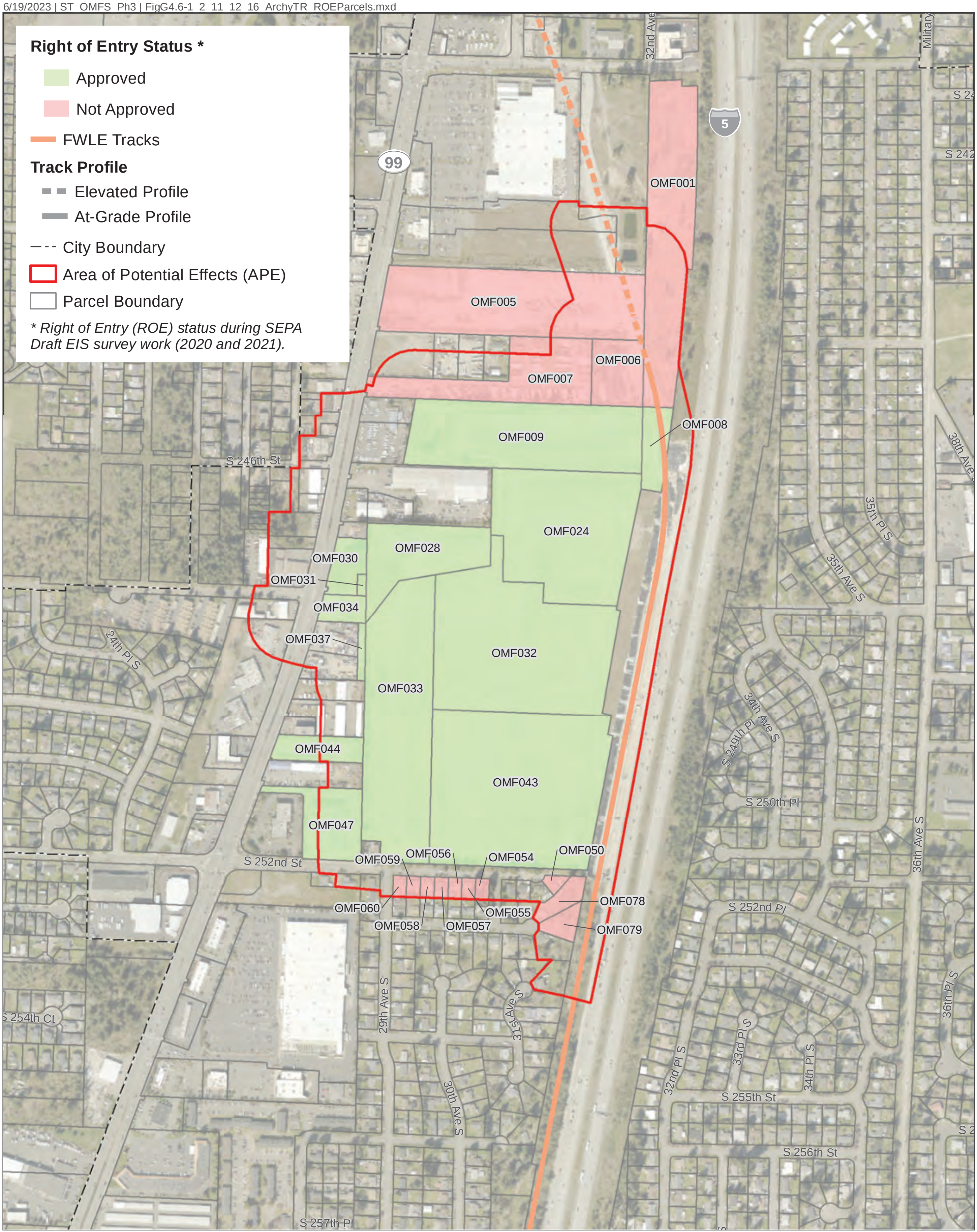


Figure G4.6-15 Surface Conditions of the WSDOT Right-of-Way Adjacent to the Midway Landfill

6/19/2023 | ST OMFS Ph3 | FigG4.6-1 2 11 12 16 ArchyTR ROEParcels.mxd


Right of Entry Status *
🟩 Approved
🟥 Not Approved
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Area of Potential Effects (APE)
Parcel Boundary
* Right of Entry (ROE) status during SEPA Draft EIS survey work (2020 and 2021).
OMF001
OMF005
OMF006
OMF007
OMF008
OMF009
OMF024
OMF028
OMF030
OMF031
OMF032
OMF033
OMF034
OMF037
OMF043
OMF044
OMF047
OMF050
OMF054
OMF055
OMF056
OMF057
OMF058
OMF059
OMF060
OMF078
OMF079
99
5
32nd Ave
Military
S 24
S 242
38th Ave
35th Pl S
35th Ave S
S 246th St
24th Pl S
34th Ave S
S 249th Pl
S 250th Pl
36th Ave S
S 252nd St
S 252nd Pl
36th Pl S
S 254th Ct
29th Ave S
31st Ave S
30th Ave S
32nd Pl S
33rd Pl S
34th Pl S
S 255th St
S 256th St
S 2
S 257th Pl

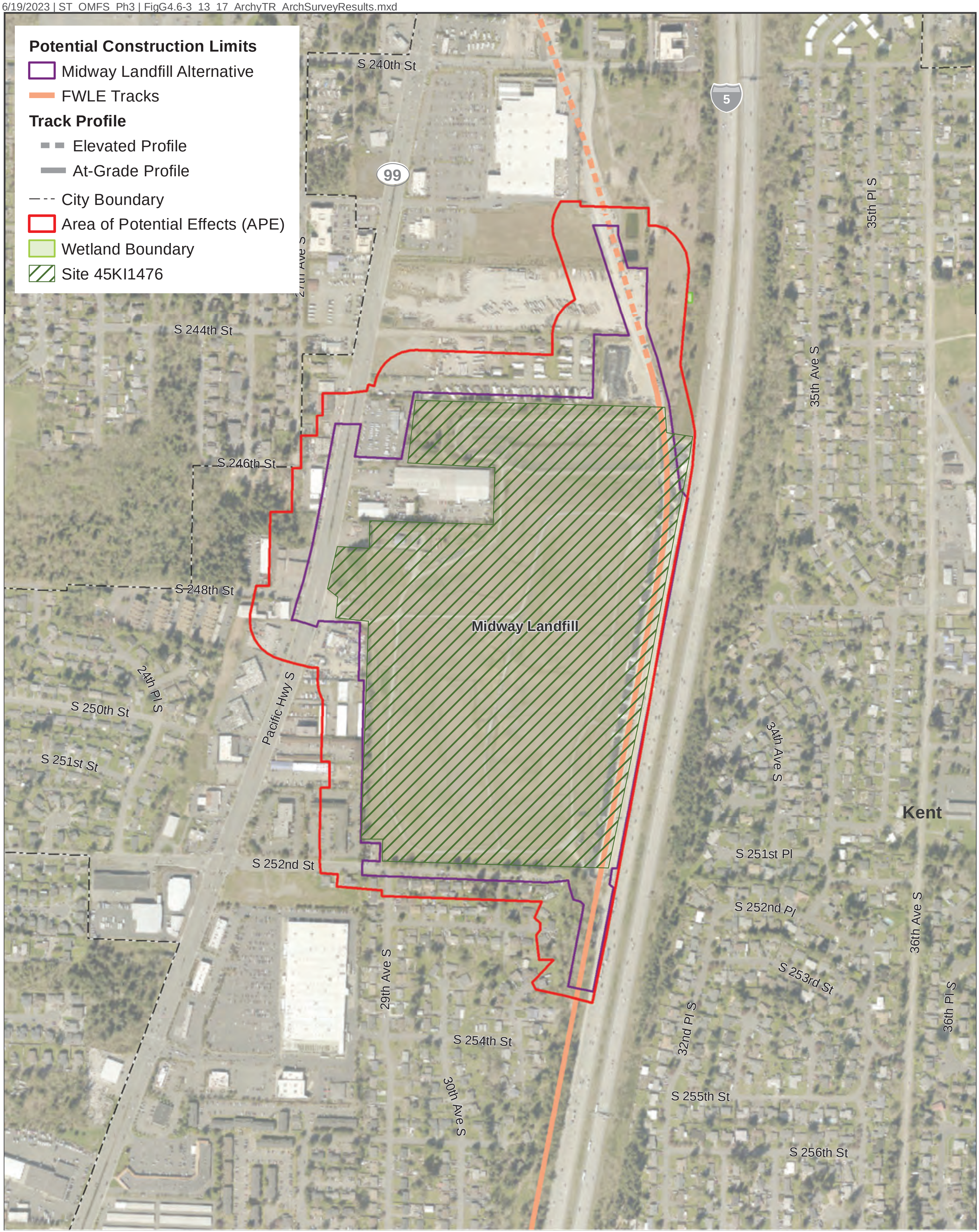
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE G4.6-16
Archaeological Rights of Entry
Midway Landfill Alternative

OMF South


Potential Construction Limits
Midway Landfill Alternative
FWLE Tracks
Track Profile
Elevated Profile
At-Grade Profile
City Boundary
Area of Potential Effects (APE)
Wetland Boundary
Site 45KI1476
S 240th St
5
99
27th Ave S
35th Pl S
S 244th St
35th Ave S
S 246th St
S 248th St
Midway Landfill
24th Pl S
Pacific Hwy S
S 250th St
S 251st St
34th Ave S
Kent
S 251st Pl
S 252nd St
S 252nd Pl
36th Ave S
29th Ave S
S 253rd St
32nd Pl S
36th Pl S
S 254th St
30th Ave S
S 255th St
S 256th St
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent.

FIGURE G4.6-17
Archaeological Survey Results
Midway Landfill Alternative

OMF South

6.1.1.4 OMF South and TDLE Overlap Area

The survey of the OMF South and TDLE overlap area within the OMF South APE was conducted within Belmor, King County Metro South 320th Street Park & Ride, Christian Faith Center, privately owned parcels, city of Federal Way right-of-way, a WSDOT-owned parcel, and WSDOT right-of-way along I-5 (Figure G4.6-22). In addition to the overlap area, survey was also conducted in areas that were within the OMF South APE that were not covered previously due to the presence of standing water during the original survey. The overall topography of the surveyed area was marked by uplands interspersed with low-lying areas adjacent to creeks and natural wetlands. Apart from the topography, survey conditions within this segment were variable depending on the nature of previous disturbances.

Past ground disturbances within this area could be seen in cuts and berms in the right-of-way adjacent to I-5, ditches, artificial wetland ponds, and markings for buried utilities. Examples of these disturbance areas include a golf fairway at Belmor (Figure G4.6-18); marked buried utilities along 24th Avenue S (Figure G4.6-19); a sports field and an adjacent strip of landscaped ground on the Christian Faith Center parcel south of S 336th Street (Figure G4.6-20); and an artificial pond with surrounding gravel road and berm area on a WSDOT parcel at the east end of S 344th Street (Figure G4.6-21).

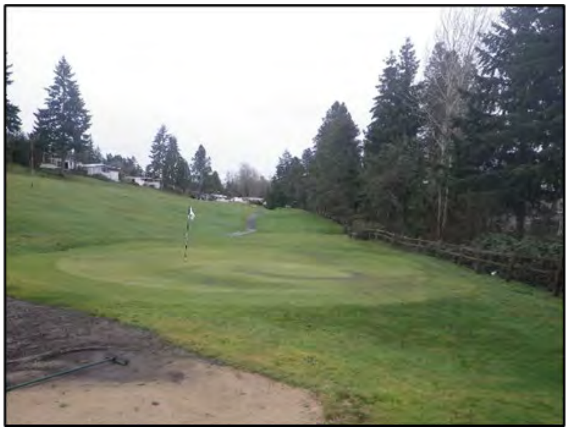


Figure G4.6-18 Portion of the golf course at Belmor within area of potential ground disturbance, view south

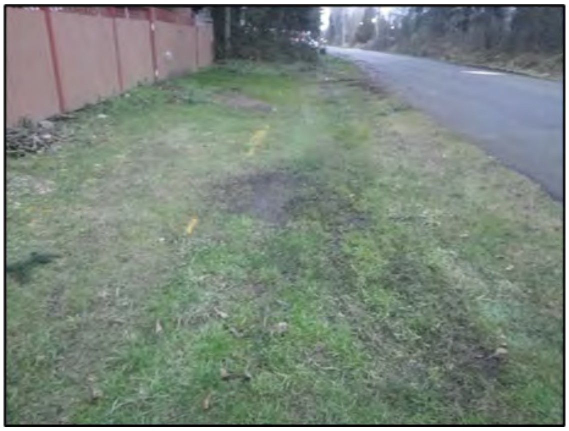


Figure G4.6-19 Marked buried natural gas pipeline (yellow paint) on the west side of 24th Avenue S, view north

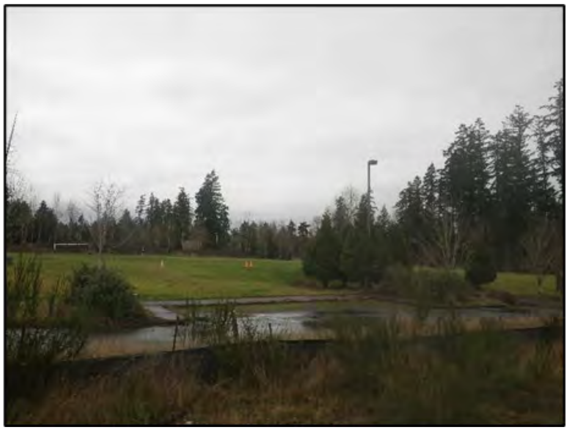


Figure G4.6-20 Sports field on the Christian Faith Center parcel, view northeast

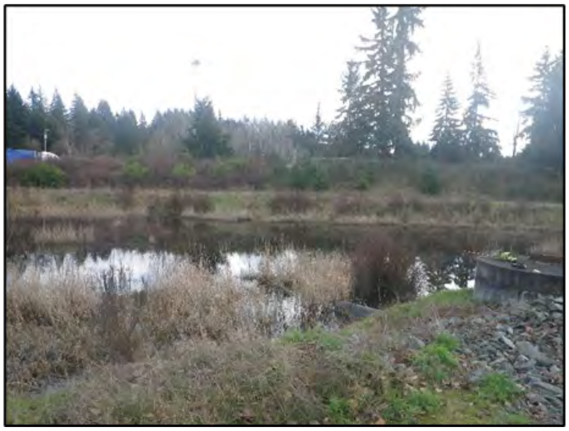


Figure G4.6-21 Artificial wetland pond on WSDOT parcel at the east end of S 344th Street, view southeast

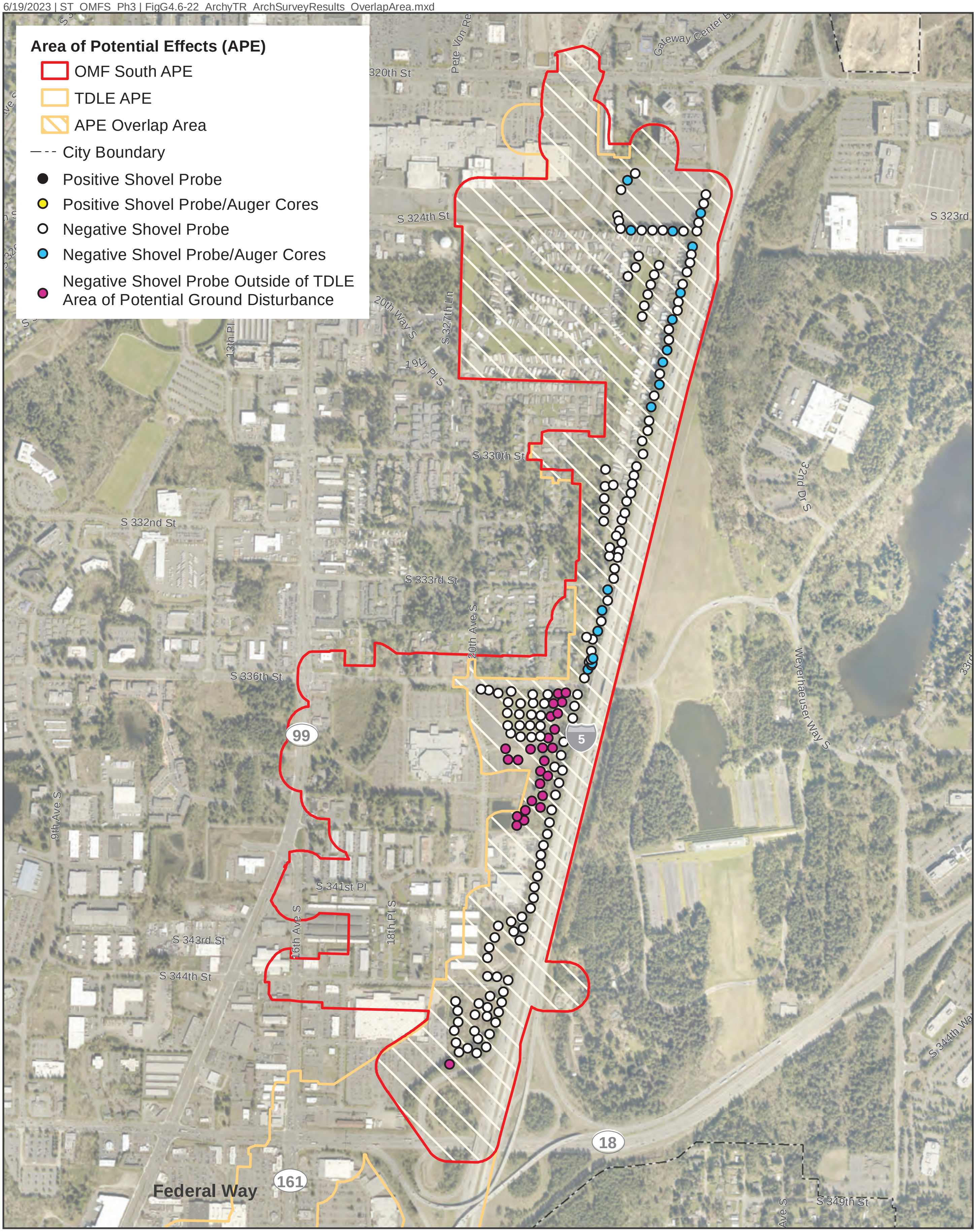

Area of Potential Effects (APE)
OMF South APE
TDLE APE
APE Overlap Area
City Boundary
Positive Shovel Probe
Positive Shovel Probe/Auger Cores
Negative Shovel Probe
Negative Shovel Probe/Auger Cores
Negative Shovel Probe Outside of TDLE Area of Potential Ground Disturbance
320th St
Pete Von Re
Gateway Center B
S 323rd
S 324th St
20th Way S
S 327th Ln
13th Pl
19th Pl S
S 330th St
32nd Dr S
S 332nd St
S 333rd St
20th Ave S
S 336th St
Weyerhaeuser Way S
33rd
99
5
9th Ave S
S 341st Pl
16th Ave S
18th Pl S
S 343rd St
S 344th St
S 344th Wa
18
161
Federal Way
Ave S
S 349th St
N
0
1,000
2,000 Feet

FIGURE G4.1-22
Archaeological Survey Results
OMF South and TDLE Overlap Area

Relatively undisturbed areas were identifiable by the presence of a mosaic of native vegetation that included Douglas-fir, Pacific madrone, western redcedar, bigleaf maple, vine maple, sword fern, and salal (Figure G4.6-23), which contrasted with the mix of landscape grasses, non-native tree plantings, English ivy, Himalayan blackberry, and Scotch broom that was present in disturbed areas (Figure G4.6-24). Ground-surface visibility was limited throughout the segment by the presence of grasses, forest duff, imported gravels, or dense understory vegetation.

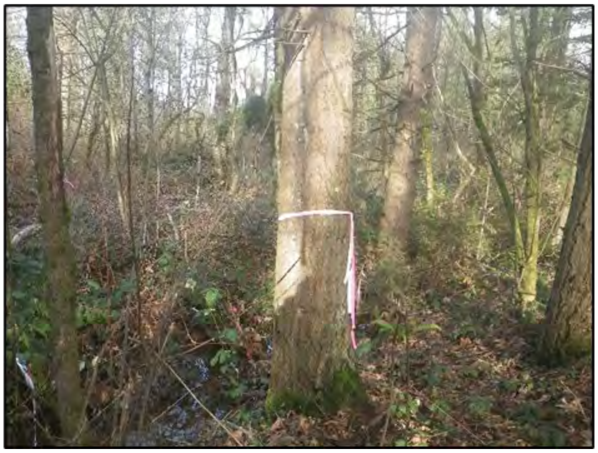


Figure G4.6-23 Wooded area within the WSDOT right-of-way east of the Christian Faith Center property, view north

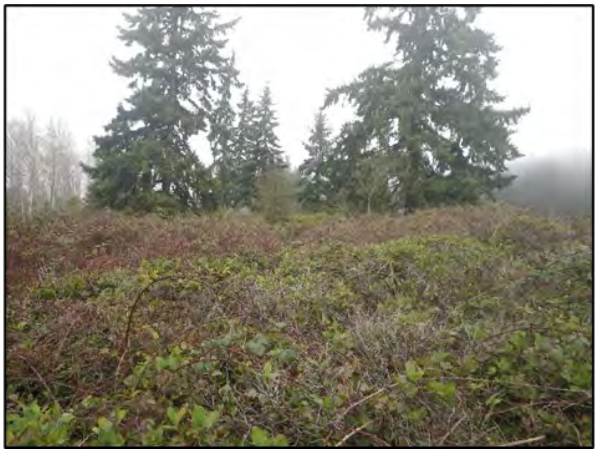


Figure G4.6-24 Disturbed area with Himalayan blackberry cover south of S 344th Street, view north

One archaeological isolate (45KI1583) was identified during the pedestrian survey. The isolate consists of an amber glass beer bottle identified on the ground surface within the WSDOT right-of-way near the base of an embankment west of I-5, approximately 75 meters (246 feet) north of S 336th Street within the area of the mainline. The isolate is discussed in greater detail in Section 6.1.1.7 below.

In total, 186 shovel probes and auger cores were excavated in the OMF South/TDLE overlap area and adjacent portions of the OMF South APE where shovel probes were not previously excavated. The sediments within the shovel probes typically comprised dark brown to dark grayish-brown sandy silt loam in near-surface depths (A horizon) that, at times, was found to overlie a yellowish-brown sandy loam B horizon (Figure G4.6-25). Gravels (rounded and subrounded pebbles and small cobbles) comprised between approximately 5 and 15 percent of the sediment volumes in these near-surface depths. Below the B horizon or, when a B horizon was not present, directly below the A horizon, was a cobbly coarse pale gray to light yellowish-brown sandy loam with a high concentration (30 to 50 percent) of rounded and subrounded pebbles and cobbles consistent with characteristics consistent with glacial sediment. This glacial sediment typically appeared between 30 and 70 centimeters (1 and 2.3 feet) below ground surface.

These overall soil conditions are consistent with the Alderwood gravelly sandy loam that is mapped for the majority of the surveyed area (Snyder 1973:8-10). Exceptions to this pattern were present in shovel probes excavated in the vicinity of drainages, which contain siltier soil in near-surface depths before transitioning to glacial sediments (Figure G4.6-26). Fill and disturbed native soils were present to varying degrees in shovel probes excavated throughout several areas within the South Federal Way Segment, particularly in probes excavated on the edges of the golf course at Belmor, around the perimeter of the King County Metro S 320th Street Park-and-Ride.

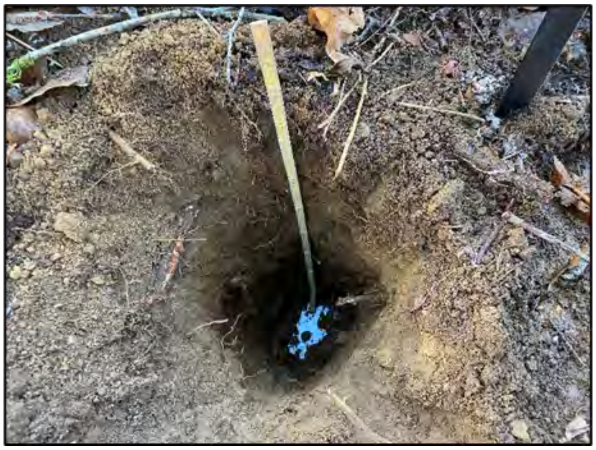


Figure G4.6-25 Shovel Probe SP-117 at completion of excavation (85 centimeters [2.8 feet] below ground surface)

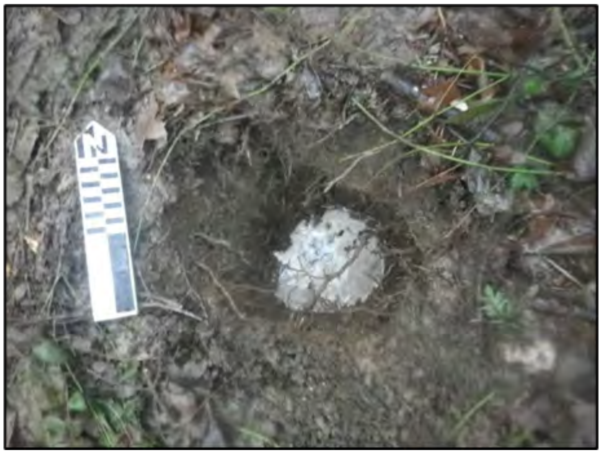


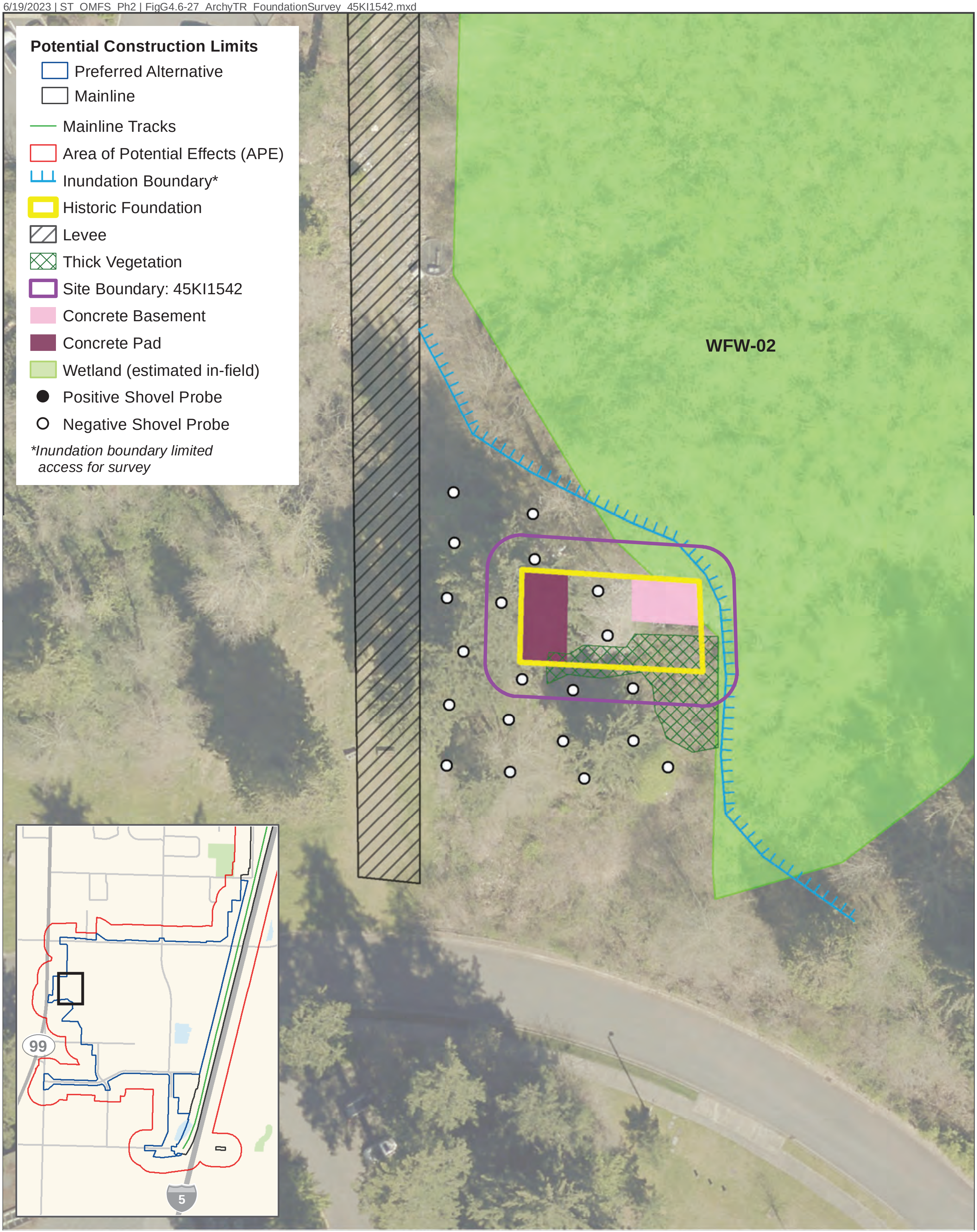
Figure G4.6-26 Shovel probe SP-78 at completion of excavation (80 centimeters [2.6 feet] below ground surface) near Hylebos Creek

6.1.1.5 Site 45KI1542

Site 45KI1542 is a historic concrete slab and perimeter wall foundation located within parcel OMF 152, immediately south of the waterline within the city of Federal Way Stormwater Pond No. 159 (Figures G4.6-7, G4.6-17, and G4.6-27). The foundation is located at a slightly higher elevation than the average water level of the pond, which is regulated by a stormwater filtration system approximately 20 meters north of the foundation. At the time of this survey, the waterline was approximately 1 meter east of the foundation (Figure G4.6-27). The vegetation surrounding and over the foundation consisted of dense thickets of nettles, Himalayan blackberry, salmonberry, partially collapsed and sprawling white oak, Douglas-fir, and Western hemlock (Figures G4.6-28 through G4.6-30). Substantial modern debris, including biohazard materials, are regularly cleared from this area (Rafael 2020 personal communication).

Before additional subsurface survey was conducted near this foundation, historic-period aerial photographs were reviewed in detail for this area. The earliest aerial imagery of this location is from 1936 and illustrates a building in the location of the identified foundation at the southwestern corner of a prairie (King County Map Vault 1936/1937a; Figure G4.6-31). The structure is no longer visible in aerial photographs by 1957 (EarthExplorer 1957a, Figure G4.6-31). The tax assessment records for this area were accessed through the Puget Sound Regional Archives, who hold the historic King County Tax Assessors Records. Of the seven structures listed for the historic tax parcel, one matched the general description and location of the identified foundation (Figure G4.6-32). The likely structure was a 30-foot by 60-foot two-story barn with a concrete foundation, dirt and concrete floors, and a 10-foot by 12-foot concrete single room basement. The records indicate that the barn was built in 1932, owned by John Danielson, and likely demolished between 1940 and 1950, given that it was assessed in 1940 by King County and noted as “gone” during the 1950 assessment.

The concrete perimeter foundation is oriented east-west with a total length of 61 feet, 6 inches (east-west) and a width of 30 feet, 6 inches (north-south). The foundation is a 6-inch footing with an inner lip that defines the outer perimeter of the foundation. The eastern section of the foundation has a 6-inch thick concrete pad that is 10 feet long by 30 feet, 6 inches wide (Figure G4.6-27). The northeastern corner of the foundation was originally a basement and measured 22 feet long by 8 feet, 4 inches wide (Figures G4.6-28 through G4.6-30). Two 8-inch square posts that would have supported a subfloor or interior wall were identified offset from the southern basement wall by 3 feet. These structural details match the general details of the potential structure identified during archival research (Figure G4.6-32).


Potential Construction Limits
Preferred Alternative
Mainline
Mainline Tracks
Area of Potential Effects (APE)
Inundation Boundary*
Historic Foundation
Levee
Thick Vegetation
Site Boundary: 45KI1542
Concrete Basement
Concrete Pad
Wetland (estimated in-field)
● Positive Shovel Probe
○ Negative Shovel Probe
*Inundation boundary limited access for survey
WFW-02
99
5
N
0
50
100 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4.6-27
Site 45KI1542
Investigation Results
Preferred Alternative
OMF South

Much of the existing foundation elements show evidence of demolition, with sections having been pushed out of alignment or removed from their original positions (Figures G4.6-28 and G4.6-29). In addition, large concrete slabs have been deposited into the basement area. Some of these slabs have been deposited on top of furniture and cover graffiti (Figure G4.6-29).

A total of 20 shovel probes were excavated on the western and southern sides of the foundation (Figure G4.6-27). Generally, historical fill ranged from 20 to 70 centimeters thick, and it was deposited directly on intact glacially deposited parent material (glacial till) (Attachment G4-2). Contacts between fill and glacial till were sharp and clearly defined, suggesting that the site had undergone substantial land alterations with heavy machinery before the structure was constructed and at least once since the structure was abandoned.

No subsurface precontact or historic artifacts, features, or other cultural deposits were identified during this shove probe survey.

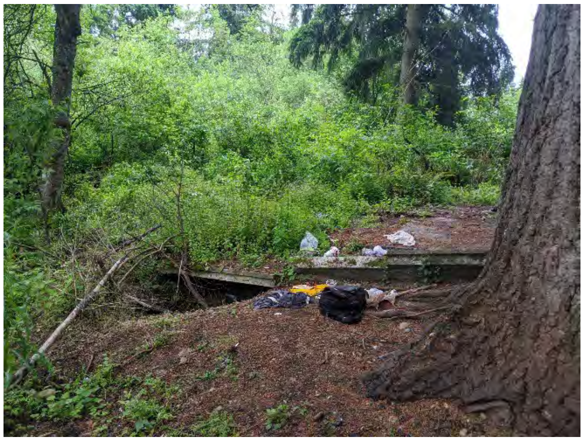


Figure G4.6-28 Concrete pad with disturbed perimeter foundation, view southeast

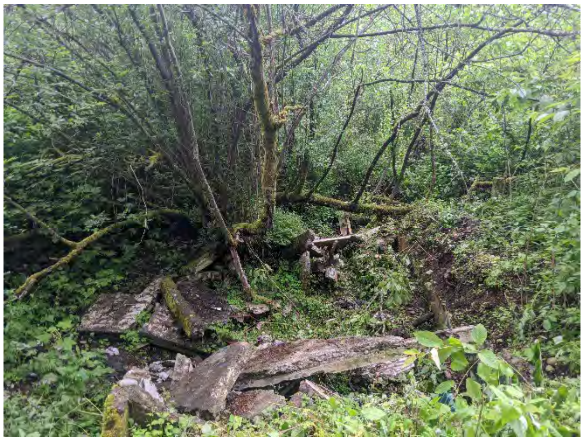
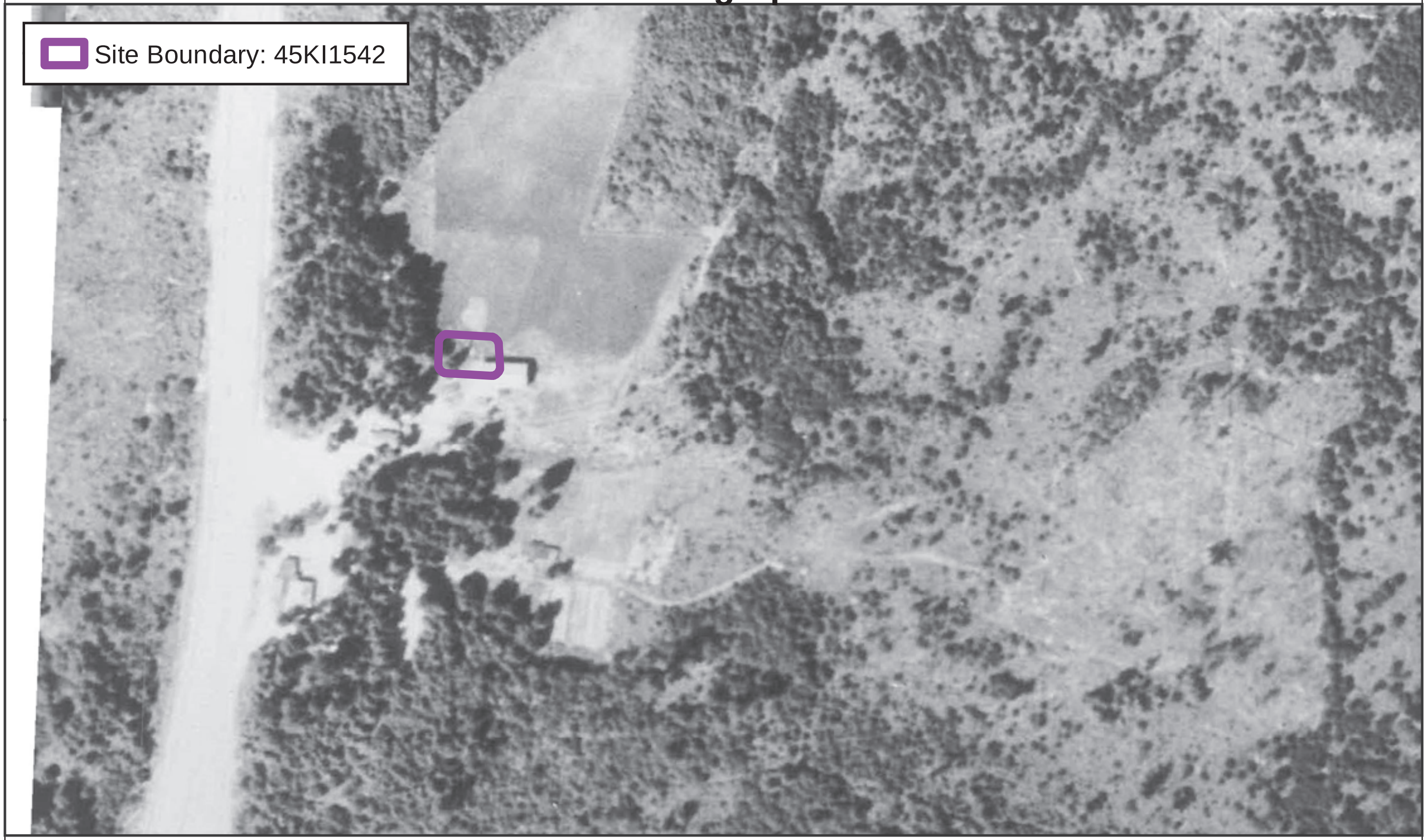


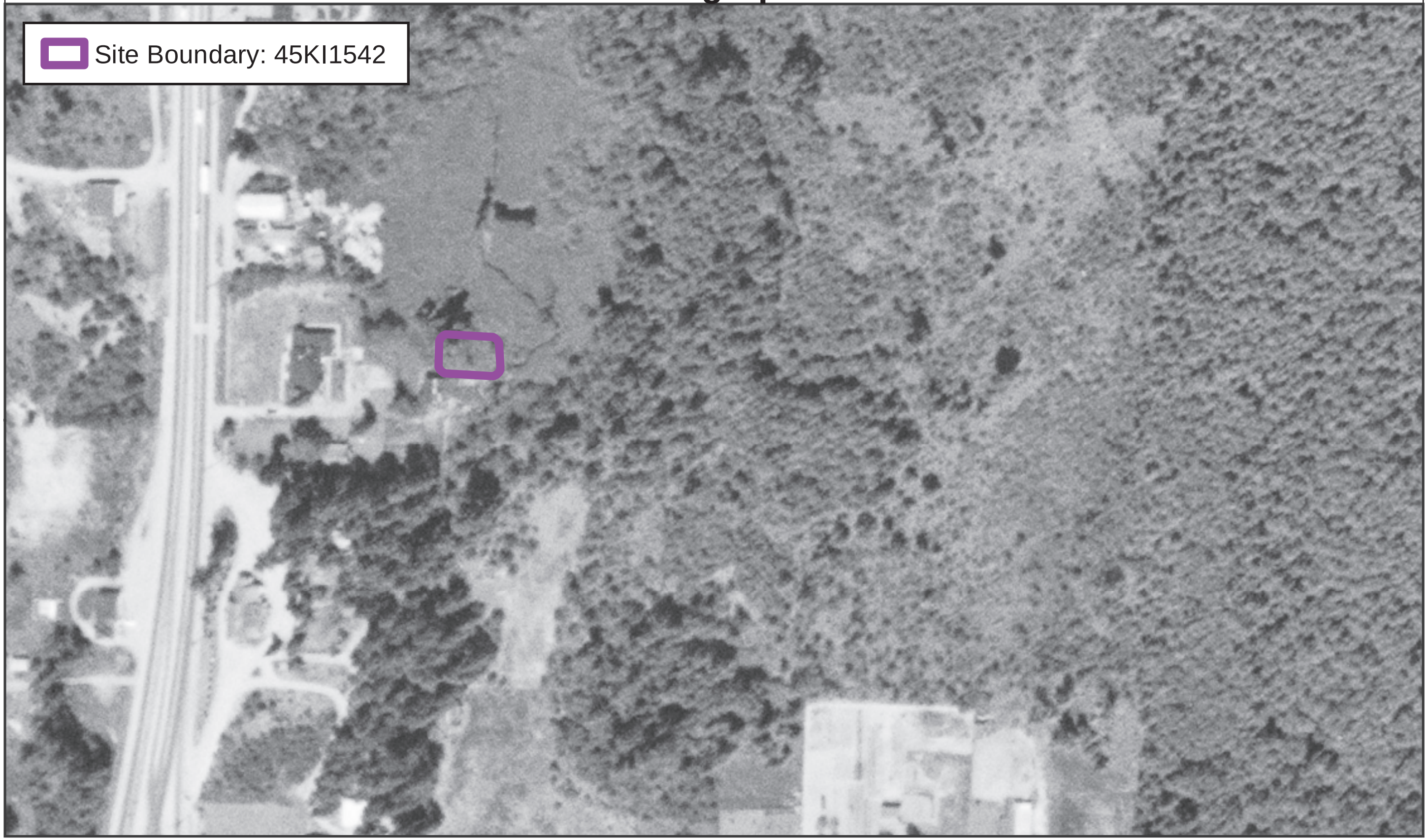
Figure G4.6-29 View of concrete basement with demolition debris, view east

Figure G4.6-30 Cleared vegetation for excavation (SP01-17), view northeast

1936/1937 Aerial Photograph of Site 45KI1542


▭ Site Boundary: 45KI1542

1957 Aerial Photograph of Site 45KI1542


▭ Site Boundary: 45KI1542

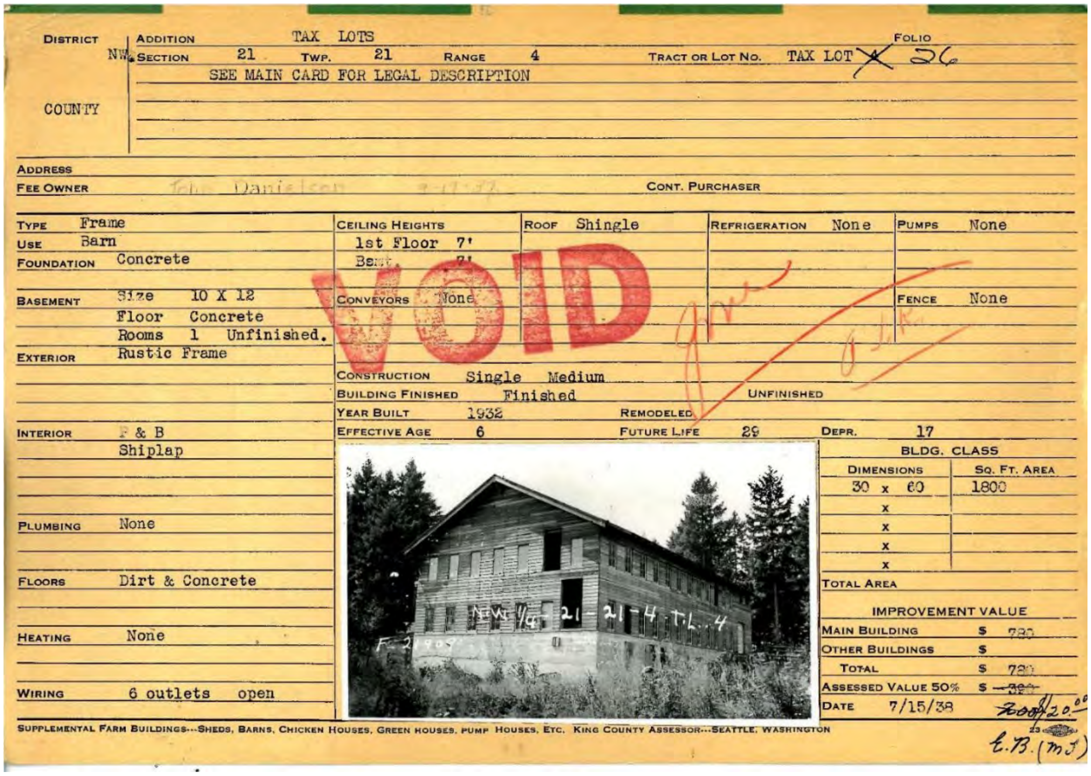
Data Sources: King County Map Vault (1937 S-T-R Records), USGS 1957 Aerial Photographs (EarthExplorer), ATCRC (2020).

FIGURE G4.6-31
1936/1937 and 1957 Historic Aerials
of Site 45KI1542

N

0 200 400 Feet

OMF South



DISTRICT NW¼ | ADDITION TAX LOTS | FOLIO
SECTION 21 TWP. 21 RANGE 4 TRACT OR LOT NO. TAX LOT ~~4~~ 26
SEE MAIN CARD FOR LEGAL DESCRIPTION
COUNTY
ADDRESS
FEE OWNER John Danielson 9-17-37 CONT. PURCHASER

TYPE Frame
USE Barn
FOUNDATION Concrete
BASEMENT Size 10 X 12
Floor Concrete
Rooms 1 Unfinished.
EXTERIOR Rustic Frame
INTERIOR F & B
Shiplap
PLUMBING None
FLOORS Dirt & Concrete
HEATING None
WIRING 6 outlets open

CEILING HEIGHTS
1st Floor 7'
Bsmt. 7'
ROOF Shingle
REFRIGERATION None
PUMPS None
CONVEYORS None
FENCE None
VOID
CONSTRUCTION Single Medium
BUILDING FINISHED Finished UNFINISHED
YEAR BUILT 1932 REMODELED
EFFECTIVE AGE 6 FUTURE LIFE 29 DEPR. 17

NW 1/4-21-21-4 T.L. 4
F-21909

BLDG. CLASS

DIMENSIONS	SQ. FT. AREA
30 x 60	1800
x	
x	
x	
x	

TOTAL AREA

IMPROVEMENT VALUE
MAIN BUILDING $ 780
OTHER BUILDINGS $
TOTAL $ 780
ASSESSED VALUE 50% $ ~~390~~
DATE 7/15/38 ~~200~~ 20.00
E.B. (MJ)

SUPPLEMENTAL FARM BUILDINGS---SHEDS, BARNS, CHICKEN HOUSES, GREEN HOUSES, PUMP HOUSES, ETC. KING COUNTY ASSESSOR---SEATTLE, WASHINGTON

Source: Courtesy of the Puget Sound Regional Archive

Figure G4.6-32 King County Tax Assessors Record, 1938

6.1.1.6 Site 45KI1543

Site 45KI1543 is a historic debris scatter in the southern portion of parcel OMF 151, on a highly modified landform situated on the northwest corner of 20th Ave South and South 341st Place intersection. The debris scatter was initially identified in two locations in the northwest and southeast corners of the landform (Figure G4.6-33). The site is located in both the Preferred and South 344th Street alternatives.

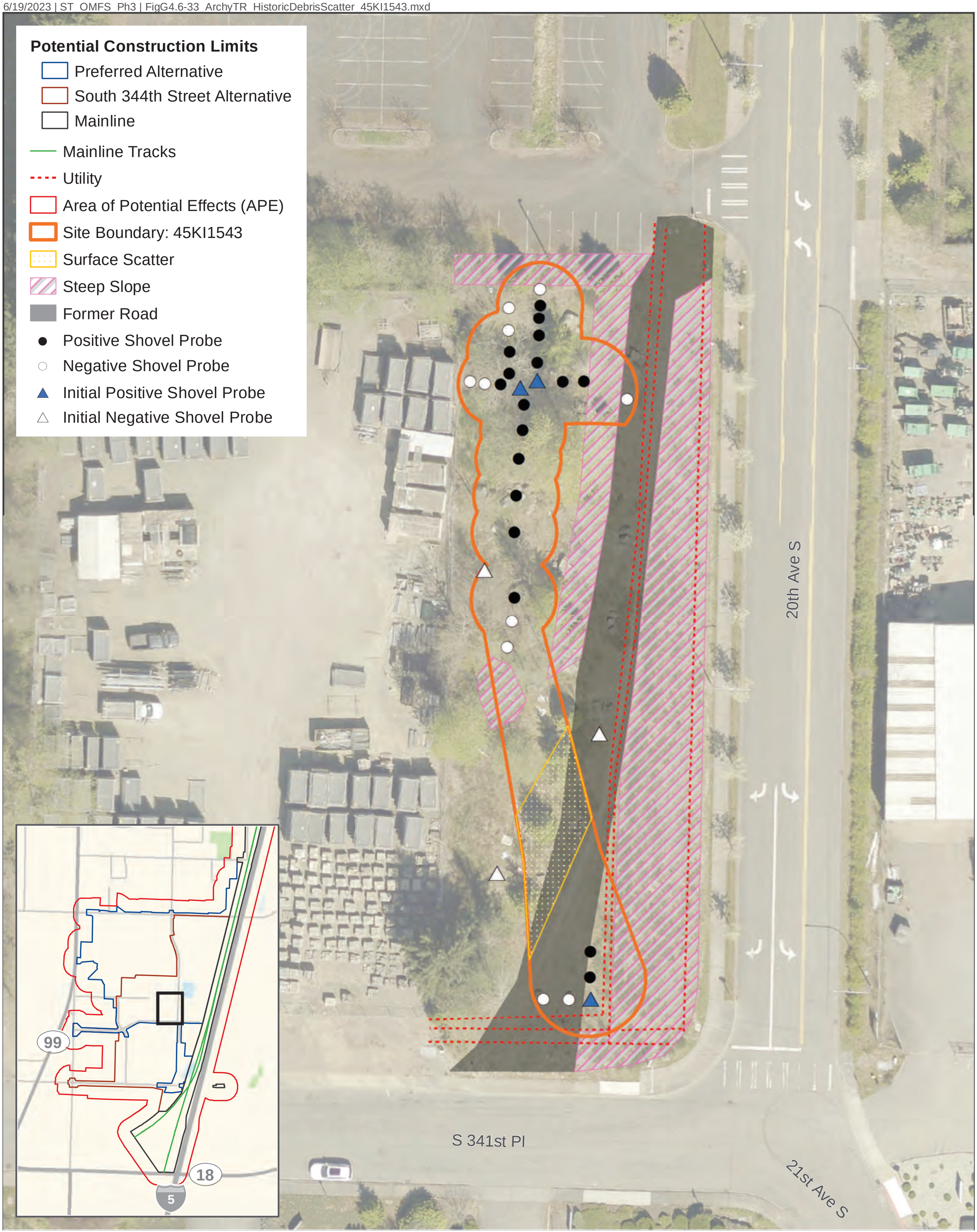
Before additional subsurface survey was conducted on the landform, historic aerial photographs were reviewed in detail for this area. The earliest aerial imagery of this location dated to 1936/1937 and illustrates a landscape with partial forest regrowth with winding paths following a clear-cut event. The closest structure at this time was located approximately 200 meters southwest as part of a small farmstead off South 344th Street (Figure G4.6-34) (King County Map Vault 1936/1937a). In the next available imagery from 1957, the site location is completely forested and the closest structures at that time are approximately 200 meters directly south (Figure G4.6-34) (EarthExplorer 1957a). There does not seem to be any access to this site from the developed areas off South 344th Street. There is no visible change in the landscape immediately surrounding the site until the development of the eastern half of South 341st Place in the 1980s. These developments slowly progressed eastward along the roadway, beginning with the clearcutting of parcels adjacent to the road between 1985 to 1987, followed by progressive grading and construction that occurred from 1987 to the early 1990s. Aerial imagery from 1990 shows the landform completely graded, with few clusters of vegetation. The landscape seems to have been completely graded to glacial soils during this time (Figure G4.6-34) (Google Earth 2020).

By 2002, the site had largely become overgrown, with evidence of dumping in aerial imagery. The evidence of dumping becomes more widespread between 2002 and 2005 (Google Earth 2020). In 2005, the site was once again mostly cleared during the preparation for the construction of 20th Ave South and the Christian Faith Center. It is at this time that the roadway shown on the surveyed landform is constructed, and a large pile of boulders appeared in the center of the landform (Google Earth 2020).

The boulders were spread across the landform by 2007, as shown in satellite imagery (Google Earth 2020), likely in conjunction with vegetation clearance. The final visible landscape alteration occurred in the summer of 2016, when a vegetation-removal effort occurred across the western half of the landform (Google Earth 2020).

A very sparse scatter of historical and recent artifacts was observed on the surface during the pedestrian survey of the landform between the two concentrations identified during the subsurface investigations (Figure G4.6-33 and Attachment G4-2). However, surface visibility was approximately 2 percent, with vegetation across the landform consisting of thick grasses, a thicket of Himalayan blackberry, Douglas-fir, Western hemlock, and several non-native decorative species (Figures G4.6-35 and G4.6-36). The landform also has three steep slopes, boulder piles, extensive utility corridors, and a prepared gravel road, which limited excavation locations (Figures G4.6-35 and G4.6-36).

Twenty-eight shovel probes were excavated across the landform. Of these, 24 were excavated across the northwestern quarter of the landform, and the remaining four were excavated in the southeastern corner. A total of 17 shovel probes contained modern or temporally non-diagnostic demolition debris (Figure G4.6-33 and Attachment G4-2). The soils across the site were identified as layers of fill over intact glacially deposited patent material. Glacial till was typically identified at depths between 20 to 30 centimeters below the surface (Figure G4.6-37 and Attachment G4-2).


Potential Construction Limits
Preferred Alternative
South 344th Street Alternative
Mainline
Mainline Tracks
Utility
Area of Potential Effects (APE)
Site Boundary: 45KI1543
Surface Scatter
Steep Slope
Former Road
Positive Shovel Probe
Negative Shovel Probe
Initial Positive Shovel Probe
Initial Negative Shovel Probe
20th Ave S
S 341st Pl
21st Ave S
99
18
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

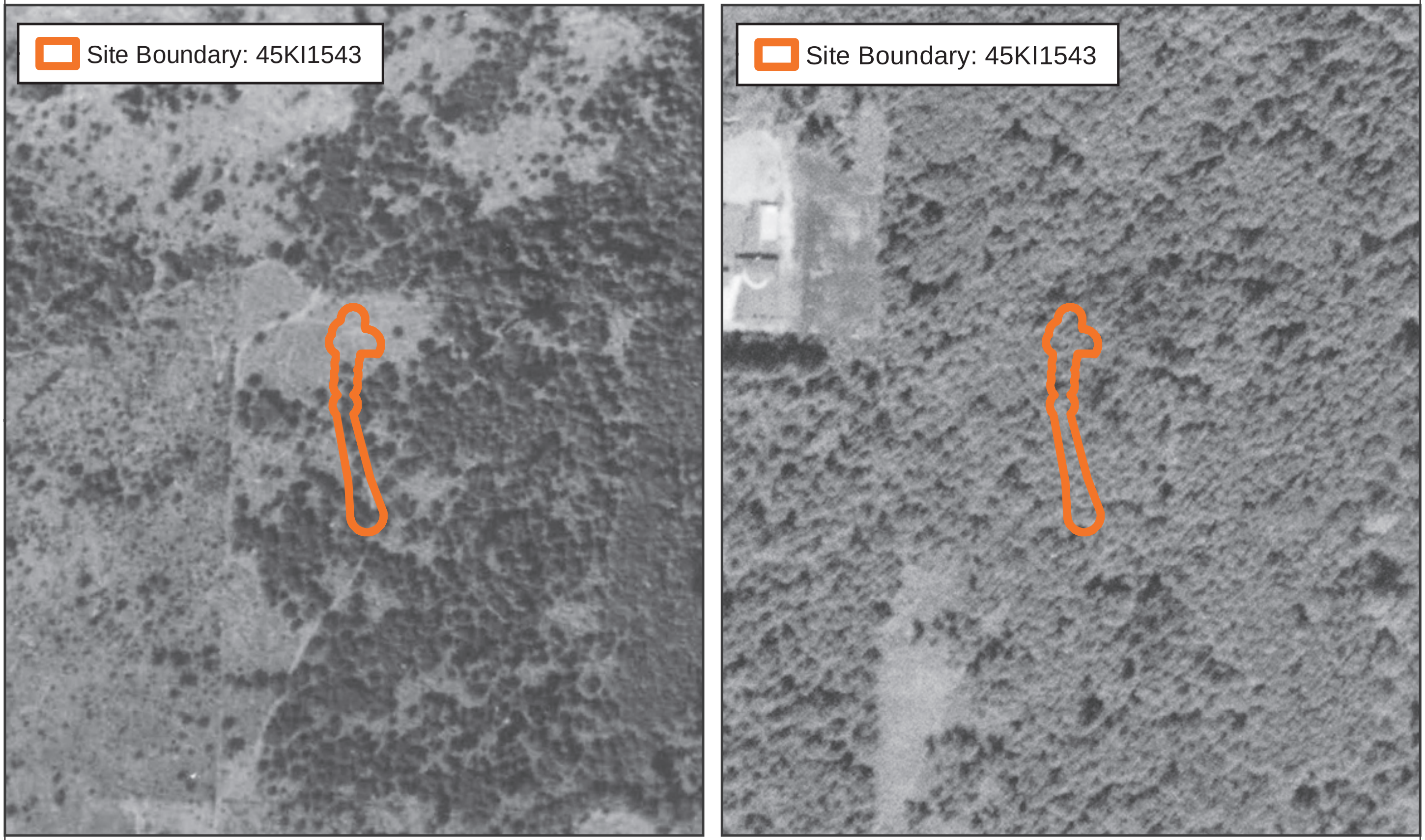
N

0 50 100 Feet

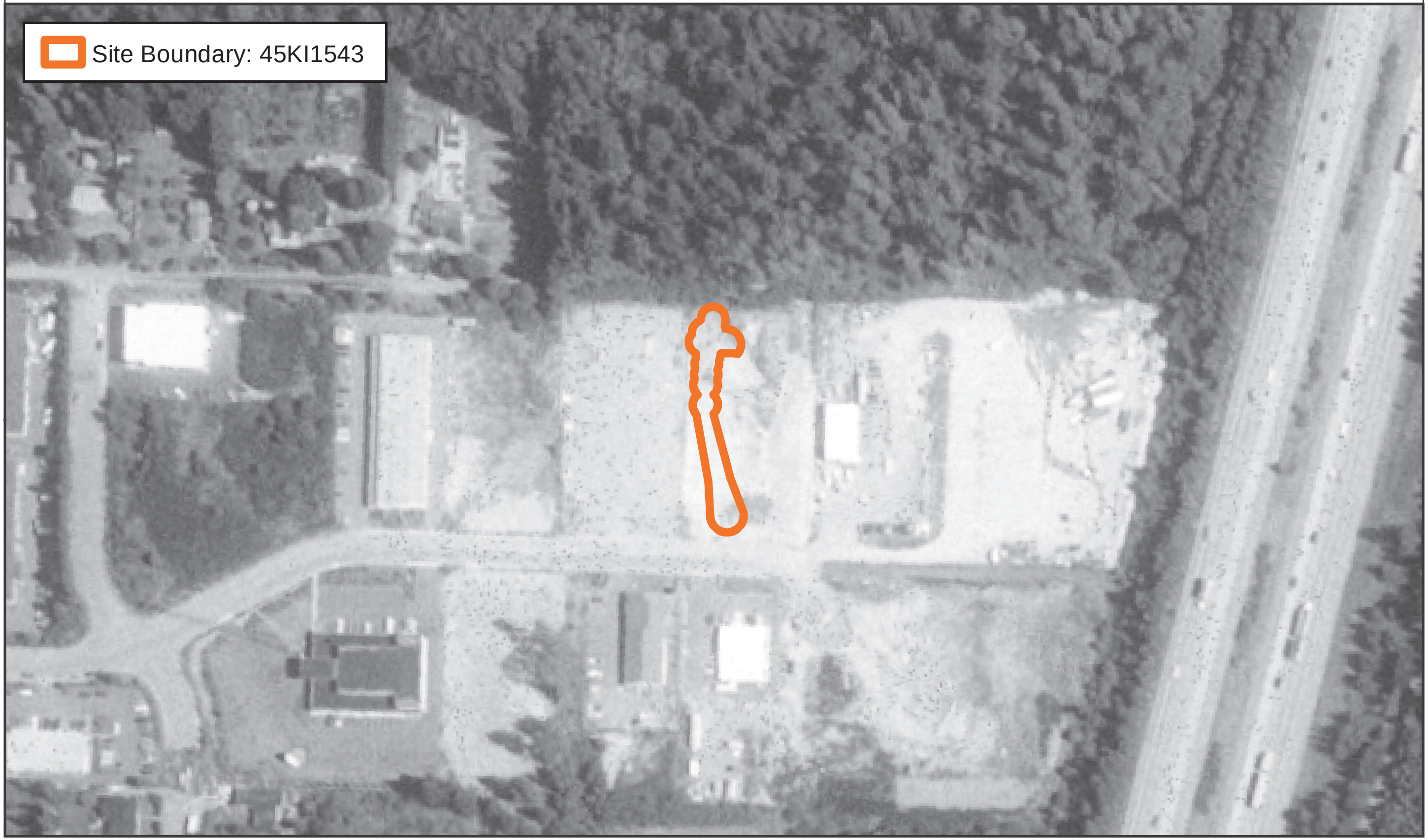
FIGURE G4.6-33
Site 45KI1543
Investigation Results
Preferred and South 344th Street Alternatives
OMF South

2/20/2023 | ST_OMFS_Ph3 | FigG4.6-34_ArchyTR_HistoricAerials_DebrisScatter_1935-1957-1991_Tri.mxd

1936/1937 Aerial Photograph of Site 45KI1543 **1957 Aerial Photograph of Site 45KI1543**


Site Boundary: 45KI1543
Site Boundary: 45KI1543

1991 Aerial Photograph of Site 45KI1543


Site Boundary: 45KI1543

Data Sources: King County Map Vault (1937 S-T-R Records), USGS 1957 Aerial Photographs (EarthExplorer), ATCRC (2020).

N

0 200 400 Feet

FIGURE G4.6-34
1936/1937, 1957, and 1991 Historic Aerials
of Site 45KI1543

OMF South

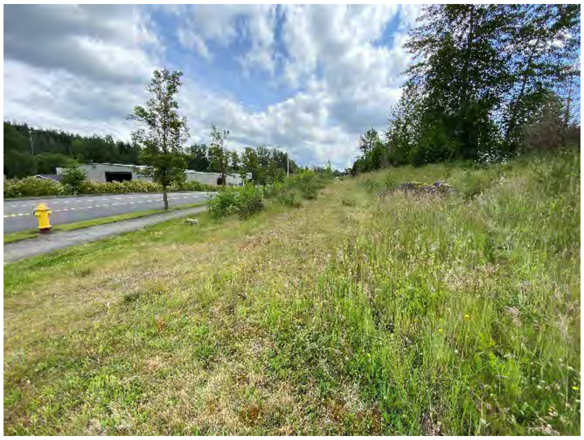


Figure G4.6-35 Overview of Site 45KI1543 landform, northeast corner, view south-southwest

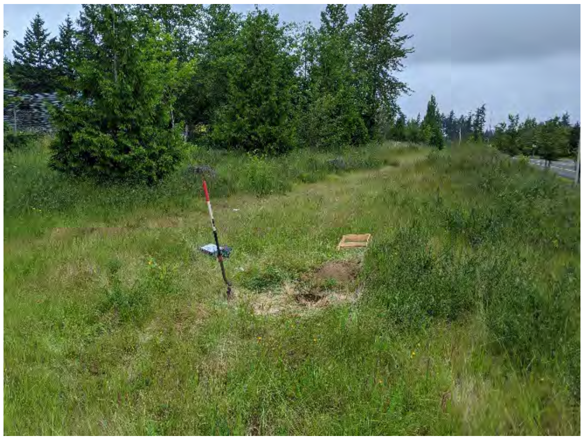


Figure G4.6-36 Overview of Site 45KI1543 landform with utilities and the gravel road, SP02-27, southeast corner, view north-northwest

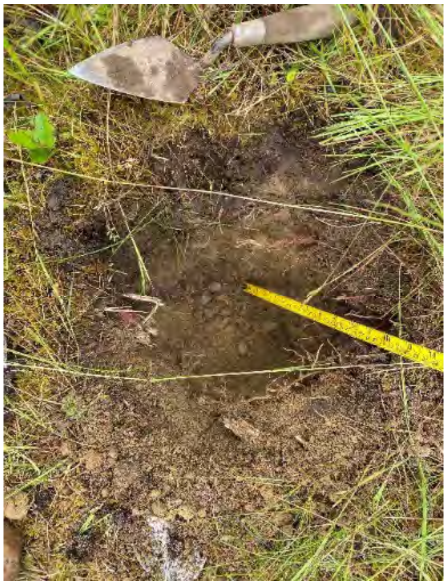


Figure G4.6-37 Typical soil strata, brown fill over orangish-brown glacial till, SP02-06

The artifacts identified include nondiagnostic clear, green, and brown glass fragments; leather scraps, plastics (both hard fragments and films), numerous, machine-made brick fragments, a ceramic tile fragment, culinary ware, ceramic fragments, and cut stone block fragments. Only two metal artifacts were identified: a wire nail and an unidentified metal. None of the artifacts were distinctive or bore any markings that might have provided temporally significant information (Figures G4.6-38 to G4.6-41**)**. All of these artifact types are mixed in the same general soil strata (brown sandy loam with pebbles and cobbles) (Figure G4.6-37, G4.6-42, and G4.6-43, and Attachment G4-2). In most cases (14 of 17), the artifact-bearing layer was present immediately on top of intact, undisturbed glacially deposited parent material with sharp, clearly defined boundaries (Figure G4.6-32 and Attachment G4-2). The other three positive shovel probes had multiple strata of modern fill with various artifact concentrations (Figure G4.6-33 and Attachment G4-2). All identified strata had sharply defined boundaries and contained moderate to high levels of pebbles and cobbles.

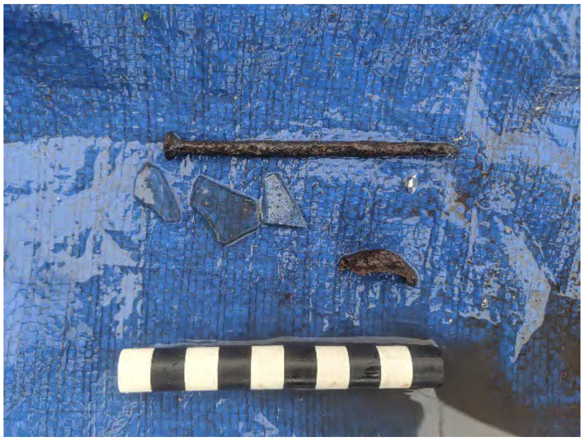


Figure G4.6-38 Metal and glass debris Strata 1, SP02-28

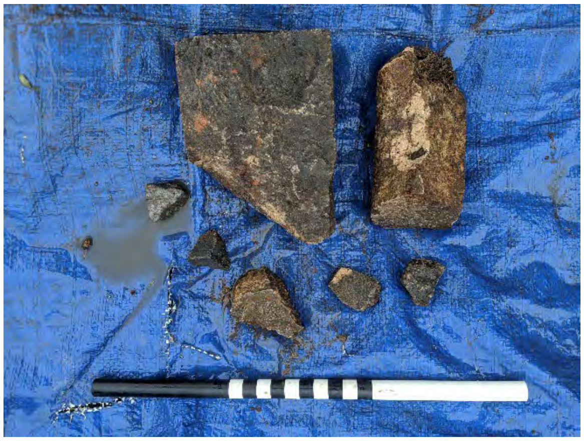


Figure G4.6-39 Cut stone fragments identified Strata 1, SP02-28

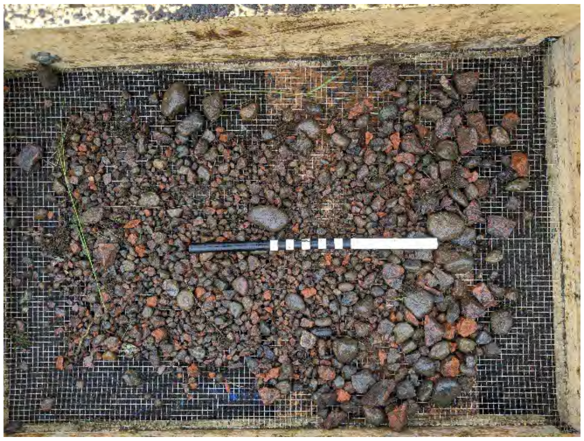


Figure G4.6-40 Mixed gravel and brick fragments Strata 1, SP02-28

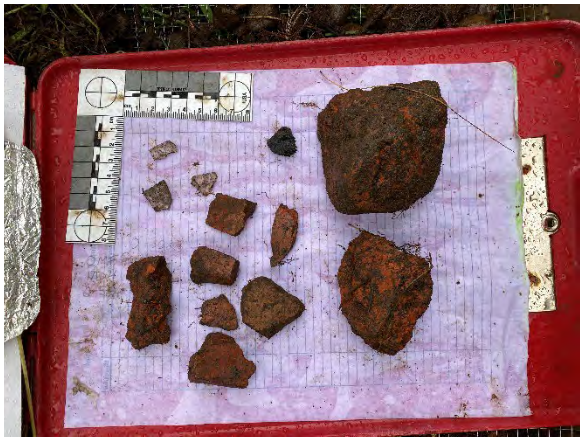


Figure G4.6-41 Glass and brick debris Strata 2, SP02-01

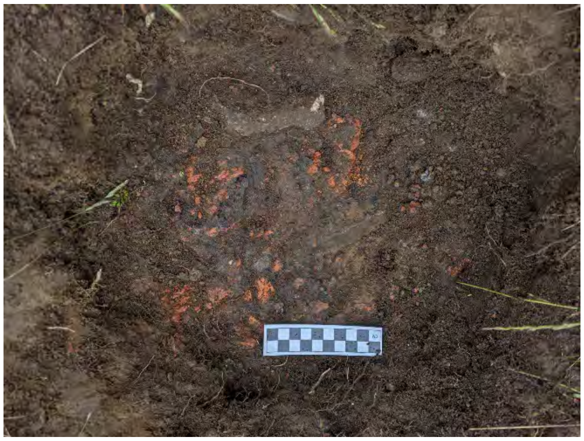


Figure G4.6-42 Typical debris concentration encountered in shovel probes across the site, SP02-28

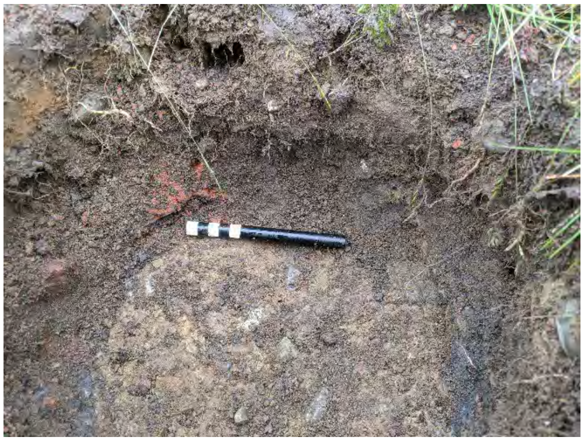


Figure G4.6-43 Detail of typical debris scatter strata with a low, sharply defined stratum boundary, SP02-28

The origin of this debris scatter is unknown. There is no evidence of historic structures near the site from the 1930s through the 1980s that could have been the source. This implies that the debris may have been imported as fill, or the site was used for dumping, following the modern clearance of the site for development. No diagnostic marks were identified on any of the artifacts encountered during the survey of this site. All of the brick fragments identified are hard, evenly fired, and of very fine industrial standard clay. All of them have edges that range from sub-round to very angular, and most are less than five centimeters in size. The cut stone fragments are finished on one face. Some have a finished edge. None have perforations, and the unfinished edges are subangular to angular. All of the glass fragments are less than 2 square centimeters in size and have subangular to angular edges.

6.1.1.7 Isolate 45KI1583

This isolate consists of an amber glass beer bottle identified on the surface within the WSDOT right-of-way near the base of an embankment west of I-5, approximately 75 meters (246 feet) north of S 336th Street (Figure G4.6-46). The bottle contains embossing on its base indicating that it was manufactured by the Northwestern Glass Company in 1966 (Figures G4.6-44 and G4.6-45) (Lockhart et al. 2017). Other modern cans and debris dating from between the mid-1970s to the 1990s were found within approximately 10 meters (33 feet) to the north of the bottle on and near the base of the same embankment below I-5. Six shovel probes and auger cores (SP-71, SP-74, SP-75, SP-76, SP-77, and SP-78) excavated in the immediate vicinity of the 1966 bottle, including four radial shovel probes excavated within 5 meters (16 feet) of the bottle and in the immediate vicinity of the other nearby surface items, contained no historically diagnostic or precontact artifacts. Because none of the other items found in the vicinity of the 1966 bottle were historically diagnostic, the bottle is recorded as an archaeological isolate.

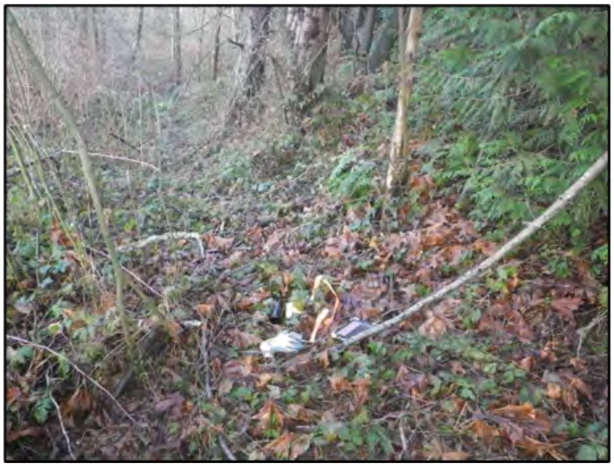


Figure G4.6-44 Isolate 45KI1583 location, view north/northwest

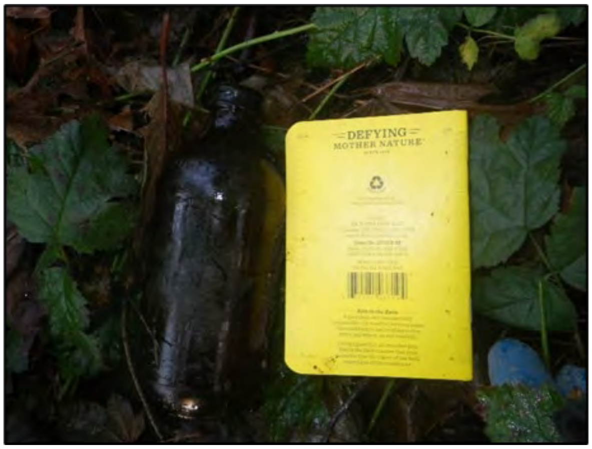
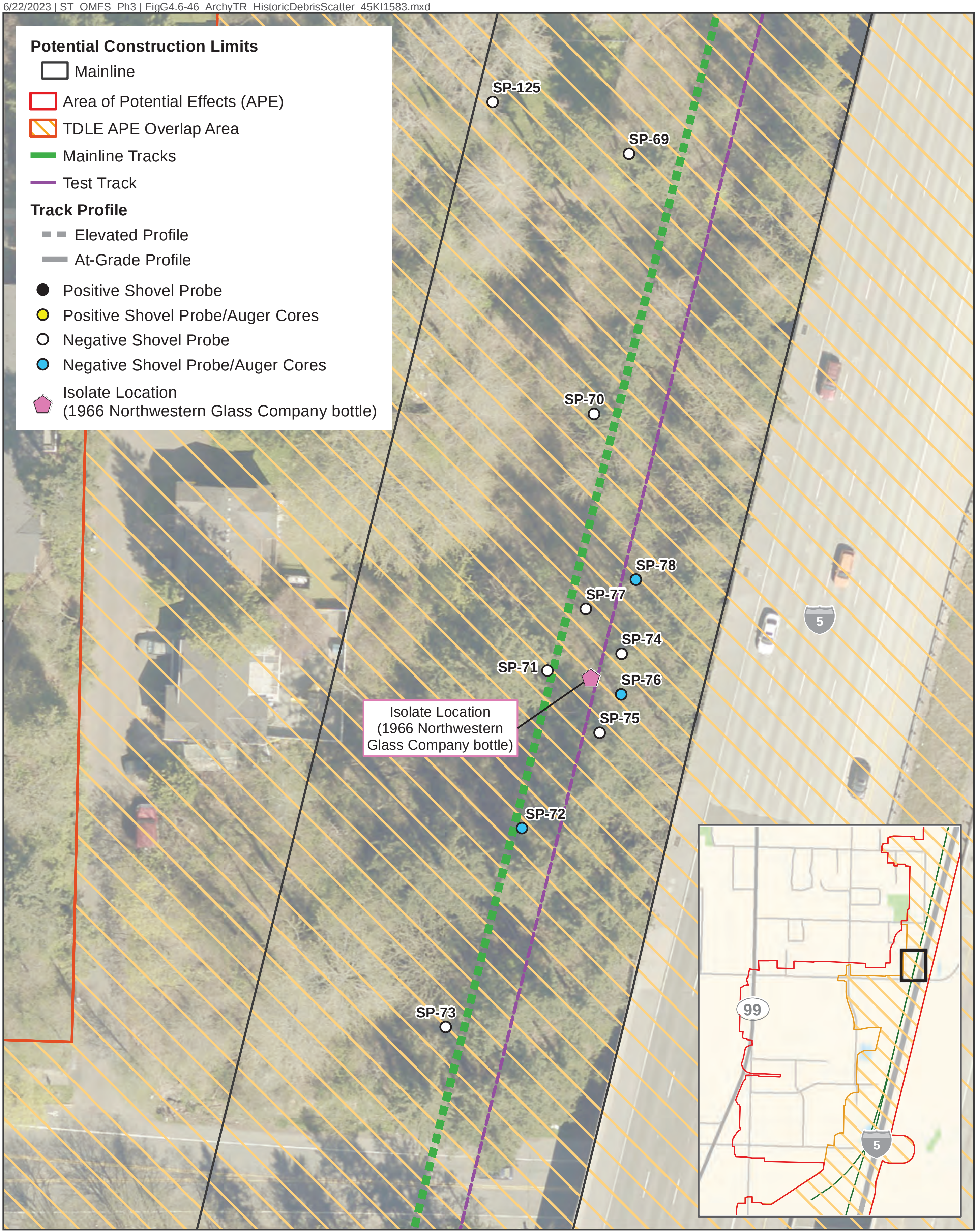


Figure G4.6-45 1966 amber glass beer bottle (Isolate 45KI1583)


Potential Construction Limits
Mainline
Area of Potential Effects (APE)
TDLE APE Overlap Area
Mainline Tracks
Test Track
Track Profile
Elevated Profile
At-Grade Profile
Positive Shovel Probe
Positive Shovel Probe/Auger Cores
Negative Shovel Probe
Negative Shovel Probe/Auger Cores
Isolate Location
(1966 Northwestern Glass Company bottle)
SP-125
SP-69
SP-70
SP-78
SP-77
SP-74
SP-71
SP-76
SP-75
Isolate Location
(1966 Northwestern
Glass Company bottle)
SP-72
SP-73
5
99
5

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

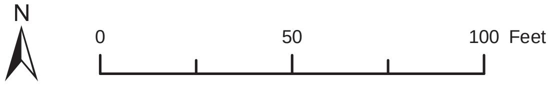

N
0
50
100 Feet

FIGURE G4.6-46
Site 45KI1583
Investigation Results
OMF South and TDLE Overlap Area
OMF South

6.1.2 NRHP Eligibility Recommendation

6.1.2.1 Site 45KI1542

Integrity

The site's structural remnants are still in the original construction location, thereby retaining the integrity of location. However, due to the removal and demolition of the building's superstructure, the resource lacks integrity of design, materials, and workmanship. The site no longer retains integrity of setting, feeling, or association, as the site location and its vicinity have been substantially altered since its period of use (1930s to 1940s). The original rural landscape surrounding the site is now heavily urbanized, thereby removing all aspects of the structure's former setting. The associated pasture — once an integral portion of the structure's setting — and its feeling have been substantially altered, and its current use is as a wooded water catchment basin. In sum, the site no longer retains the aspects of integrity that would pertain to its potential significance and NRHP eligibility.

Significance

Located off of SR 99, the foundation is the remains of a barn associated with John Danielson, who owned the barn. It was constructed in 1932, at the beginning of the Great Depression (Figure G4.6-13). It appears that the barn's demolition occurred between 1940 and 1950. The former structure was likely a west-facing gable. The two-story building has a dirt and concrete floor. The foundation was associated with the important economic collapse of the 1930s and the agricultural development of the area from the 1920s through the early 1960s.

While the site is temporally associated with the Great Depression, its absence of integrity precludes it from conveying a clear link to an aspect of this period that may represent a significant pattern in local, state, or national history. The site is therefore recommended to be not eligible for listing in the NRHP under Criterion A. Research has also demonstrated that the resource is not associated with individuals (including John Danielson, who owned the barn) who are significant at a local, state, or national level, and, therefore, the site is recommended to be not eligible for listing in the NRHP under Criterion B. The construction and design of the foundation are not distinct in terms of engineering, architecture, or artistic design, nor does the foundation embody distinctive characteristics of a type, period, or method of construction, or the work of a master. The site is therefore recommended to be not eligible for listing in the NRHP under Criterion C. The foundation is associated with no surface or subsurface artifacts and by itself contributes no significant information regarding rural farming and its social and economic context in this area of Washington during the 1930s, or during any other period and, therefore, the site is recommended to be not eligible for listing in the NRHP under Criterion D.

In summary, site 45KI1542 lacks integrity and does not meet criteria to be considered significant under Criteria A through D of the NRHP and does not meet criteria necessary for listing in the WHR or local registers. In January 2021, DAHP concurred that the site is not eligible for listing in the NRHP.

6.1.2.2 Site 45KI1543

Integrity

This site retains little to no aspect of integrity relevant to its potential significance and NRHP eligibility. The site retains no demonstrable integrity of location, given the characteristics and content of the site’s artifact assemblage — predominantly fragmented construction materials in a disturbed context — incorporated in a secondary depositional context as part of an imported fill matrix. As such, the artifacts at the site also lack integrity of feeling, setting, and association. Indeed, all of the debris shows evidence of having been tumbled and worn. The lack of metals in the debris identified also suggests that a concerted effort was made to remove it before the debris was deposited in its current location. Lastly, the sharp, clear boundaries between multiple soil strata is a typical indication of modern landscape modification strategies, where soils are layered and compacted with heavy machinery. The act of removing, sorting, and redepositing the historic debris from its place of origin has severed its link to a specific location and setting. Given the absence of any built structures or features at the site, integrity of design, materials, and workmanship do not pertain to the evaluation of this site.

Eligibility

The site’s historic artifacts appear to be structural remnants; however, they are in a secondary depositional context and amongst materials deposited as fill. The site has no demonstrable connection to a pattern of events to be considered significant under Criterion A, nor is it associated with a prominent person who would make it significant under Criterion B. The site also lacks any features that would make it significant under Criterion C. The site’s cultural material contributes no new information about local, regional, or national history that would make the site potentially significant under Criterion D.

In summary, site 45KI1543 lacks integrity and does not meet criteria to be considered significant under Criteria A through D of the NRHP and does not meet criteria necessary for listing in the WHR or local registers. In January 2021, DAHP concurred that the site is not eligible for listing in the NRHP.

6.1.2.3 Isolate 45KI1583

Integrity

Isolate 45KI1583 appears to retain integrity of location and potentially retains integrity of setting, feeling, and association, given that the immediate surroundings of the isolate (WSDOT right-of-way adjacent to I-5) have likely changed little since the artifact was deposited. As the isolate is not associated with built structures or other features, integrity aspects of design, materials, and workmanship do not pertain to the evaluation of the isolate.

Eligibility

This isolated beer bottle has no demonstrable connection to a pattern of events to be considered significant under Criterion A, nor is it associated with a prominent person that would make it significant under Criterion B. The isolate also lacks any features that would make it significant under Criterion C. This artifact, by itself, contributes no new information about local, regional, or national history and is therefore not significant under Criterion D.

HRA and ATCRC recommends that Isolate 45KI1583 is not eligible for listing in the NRHP or the WHR. Sufficient information has been gathered from the site to evaluate it under National

Register Criteria A, B, C, and D. In May 2023, DAHP concurred that the isolate is not eligible for listing in the NRHP.

6.2 Historic-Period, Built-Environment Survey Results

Using the methods described above (Section 5.2), HRA identified a total of 86 historic-period, built-environment resources that could qualify for listing in the KCRHP, WHP, and NRHP within the APE requiring survey and inventory. A map of surveyed resources is found in Attachment G4-4. As noted above, resources surveyed and inventoried for the OMF South project included historic-period, built-environment resources that will be 40 years old or older at the time of project construction (i.e., 2025) or those built in or before 1985, minus those meeting clearly defined exemptions (Section 5.2). HRA found that 58 of the 86 historic-period resources are old enough to qualify for listing in the NRHP; survey results were recorded in HPIs and are included as Attachment G4-5. The remaining 28 surveyed resources were old enough to meet minimum age criteria for KCRHP eligibility consideration and were evaluated under King County criteria but were not recorded in WISAARD due to age restrictions, as per consultation with DAHP.

Table G4.6-1 lists the surveyed resources in the OMF South APE. HRA provided an initial recommendation that none of the resources are eligible for listing in the NRHP under Criteria A through D. These recommendations are advisory and can inform the lead agency's determinations of eligibility for surveyed resources. In a letter dated October 27, 2023, FTA determined that the none of the resources listed in Table G4.6-1 are eligible for listing in the NRHP (see Attachment G4-6, Tribal and Agency Coordination). In addition, based on the survey results, HRA recommends that no built-environment resources surveyed for the OMF South Project are eligible for the WHR or KCRHP as historic properties.

Table G4.6-1Surveyed Resources in the OMF South Area of Potential Effects

#	Address	Parcel	OMFPIN	Existing Use	Year Built	OMF South Alternative APE	FTA NRHP Eligibility Determination
1	1706 S Commons	7622400010	OMF097	Commercial	1975	Preferred Alternative	Not Eligible for NRHP listing
2	2101 S 324th Street	1621049037	OMF102	Residence	1966	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
3	33003 24th Avenue S	7978800682	OMF108	Residence	1951	Preferred Alternative	Not Eligible for NRHP listing
4	33035 24th Avenue S	7978800679	OMF110	Residence	1957	Preferred Alternative	Not Eligible for NRHP listing
5	33049 24th Avenue S	7978800681	OMF111	Residence	1948	Preferred Alternative	Not Eligible for NRHP listing
6	33111 24th Avenue S	7978200164	OMF113	Residence	1968	Preferred Alternative	Not Eligible for NRHP listing
7	33211 24th Avenue S	7978200165	OMF114	Residence	1975	Preferred Alternative	Not Eligible for NRHP listing
8	33217 24th Avenue S	7978200167	OMF115	Residence	1969	Preferred Alternative	Not Eligible for NRHP listing
9	2244 S 333rd Street	7978200160	OMF117	Residence	1967	Preferred Alternative	Not Eligible for NRHP listing
10	2221 S 333rd Street	7978200182	OMF123	Residence	1980	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing

Table G4.6-1 Surveyed Resources in the OMF South Area of Potential Effect(continued)

#	Address	Parcel	OMFPIN	Existing Use	Year Built	OMF South Alternative APE	FTA NRHP Eligibility Determination
11	2237 S 333rd Street	7978200184	OMF122	Residence	1985	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
12	2245 S 333rd Street	7978200180	OMF121	Residence	1948	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
13	2253 S 333rd Street	7978200186	OMF125	Residence	1985	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
14	2230 S 336th Street	7978200210	OMF126	Residence	1962	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
15	2234 S 336th Street	7978200215	OMF127	Residence	1959	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
16	33366 20th Avenue S	7978200106	OMF132	Residence	1967	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
17	1820 S 336th Street	7978200096	OMF137	Residence	1950	Preferred Alternative	Not Eligible for NRHP listing
18	1812 S 336th Street	7978200070	OMF138	Residence	1947	Preferred Alternative	Not Eligible for NRHP listing
19	33532 18th Avenue S	4129400050	OMF142	Residence	1954	Preferred Alternative	Not Eligible for NRHP listing
20	33531 18th Avenue S	4129400005	OMF146	Residence	1954	Preferred Alternative	Not Eligible for NRHP listing
21	33606 Pacific Highway S	2121049025	OMF153	Commercial	1951	Preferred Alternative	Not Eligible for NRHP listing
22	33903 Pacific Highway S	2021049086	OMF160	Commercial	1947	Preferred Alternative	Not Eligible for NRHP listing
23	33838 Pacific Highway S	2121049068	OMF157	Commercial	1980	Preferred Alternative	Not Eligible for NRHP listing
24	34020 Pacific Highway S	2121049050	OMF163	Commercial	1985	Preferred Alternative	Not Eligible for NRHP listing
25	1700 S 340th Street: Residence	2121049024	OMF164	Residence	1946	Preferred and S 344th Street Alternative	Not Eligible for NRHP listing
26	1700 S 340th Street: Masonic	2121049024	OMF164	Meeting Hall	1946	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
27	1724 S 340th Street	2121049041	OMF165	Residence	1966	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
28	1800 S 340th Street	2121049042	OMF166	Residence	1966	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
29	1816 S 340th Street	2121049040	OMF167	Residence	1949	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing

Table G4.6-1 Surveyed Resources in the OMF South Area of Potential Effect(continued)

#	Address	Parcel	OMFPIN	Existing Use	Year Built	OMF South Alternative APE	FTA NRHP Eligibility Determination
30	1828 S 340th Street	2121049039	OMF168	Residence	1946	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
31	1920 S 340th Street	2121049047	OMF169	Residence	1953	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
32	1908 S 341st Place	3903800070	OMF178	Commercial	1985	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
33	2102 S 341st Place	2121049061	OMF181	Commercial	1983	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
34	34008 18th Place S	3903800100	OMF175	Commercial	1985	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
35	1626 S 341st Place	3903800110	OMF171	Commercial	1978	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
36	34004 16th Avenue S	3903800160	OMF170	Commercial	1981	Preferred Alternative	Not Eligible for NRHP listing
37	34110 Pacific Highway S	2021049119	OMF566	Commercial	1977	S 344th Street Alternative	Not Eligible for NRHP listing
38	1610 S 341st Place	3903800150	OMF608	Commercial	1978	S 344th Street Alternatives	Not Eligible for NRHP listing
39	1620 S 341st Place	3903800140	OMF172	Commercial	1978	S 344th Street Alternatives	Not Eligible for NRHP listing
40	1710 S 341st Place	3903800130	OMF173	Commercial	1978	Preferred and S 344th Street Alternatives	Not Eligible for NRHP listing
41	1720 S 341st Place	3903800120	OMF174	Commercial	1978	Preferred Alternative	Not Eligible for NRHP listing
42	34222 Pacific Highway S	2021049137	OMF568	Skating Rink	1979	S 344th Street Alternative	Not Eligible for NRHP listing
43	1607 S 341st Place	3903800010	OMF606	Commercial	1976	S 344th Street Alternative	Not Eligible for NRHP listing
44	1625 S 341st Place	3903800015	OMF607	Commercial	1980	S 344th Street Alternative	Not Eligible for NRHP listing
45	1707 S 341st Place	3903800020	OMF190	Commercial	1980	Preferred and S 344th Street Alternative	Not Eligible for NRHP listing
46	1909 S 341st Place	3903800030	OMF189	Religious Facility	1985	Preferred and S 344th Street Alternative	Not Eligible for NRHP listing
47	34205 18th Place S	4129600080	OMF205	Residence	1959	S 344th Street Alternative	Not Eligible for NRHP listing
48	34204 18th Place S	4129600005	OMF197	Residence	1962	S 344th Street Alternative	Not Eligible for NRHP listing
49	34213 18th Place S	4129600075	OMF206	Residence	1961	S 344th Street Alternative	Not Eligible for NRHP listing
50	34212 18th Place S	4129600010	OMF198	Residence	1959	S 344th Street Alternative	Not Eligible for NRHP listing

Table G4.6-1 Surveyed Resources in the OMF South Area of Potential Effect(continued)

#	Address	Parcel	OMFPIN	Existing Use	Year Built	OMF South Alternative APE	FTA NRHP Eligibility Determination
51	34221 18th Place S	4129600070	OMF207	Residence	1958	S 344th Street Alternative	Not Eligible for NRHP listing
52	34220 18th Place S	4129600015	OMF199	Residence	1958	S 344th Street Alternative	Not Eligible for NRHP listing
53	34229 18th Place S	4129600065	OMF208	Residence	1955	S 344th Street Alternative	Not Eligible for NRHP listing
54	34228 18th Place S	4129600020	OMF200	Residence	1958	S 344th Street Alternative	Not Eligible for NRHP listing
55	34320 Pacific Highway S	2021049093	OMF564	Industry	1954	S 344th Street Alternative	Not Eligible for NRHP listing
56	34235 18th Place S	4129600060	OMF209	Residence	1955	S 344th Street Alternative	Not Eligible for NRHP listing
57	34234 18th Place S	4129600025	OMF201	Residence	1957	S 344th Street Alternative	Not Eligible for NRHP listing
58	34243 18th Place S	4129600055	OMF210	Residence	1960	S 344th Street Alternative	Not Eligible for NRHP listing
59	34242 18th Place S	4129600030	OMF202	Residence	1955	S 344th Street Alternative	Not Eligible for NRHP listing
60	1610 S 344th Street	2121049073	OMF571	Commercial	1985	S 344th Street Alternative	Not Eligible for NRHP listing
61	34251 18th Place S	4129600050	OMF211	Residence	1955	S 344th Street Alternative	Not Eligible for NRHP listing
62	34250 18th Place S	4129600035	OMF203	Residence	1955	S 344th Street Alternative	Not Eligible for NRHP listing
63	34259 18th Place S	4129600045	OMF212	Not in Use	1966	S 344th Street Alternative	Not Eligible for NRHP listing
64	1824 S 344th Street	4129600040	OMF204	Residence	1959	S 344th Street Alternative	Not Eligible for NRHP listing
65	1916 S 344th Street	2121049056	OMF196	Residence	1947	S 344th Street Alternative	Not Eligible for NRHP listing
66	1928 S 344th Street	2121049045	OMF194	Commercial	1948	S 344th Street Alternative	Not Eligible for NRHP listing
67	1515 S 344th Street	8897000030	OMF648	Commercial	1977	S 344th Street Alternative	Not Eligible for NRHP listing
68	34703 16th Avenue S	8897000090	OMF657	Commercial	1974	S 344th Street Alternative	Not Eligible for NRHP listing
69	1610 S 347th Place	2121049012	OMF569	Commercial	1985	S 344th Street Alternative	Not Eligible for NRHP listing
70	34726 16th Avenue S	2121049077	OMF572	Commercial	1978	S 344th Street Alternative	Not Eligible for NRHP listing
71	1688 S 348th Street	2121049078	OMF573	Hotel	1982	S 344th Street Alternative	Not Eligible for NRHP listing
72	2859 S 244th Street	2122049069	OMF240	Residence	1948	Midway Landfill Alternative	Not Eligible for NRHP listing
73	2907 S 244th Street	2122049111	OMF238	Residence	1952	Midway Landfill Alternative	Not Eligible for NRHP listing
74	24805 Pacific Highway S	2122049156	OMF035	Commercial	1977	Midway Landfill Alternative	Not Eligible for NRHP listing
75	24811 Pacific Highway S	2122049152	OMF036	Commercial	1979	Midway Landfill Alternative	Not Eligible for NRHP listing

Table G4.6-1 Surveyed Resources in the OMF South Area of Potential Effect(continued)

#	Address	Parcel	OMFPIN	Existing Use	Year Built	OMF South Alternative APE	FTA NRHP Eligibility Determination
76	24852 Pacific Highway S	2122049078	OMF041	Commercial	1974	Midway Landfill Alternative	Not Eligible for NRHP listing
77	25036 Pacific Highway S	2122049154	OMF045	Not in Use	1966	Midway Landfill Alternative	Not Eligible for NRHP listing
78	25205 29th Avenue S	1950900005	OMF061	Residence	1958	Midway Landfill Alternative	Not Eligible for NRHP listing
79	2905 S 252nd Street	1950900055	OMF060	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
80	2911 S 252nd Street	1950900060	OMF059	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
81	2919 S 252nd Street	1950900065	OMF058	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
82	2925 S 252nd Street	1950900070	OMF057	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
83	2933 S 252nd Street	1950900075	OMF056	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
84	2939 S 252nd Street	1950900080	OMF055	Residence	1957	Midway Landfill Alternative	Not Eligible for NRHP listing
85	3018 S 253rd Street	1951500015	OMF078	Residence	1959	Midway Landfill Alternative	Not Eligible for NRHP listing
86	25318 31st Avenue S	1951500070	OMF090	Residence	1977	Midway Landfill Alternative	Not Eligible for NRHP listing

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Preferred Alternative

7.1.1 Archaeological Recommendation

Archival research has not identified any archaeological resources within the Preferred Alternative APE that are listed in or eligible for listing in the NRHP, WHR, or KCRHP. ATCRC and HRA identified three historic-period archaeological resources within the area surveyed (Sites 45KI1542 and 45KI1543; and Isolate 45KI1583). ATCRC and HRA recommended that the two sites lack integrity and are not eligible for listing in the NRHP, WHR, and KCRHP. In January 2021, DAHP concurred that neither site is eligible for listing in the NRHP. ATCRC and HRA recommend the isolate does not meet any criteria for eligibility in the NRHP, WHR, or KCRHP. In May 2023, DAHP concurred that Isolate 45KI1583 is not eligible for listing in the NRHP. Should the project be modified from that described in Section 1, additional archaeological analysis may be necessary.

ATCRC and HRA recommend adoption of an Inadvertent Discovery Plan (IDP) prior to ground disturbance activities in the event that previously unidentified archaeological resources or human remains are discovered during construction. An IDP has been developed for the project and would be implemented during construction (see Attachment G4-7). The purpose of the IDP is to minimize the risk of damage to currently unknown archaeological resources by providing appropriate procedures for addressing any inadvertent discoveries of human remains or archaeological resources during ground-disturbing work. Sound Transit would coordinate with SHPO and Tribes to review the plan prior to implementation. A contractor orientation would also be prepared to familiarize construction crews with IDP procedures and the kinds of resources that may be encountered during construction.

7.1.2 Historic, Built-Environment Properties Recommendations

Archival research indicated that there are no previously identified historic properties listed in or eligible for listing in the NRHP, WHR, or KCRHP located in the APE for the Preferred Alternative, with the exception of the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. Under separate evaluations, BPA and FTA determined that the OMF South project would have no adverse effect to the transmission lines under Section 106, a finding with which SHPO has concurred (see Attachment G4-6). Additionally, FTA determined, and SHPO concurred, that no historic-period, built-environment resources surveyed for the OMF South project are eligible for listing in the NRHP. Based on the survey results, HRA recommends that no built-environment resources surveyed for the OMF South Project are eligible for the WHR or KCRHP as historic properties. Should the project be modified from that described in Section 1, additional historic-period built-environment analysis may be necessary.

7.2 South 344th Street Alternative

7.2.1 Archaeological Recommendations

Archival research has not identified any archaeological resources within the South 344th Street APE that are listed in or eligible for listing in the NRHP, WHR, or KCRHP. ATCRC identified one historic archaeological resource (45KI1543) within the area surveyed. However, ATCRC and HRA are recommending that this site lacks integrity and is not eligible for listing in the NRHP, WHR, and

KCRHP. Should the project be modified from that described in Section 1 additional archaeological analysis may be necessary.

ATCRC and HRA recommend adoption of an IDP prior to ground disturbance activities in the event that previously unidentified archaeological resources or human remains are discovered during construction. An IDP has been developed for the project and would be implemented during construction (see Attachment G4-7). Sound Transit would coordinate with SHPO and Tribes to review the plan prior to implementation. A contractor orientation would also be prepared to familiarize construction crews with IDP procedures and the kinds of resources that may be encountered during construction.

7.2.2 Historic, Built-Environment Properties Recommendations

Archival research indicated that there are no previously identified historic properties listed in or eligible for listing in the NRHP, WHR, or KCRHP located in the APE for the South 344th Street Alternative, with the exception of the Tacoma-Covington No. 2, 3, and 4 and Tacoma-Raver No. 1 transmission lines. Under separate evaluations, BPA and FTA determined that the OMF South project would have no adverse effect to the transmission lines under Section 106, a finding with which SHPO has concurred (see Attachment G4-6). Additionally, FTA determined, and SHPO concurred, that no historic-period, built-environment resources surveyed for the OMF South project are eligible for listing in the NRHP. Based on the survey results, HRA recommends that no built-environment resources surveyed for the OMF South Project are eligible for the WHR or KCRHP as historic properties. Should the project be modified from that described in Section 1, additional historic-period, built-environment analysis may be necessary.

7.3 Midway Landfill Alternative

7.3.1 Archaeological Recommendations

Archival research has not identified any archaeological resources within the Midway Landfill APE that are listed in or eligible for listing in the NRHP, WHR, or KCRHP. Additionally, ATCRC did not identify any archaeological resources within the area surveyed for the Midway Landfill APE. As such, archaeological resources will not be impacted by this alternative. Should the project be modified from that described in Section 1, additional archaeological analysis may be necessary.

ATCRC and HRA recommend the adoption of an IDP prior to ground disturbance activities in the event that previously unidentified archaeological resources or human remains are discovered during construction. An IDP has been developed for the project and would be implemented during construction (see Attachment G4-7). Sound Transit would coordinate with SHPO and Tribes to review the plan prior to implementation. A contractor orientation would also be prepared to familiarize construction crews with IDP procedures and the kinds of resources that may be encountered during construction.

7.3.2 Historic, Built-Environment Properties Recommendations

Archival research indicated that there are no previously identified historic built-environment properties listed in or eligible for listing in the NRHP, WHR, or KCRHP located in the APE for the Midway Landfill Alternative. Additionally, based on survey results, FTA determined, and SHPO concurred, that no historic-period, built-environment resources surveyed for the OMF South project are eligible for listing in the NRHP. Based on the survey results, HRA recommends that no built-environment resources surveyed for the OMF South Project are eligible for the WHR or KCRHP as historic properties. Should the project be modified from that described in Section 1, additional historic-period, built-environment analysis may be necessary.

7.4 Summary of Recommendations and Effects

ATCRC and HRA do not recommend any archaeological or historic-built environment resources for eligibility in the NRHP, WHR, or KCRHP for any of the build alternatives. However, ATCRC and HRA recommend adoption of an Inadvertent Discovery Plan (IDP) for all build alternatives prior to ground disturbance activities in the event that previously unidentified archaeological resources or human remains are discovered during construction.

In a letter dated October 27, 2023, FTA determined that the project would have no adverse effect to resources that are listed on, or eligible for the NRHP within the APE. SHPO concurred with this determination in a letter dated October 31, 2023 (see Attachment G4-6, Tribal and Agency Correspondence).

8 REFERENCES

Ames, Kenneth M. and Herbert D. G. Maschner. 1999 Peoples of the Northwest Coast: Their Archaeology and Prehistory. Thames & Hudson, London.

Artifacts Consulting Inc. 2016. Highline College, Cultural Resources Survey. Prepared for Highline College. Report on file with DAHP.

Baldwin, Garth. 2014. Cultural Resources Assessment for the Pacific Highway South HOV Lanes Phase V (S 340th Street to S 359th Street) Project, Federal Way. Prepared for Widener and Associates. On file with DAHP.

Baldwin, Garth. 2015. Cultural Resources Assessment for the South 356th Street Roadway Improvements Project, Federal Way. Prepared for Wildner and Associates. Report on file with DAHP.

Ballard, Arthur C. 1957. The Salmon Weir on Green River, Western Washington. Davidson Journal of Anthropology, Vol. 1, No. 1, pp. 37-54.

Bard, James. 2006. Final Report: Cultural Resources discipline Report for I-5 SR 161/SR 18 Triangle Improvements. Prepared for WSDOT. Report on file with DAHP.

Bartoy, Kevin. 2013. State of Washington Archaeological Site Inventory Form, 45KI719. Form on file with the DAHP. Accessed October 2019.

Beck, Charlotte and Tom Jones. 2010. Clovis and Western Stemmed: Population Migration and the Meeting of Two Technologies in the Intermountain West. *American Antiquity* 75(1):81–116.

Beck, Charlotte and Tom Jones. 2012. Clovis and Western Stemmed Again: Reply to Fiedel and Morrow. American Antiquity 77(2):386–397.

Binford, Lewis. 1980. Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity*, 45(1): 4-20.

Blecha, Pete. 2002. Spanish Castle Ballroom (Seattle). HistoryLink.org Essay 3826. Available at: https://www.historylink.org/File/3826. Accessed October 29, 2019.

Boyd, Robert T. 1998 The Coming of Spirit and Pestilence, Introduced Diseases and Population Decline among Northwest Coast Indians, 1774–1874. University of Washington Press, Seattle.

Carlson, Roy. 1990. Cultural Antecedents. In Northwest Coast, edited by Wayne Suttles, pp. 60–69. Handbook of North American Indians, vol. 7, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Carpenter, C.S. 1986. Fort Nisqually – A Documented History of Indian and British Interaction. Tahoma Research Publications, Tacoma, WA.

Chambers, Jennifer. 2009. Cultural Resources Assessment for the City of Edgewood, Meridian Avenue Sewer LID No. 1 Improvement Project. Prepared for Tetra Tech. On file with DAHP.

Chambers, Jennifer and Sarah Amell. 2014. Cultural Resources Assessment for the Saltwater State Park Bridge Rehabilitation Project, Des Moines. Prepared for Saltwater State Park. Report on file with DAHP.

Chatters, James C., Jason B. Cooper, Philippe D. LeTourneau, and Lara C. Rooke. 2011. Understanding Olcott: Data Recovery at 45SN28 and 45SN303 Snohomish County, Washington. Report prepared by AMEC Earth & Environmental for Granite Falls Alternate Route Project, Department of Public Works, Snohomish County, Washington.

City of Kent. 2001. City of Kent Midway Subarea Plan, on file with the City of Kent, Kent, Washington.

Clague, John J., and Thomas S. James. 2002. History and Isostatic Effects of the Last Ice Sheet in Southern British Columbia. Quaternary Science Reviews 21:71-87.

Colon, Justin. 2020. State of Washington Archaeological Site Inventory Form, 45KI1481. Form on file with the DAHP. Accessed June 2020.

Croes, Dale, Scott Williams, Larry Ross, Mark Collard, Carolyn Dennler, and Barbara Vargo. 2008. The Projectile Point Sequences in the Puget Sound Region, In Projectile Point Sequences in Northwestern North America, edited by Roy L. Carlson and P. R. Magne, pp. 105–130, Archaeology Press, Simon Fraser University, Burnaby, British Columbia.

Crowley, Walt. 2003a. George Vancouver Begins British Survey of Puget Sound on May 19, 1792. HistoryLink.org essay 5230. Available at: https://www.historylink.org/File/5230. Accessed October 10, 2019.

Crowley, Walt. 2003b. Hudson’s Bay Company Establishes Fort Nisqually, First Non-Native Settlement on Puget Sound, in April 1833. HistoryLink.org essay 5231. Available at: https://www.historylink.org/File/5231. Accessed October 10, 2019.

DAHP (Department of Archeology and Historic Preservation). 2005. Letter of determination. Gregory Griffith. June 2, 2005.

DAHP (Department of Archeology and Historic Preservation). 2020a. Washington State Standards for Cultural Resource Reporting, January 2, 2020. Available at: https://dahp.wa.gov/project-review/washington-state-standards-for-cultural-resource-reporting. Accessed January 2, 2020.

DAHP (Department of Archeology and Historic Preservation). 2020b. Washington Information System for Architectural and Archaeological Records Data. Available at: https://wisaard.dahp.wa.gov/. Accessed November 2020.

DAHP (Department of Archeology and Historic Preservation). Letter of Concurrence. 2020c. No Historic Properties Affected: Federal Way Link Transit Extension, March 16, 2020

Denfeld, Duane Colt. 2012. Fort Steilacoom (1849–1868). HistoryLink.org essay 10102.Available at: https://www.historylink.org/File/10102. Accessed October 10, 2019.

Deppen, J., Stephanie Jolivette, Peter Lape, Tom Minichillo, Molly Odell, Laura Phillips, and Brandon Reynon. 2014. Report on Excavations at 45-KI-843 (*qebqebaXad*, the Manzanita Beach Site), Maury Island, King County, Washington. Submitted to the Department of Archaeology and Historic Preservation in fulfillment of permit 2010-29.

Donald, Leland. 2003. The Northwest Coast as a Study Area: Natural, Prehistoric, and Ethnographic Issues, In Emerging from the Mist: Studies in Northwest Coast Culture History, edited by R. G. Matson, Gary Coupland, and Quentin Mackie, pp. 289–327, UBC Press, Vancouver, British Columbia.

Earley, Amber. 2005. Cultural Resources Assessment of the Thompson Park Project, Federal Way. Prepared for the City of Federal Way. Report on file with DAHP.

EarthExplorer. 1957a. United Stated Geological Service Database. 1957 Aerial Photograph, ARA550460020205, Township 21N, Range 4E.

EarthExplorer. 1957b Aerial Photograph, A550460020182, Township 22N, Range 4E.

Easterbrook, Donald J. 2003. Cordilleran Ice Sheet Glaciation of the Puget Lowland and Columbia Plateau and Alpine Glaciation of the North Cascade Range, Washington. In Western Cordillera and Adjacent Areas, ed. T. W. Swanson, pp. 137-157. Geological Society of America, Boulder, Colorado.

Elliott, P., M. Chidley, M. Sterner. 2020. Draft: Federal Way Link Extension, Additional Cultural Resources Inventory, King County, Washington.

EPA (Environmental Protection Agency). 2000. EPA Superfund Record of Decision: Midway Landfill, EPA ID: WAD 980638910; OU 01; Kent Washington. 09/06/2000. (R10-00/043).

Forsman, L.A., D.E. Lewarch, J.R. Robbins, and L.L. Larson. 1998. TRA Lakewood-to-Tacoma Commuter Rail Project, Tacoma Dome, South Tacoma, and Lakewood Sections, Pierce County, Washington. Cultural Resources Assessment. Larson Anthropological Archaeological Services, Seattle, WA. Technical Report 98-13. Report on file, Department of Archaeology and Historic Preservation, Olympia, WA.

Gibbs, George.1877. Tribes of Western Washington and Northwest Oregon. U.S. Geographical and Geological Survey of the Rocky Mountain Region, Contributions to North American Ethnology 1. Facsimile Reproduction, Shorey Bookstore, Seattle, Washington.

Gilbert, M. Thomas P., Dennis L. Jenkins, Anders Gotherstrom, Nuria Naveran, Juan J. Sanchez, Michael Hofreiter, Philip Francis Thomsen, Joan Binladen, Thomas F. G. Higham, Robert M. Yohe II, Robert Parr, Linda Scott Cummings, and Eske Willerslev. 2008. DNA from Pre-Clovis Human Coprolites in Oregon, North America. Science 320:786–789.

Givens, Linda Holden. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Available at: https://www.historylink.org/File/20376. Accessed October 10, 2019.

GLO (General Lands Office). 1863. U.S. Department of Interior GLO Public Lands Survey System-Survey of Township 22 N Range 4E.

GLO (General Lands Office). 1894. U.S. Department of Interior GLO Public Lands Survey System-Survey of Township 21 N Range 4E.

Goodwin, Matt. 2014. Archaeological Survey for the Proposed SC1996 Midway South Telecommunications Facility. Prepared for Adapt Engineering. Report on file with DAHP.

Google Earth. 2019. July 2005, South 336th Area of Potential Effects, https://earth.google.com/web/

Google Earth. 2020. July 2005, South 336th Area of Potential Effects, https://earth.google.com/web/

Greengo, Robert E. 1966. Archaeological Excavations at the Marymoor Site (45KI9).: A Report to the National Park Service Region Four, Order Invoice Voucher 34-703 and 34-64-554 (Sammamish Flood Control Project). Department of Anthropology, University of Washington, Seattle.

Haeberlin, Hermann and Erna Gunther. 1930. The Indians of Puget Sound. University of Washington Publications in Anthropology No. 4(1):1-83.

Hannum, Michelle. 2018. Cultural Resources Assessment for the Zenith Park Site, King County, Washington. Prepared for Hutteball & Oremus Architecture. Report on file with DAHP.

Hartwich, G. 1972. Early Settlements in the Puyallup Valley. Master's Thesis, University of Washington Library, Seattle, Washington.

HDR Engineering, Inc. and CH2M Hill. 2016. Federal Way Link Extension: Historical and Archaeological Technical Report. Prepared for the Sound Transit Authority. Report provided by the Sound Transit Authority.

Hebda, R. J., and R. W. Matthews.1984. Holocene History of Cedar and Native Indian Cultures of the North American Pacific Coast. Science 225:711–713.

Hilbert, V., J. Miller, and Z. Zahir. 2001. Puget Sound Geography. Lushootseed Press.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Available at: http://www.federalwayhistory.org/federal-way-timeline.php. Accessed October 10, 2019.

Hodge, Frederick W. 1910. Handbook of American Indians North of Mexico. 2 vols. Bureau of American Ethnography Bulletin 30. Washington D.C.

Iversen, David, Dennis Lewarch, Leonard Forsman, and Lynn Larson. 2001. Pacific Highway South HOV Lanes Cultural Resources Assessment. Report prepared or the City of Kent. Report on file with DAHP.

Ives, Ryan, Stephen Emerson, and Jennifer Wilson. 2017. Cultural Resources Survey for the WSDOT SR 509 SeaTac to I-5 Freeway Extension Project. Prepared for WSDOT. Report on file with DAHP.

Jolivette, Stephanie A.E., and Edgar K. Huber. 2016 Monitoring Site Restoration and Analysis of Materials from the Bray Site (45PI1276) under DAHP Excavation Permit No, 2015-31, Pierce County, Washington. Statistical Research Technical Report, 16-27, Lacey, WA.

Kenady, Stephen M., Michael C. Wilson, Randall F. Schalk, and Robert R. Mierendorf. 2011. Late Pleistocene butchered Bison antiquus from Ayer Pond, Orcas Island, Pacific Northwest: Age confirmation and taphonomy. Quaternary International 233:130–141.

Kidd, Robert S. 1964. A Synthesis of Western Washington Prehistory from the Perspective of Three Occupational Sites. Master's thesis, Department of Anthropology, University of Washington, Seattle. King County Assessor. 2020. eReal Property Database. Available at: https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx. Accessed May 31, 2020.

King County (Map Vault).
1936/1937a Aerial Photograph- Section 21, Township 21 N Range 4 E.
1936/1937b Aerial Photograph- Section 21, Township 22 N Range 4 E.
1936/1937c Aerial Photograph- Section 16, Township 21 N Range 4 E.
1965a Aerial Photograph- Section 16, Township 21 N Range 4 E
1965b Aerial Photograph- Section 21, Township 21 N Range 4 E.

Kirk, Ruth and Carmela Alexander. 1990. Exploring Washington's Past: A Road Guide to History. University of Washington Press, Seattle, WA.

Kirk, Ruth, and Richard D. Daugherty. 2007. Archaeology in Washington. University of Washington Press, Seattle, Washington.

Kopperl, Robert, Charles Hodges, Christian Miss, Johonna Shea, and Alecia Spooner. 2016. Archaeology of King Country, Washington: A Context Statement for Native American Archaeological Resources. Prepared for the King County Historic Preservation Program. Seattle, Washington.

Kopperl, Robert E., Amanda K. Taylor, Christian J. Miss, Kenneth M. Ames, and Charles M. Hodges. 2015. The Bear Creek Site (45KI839), a Late Pleistocene–Holocene Transition Occupation in the Puget Sound Lowland, King County, Washington. PaleoAmerica. 25(1): 116-120.Kroll Map Company. 1912. King County 1912, Washington, Page 13. Published by the Kroll Map Company.

Kroll Map Company. 1926. King County 1926, Washington, Page 13. Published by the Kroll Map Company.

Larson Anthropological Archaeological Services Limited. 2000a. Regional Express/ Federal Way and Star Lake Project Cultural Resource Assessment Federal Way Alternative. Report completed for the Central Puget Sound Regional Transit authority. Report on file with DAHP.

Larson Anthropological Archaeological Services Limited. 2000b. Regional Express/ Federal Way and Star Lake Project Cultural Resource Assessment Star Lake Alternative. Report completed for the Central Puget Sound Regional Transit authority. Report on file with DAHP.

Larson, L.L., and D.E. Lewarch. 1995. The Archaeology of West Point, Seattle, Washington: 4,000 Years of Hunter-fisher-gatherer Land Use in Southern Puget Sound. Report on file, DAHP, Olympia WA. Lasmanis, Raymond. 1991. The Geology of Washington. Rocks and Minerals 66:262–277.

Lasmanis, Raymond. 1991. The geology of Washington. Rocks & Minerals, 66(4): 262-277.

Limberg, Caitlin, James Jenks, and Jennifer Thompson. 2021. SR 509/24th Avenue South to South 188th Street – New Expressway (SR 509 Stage 2) Project, King County, Washington. Prepared for WSDOT. Report on file with DAHP.

Lockhart, Bill, Beau Schriever, Bill Lindsey, and Carol Serr. 2017. Northwestern Glass Co. In Encyclopedia of Manufacturers Marks on Glass Containers, Volume N-O, edited by Bill Lockhart, Bill Lindsey, Carl Serr, Pete Schultz, and Beau Schriever, pp. 35–42. Available at: https://sha.org/bottle/pdffiles/NorthwesternGlass.pdf. Accessed March 19, 2021.

Lockwood, Chris. 2016. Archaeological site update form, 45-KI-9 (Marymoor Site). Electronic document on file with the DAHP.

Luttrell, Charles. 2003. Cultural Resources Investigations for Washington Department of Transportation's SR 161: Milton Way to South 360th Street Project. Prepared for WSDOT. Report on file with DAHP.

Luttrell, Charles. 2005. Letter to Kimberly Farley Regarding I-5: Pierce County Line to Tukwila Stage 4 HOV Project. Prepared for WSDOT. Report on file with DAHP.

Luttrell, Charles. 2006. Cultural Resources Investigations for the Washington Department of Fish and Wildlife's Lake Dolloff Access Redevelopment Project. Prepared for Washington Department of Fish and Wildlife. Report on file with DAHP.

MacIntosh, Heather M. and David Wilma. 1999. Northern Pacific Railroad Announces Tacoma Terminus on July 14, 1873. HistoryLink.org Essay 922. Available at: https://www.historylink.org/File/922. Accessed October 10, 2019.

Mather, Camille and Ed Arthur. 2015. Archaeological Survey and Assessment of the Proposed Lakeridge Highline View Estates Subdivision (TPN 6929603575), Des Moines. Prepared for Lakeridge Development. Report on file with DAHP.

Matson, R. G. 1985. The Relationship between Sedentism and Status Inequalities among Hunter-Gatherers. In *Status, Structure and Stratification: Current Archaeological Reconstructions*, edited by M. Thompson, M. T. Garcia, and F. J. Kense, pp. 245–252. University of Calgary Archaeological Association, Calgary, Alberta, Canada.

Matson, R. G., and Gary Coupland. 2009. *The Prehistory of the Northwest Coast*. Left Coast Press, Walnut Creek, California.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Prepared for 4Culture and the United Daughters of the Confederacy, Seattle, Washington. Available at: https://www.federalwayhistory.org/~federax3/wp-content/uploads/2020/04/Military-Road-Brochure.pdf. Accessed October 10, 2019.

Metsker, Chas F. 1936. King County 1936, Washington, Page 12. Published by Chas F. Metzker, Seattle Washington.

Mishkar, Larry, Katherine Chobot, and Paula Johnson. 2009. North Twin Bridge Assessment, Des Moines. Prepared for the City of Des Moines. Report on file with DAHP.

Miss, C.J., and S.K. Campbell. 1991. Prehistoric Cultural Resources of Snohomish County, Washington. Report on file, DAHP, Olympia.

Morgan, Vera E. (editor). 1999. The SR-101 Sequim Bypass Archaeological Project: Mid- to Late-Holocene Occupations on the Northern Olympic Peninsula, Clallam County, Washington. Reports in Archaeology and History 100–108. Archaeological and Historical Services, Eastern Washington University, Cheney, Washington. Prepared for Washington Department of Transportation, Olympia.

Munsell, David A. The Wapato Creek Fish Weir Site, 45PI47, Tacoma, Washington. Report on file at the U.S. Army Corps of Engineers, Seattle District.

Nelson, Charles. 1990. Prehistory of the Puget Sound Region. In Northwest Coast, edited by Wayne Suttles, pp 572-579. Handbook of North American Indians, Vol 7, W. C. Sturtevant, general editor.: Northwest Coast. Smithsonian Institution, Washington D.C. pp 572-579.

Nisbet, Jack and Claire Nisbet. 2011 Hudson's Bay Company. HistoryLink.org Essay 9881. Available at: https://www.historylink.org/File/9881. Accessed October 10, 2019.

NPS (National Park Service). 1995. National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Cultural Resources Department, Washington D.C.

NPS (National Park Service). 1997. National Register Bulletin 16a: How to Complete the National Register Registration Form. U.S. Department of the Interior, National Park Service, Cultural Resources Department, Washington D.C.

NRCS (Natural Resources Conservation Service). 2019. Soil Survey Staff. United States Department of Agriculture. Web Soil Survey. Available at: https://websoilsurvey.nrcs.usda.gov/. Accessed October 16, 2019.

Porter, S. C. and T. W. Swanson. 1998. Radiocarbon Age Constraints on Rates of Advance and Retreat of the Puget Lobe of the Cordilleran Ice Sheet During the Last Glaciation. Quaternary Research 50:205-213.

Rafael, David. 2020. Personal communication [Email] of June 10, 2020. Facilities Engineer Christian Faith Center. Federal Way, WA.

Riddle, Margaret. 2010. Donation Land Claim Act, Spur to American Settlement of Oregon Territory, Takes Effect on September 27, 1850. HistoryLink.org essay 9501. Available at: https://www.historylink.org/File/9501. Accessed October 10, 2019.

Rooke, Laura. 2002. Letter Report: Procedures and Results of a Cultural Resources Survey of Cingular Wireless Tower Site WA-645 (Lake Fenwick). Prepared for Vertex Engineering Services, Inc. Report on file with DAHP.

Rowe, Kara. 2018. Agriculture in Washington 1792 to 1900. HistoryLink.org essay 20523. Available at: https://www.historylink.org/File/20523. Accessed October 10, 2019.

Ruby, R.H. and Brown J.A. 1986. A Guide to the Indian Tribes of the Pacific Northwest. University of Oklahoma Press, Norman, OK.

Scott, Todd. 2008. Historic Resources Survey and Inventory, Kent. Prepared for the City of Kent. Report on file with DAHP.

Seattle Times. 1928. "New Highway to Tacoma to Clip off Miles." The Seattle Times, January 25, 1928. Page 1.

Seattle Times. 1964 National Disposal Proposed Garbage Landfill Near Kent. April 9:6.

Shantry, Kate, Brandy Rinck, and Ross Smith. 2010. Results of Testing at Xaxtl'abish 1 (45PI974), Hylebos Creek, Pierce County, WA. Report prepared by NWAA, for Wildlands, Inc. Report on file with the DAHP.

Sharpe, James, James Bard, and Jessica Feldman. 2009. Tacoma/Pierce County HOV Program: I 5: M Street to Portland Avenue-HOV, I 5: Portland Avenue to Port of Tacoma Road: Historical, Cultural and Archaeological Discipline Report. Prepared for the Washington State Department of Transportation, by CH2M Hill. Report on file with the DAHP.

Shufelt, Sarah. 2009 Final Draft: Cultural Resources Survey WSDOT Pierce County HOV Program Clear Creek Riverside Mitigation Site, Tacoma. Report completed by WSDOT, Report No. 09-23. On file with the DAHP.

Smith, Marian W. 1940. The Puyallup-Nisqually. Columbia University Contributions to Anthropology, Vol. 32, Columbia University Press, New York.

Snyder, D.E., Gale, P.S., and Pringle, R.F. 1973. Soil Survey of King County, Washington. United States Department of Agriculture, Soil Conservation Service in cooperation with Washington State.

Spier, Leslie. 1936 Tribal Distribution in Washington. General Series in Anthropology, Number 3. George Banta Publishing Company, Menasha, Wisconsin.

Stein, Alan J. 2001. Kent—Thumbnail History. HistoryLink.org Essay 3587. Available at: https://www.historylink.org/File/3587. Accessed October 29, 2019.

Stein. Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Available at: https://www.historylink.org/File/4215. Accessed October 10, 2019.

Stripe, Frank. 2016. Weyerhaeuser Property Cultural Resource Investigation. Prepared for Tetra Tech. On file with DAHP.

Stripe, Frank. 2017. Talasaea Consultants Project No. TAL-1572F, Federal Way Development Project. Prepared for Tetra Tech. On file with DAHP.

Suttles, Wayne and Barbara Lane. 1990. Southern Coast Salish. In Northwest Coast, edited by Wayne Suttles, pp. 485–502. Handbook of North American Indians, vol. 7, W. C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

Tate, Cassandra. 2003. Lewis and Clark Expedition enters future state of Washington on October 10, 1805. HistoryLink.org Essay 5323. Available at: https://www.historylink.org/File/5323. Accessed March 20, 2020.

Taylor, Amanda K., Stephanie A. E. Jolivette, and Julie K. Stein. 2009. The San Juan Islands Archaeological Project, 2008. Report completed for the Washington State Office of Archaeology and Historic Preservation, Archaeological Excavation Permit 08-18.

Taylor, Amanda K., Julie K. Stein, and Stephanie A. E. Jolivette. 2011. Big Sites, Small Sites, and Coastal Settlement Patterns in the San Juan Islands, Washington. Journal of Island and Coastal Archaeology 6(2):287–313.

Thorson, R.M. 1980. Ice-Sheet Glaciation of the Puget Lowland, Washington, During the Vashon State (Late Pleistocene). Quaternary Research 13:303-321.

Tingwall, Douglass, Linda Goetz, and Kara Kanaby. 2008. Cultural Resources Report, Pacific Highway South (SR 99) Phase IV Improvements Project, Federal Way. Prepared for WSDOT. On file with the DAHP.

USGS (United States Geological Survey). 1897a. Tacoma, WA Land Classification Map, Scale 1:125,000
1897b Tacoma, WA Topographic map, Scale 1:125,000
1900 Tacoma, WA Topographic map (Ed. 1900-1945), Scale 1:125,000
1949, 1957, 1961 Poverty Bay Topographic map (Ed. 1956), Scale 1:24,000
1962, 1968 Poverty Bay Topographic map (Ed. 1962), Scale 1:24,000
1969, 1972 Poverty Bay Topographic map (Ed. 1969), Scale 1:24,000
1981, 1991 Poverty Bay Topographic map (Ed. 1981), Scale 1:24,000

United States War Department. 1944. Aerial photograph: Northwest Sector No. 24-24, Scale 1:20,000.

WaDGER (Washington Division of Geology and Earth Resources). 2016. Surface Geology, 1:100,000—GIS data, November 2016: Washington Division of Geology and Earth Resources Series DS-18, version 3.1, previously released 2010.

Waters, Michael R., Thomas W. Stafford, Jr., H. Gregory McDonald, Carl Gustafson, Morten Rasmussen, Enrico Cappellini, Jesper V. Olsen, Damian Szklarczyk, Lars Juhl Jensen, M. Thomas, P. Gilbert, and Eske Willerslev. 2011. Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington. *Science* 334(6054):351–353.

Wessen, Gary C. 1969. A Report of Archaeological Testing at the DuPont Southwest Site (45PI72), Pierce County Washington, Western Heritage, Olympia.

Wessen, Gary C. 1985. Archaeological site survey in coastal and near-coastal areas of Western Washington, in Archaeological Inventory and Predictive Modelling in the Pacific Northwest, Studies in Cultural Resource Management no. 6, United States Department of Agriculture, Pacific Northwest Region, Portland.

Willamette Cultural Resources Associates. 2019. Creekside Commons Development (In Progress). Draft report on file with DAHP.

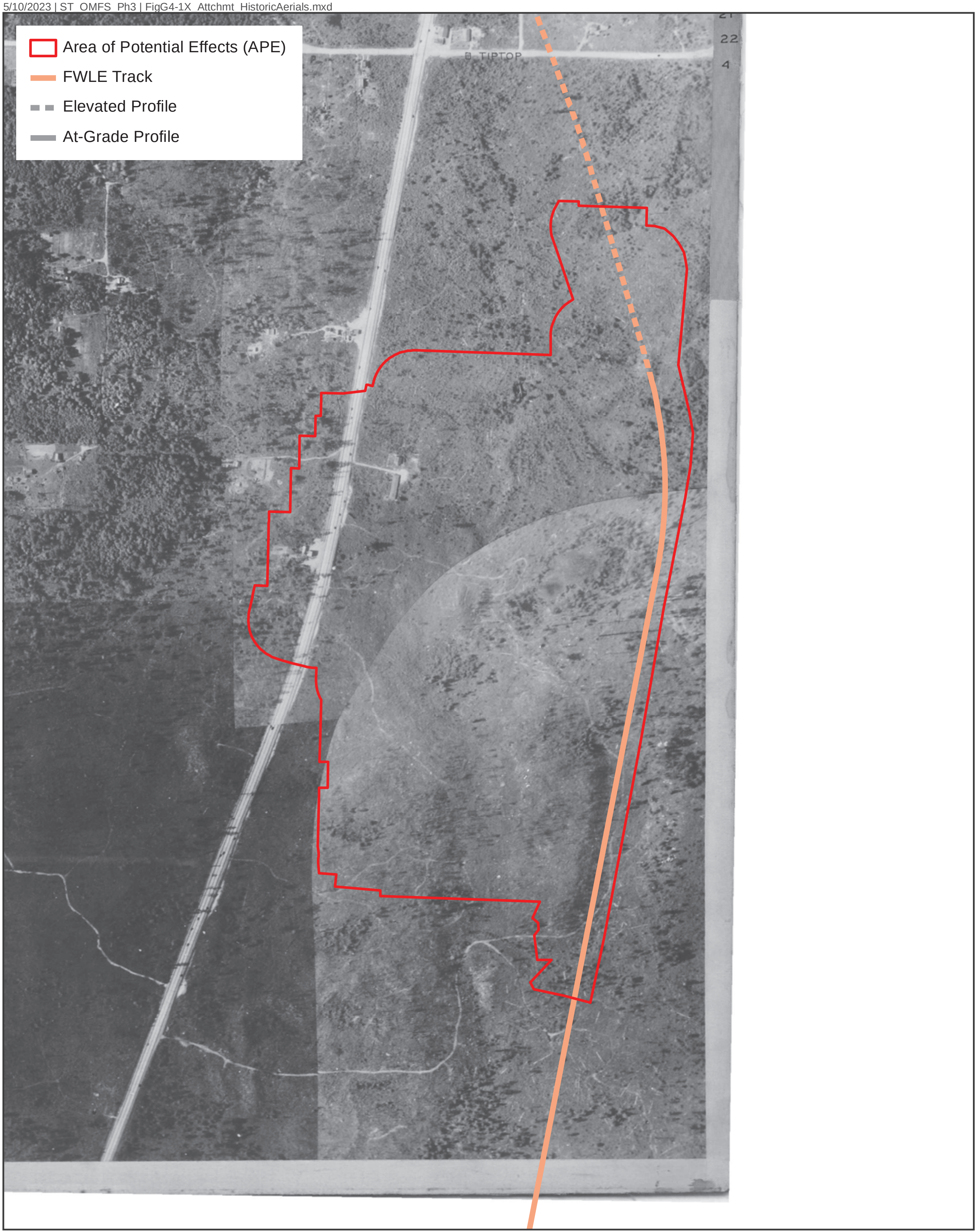
Operations and Maintenance Facility South

ATTACHMENT G4-1

Historical Aerials

Federal Transit Administration

SoundTransit


Area of Potential Effects (APE)
FWLE Track
Elevated Profile
At-Grade Profile
TIPTOP
21
22
4

Data Sources: King County Map Vault; EarthExplorer.

N

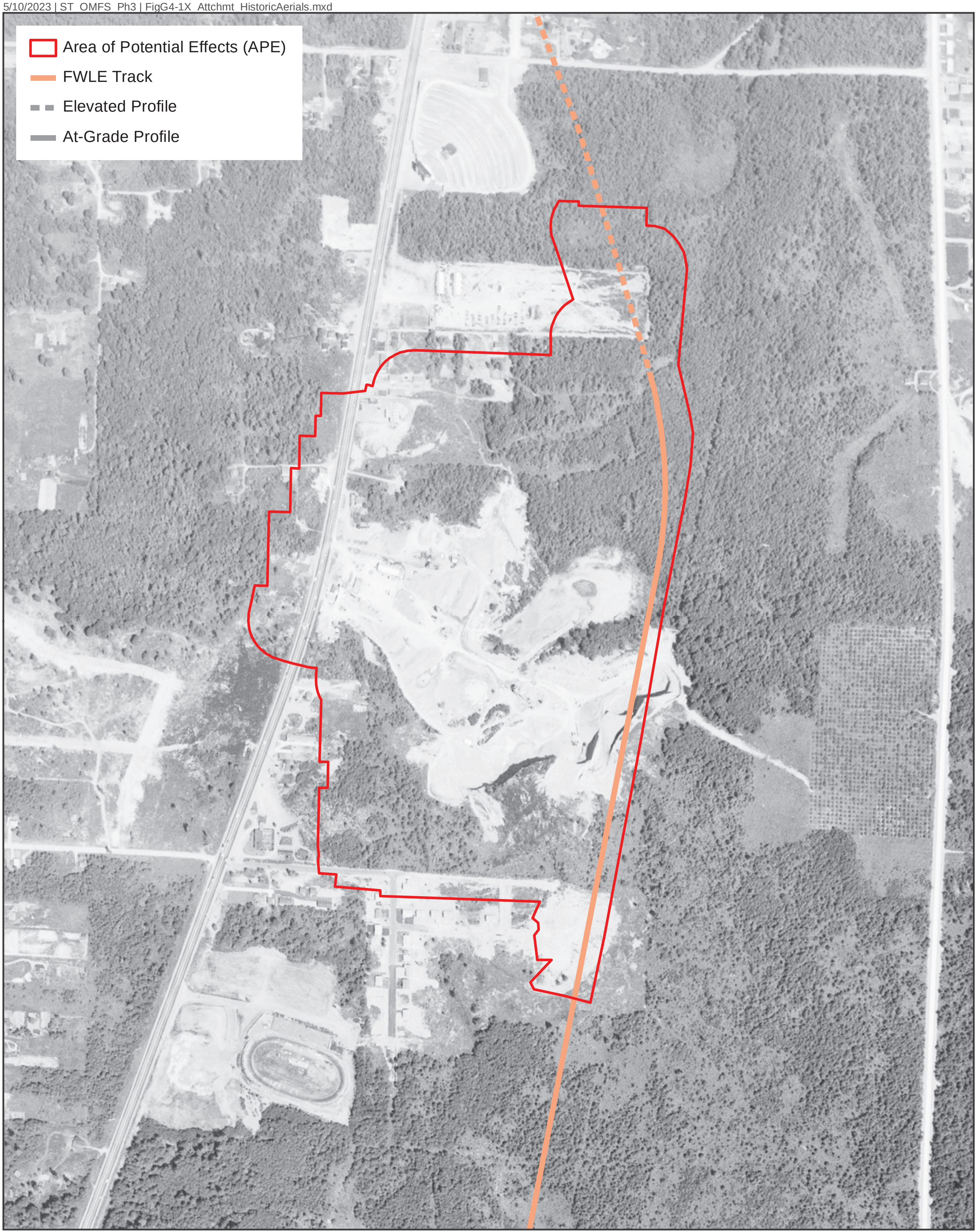
0 500 1,000 Feet

FIGURE G4-1.1

1937 Historic Aerial

Midway Landfill Alternative

OMF South


🟥 Area of Potential Effects (APE)
FWLE Track
Elevated Profile
At-Grade Profile

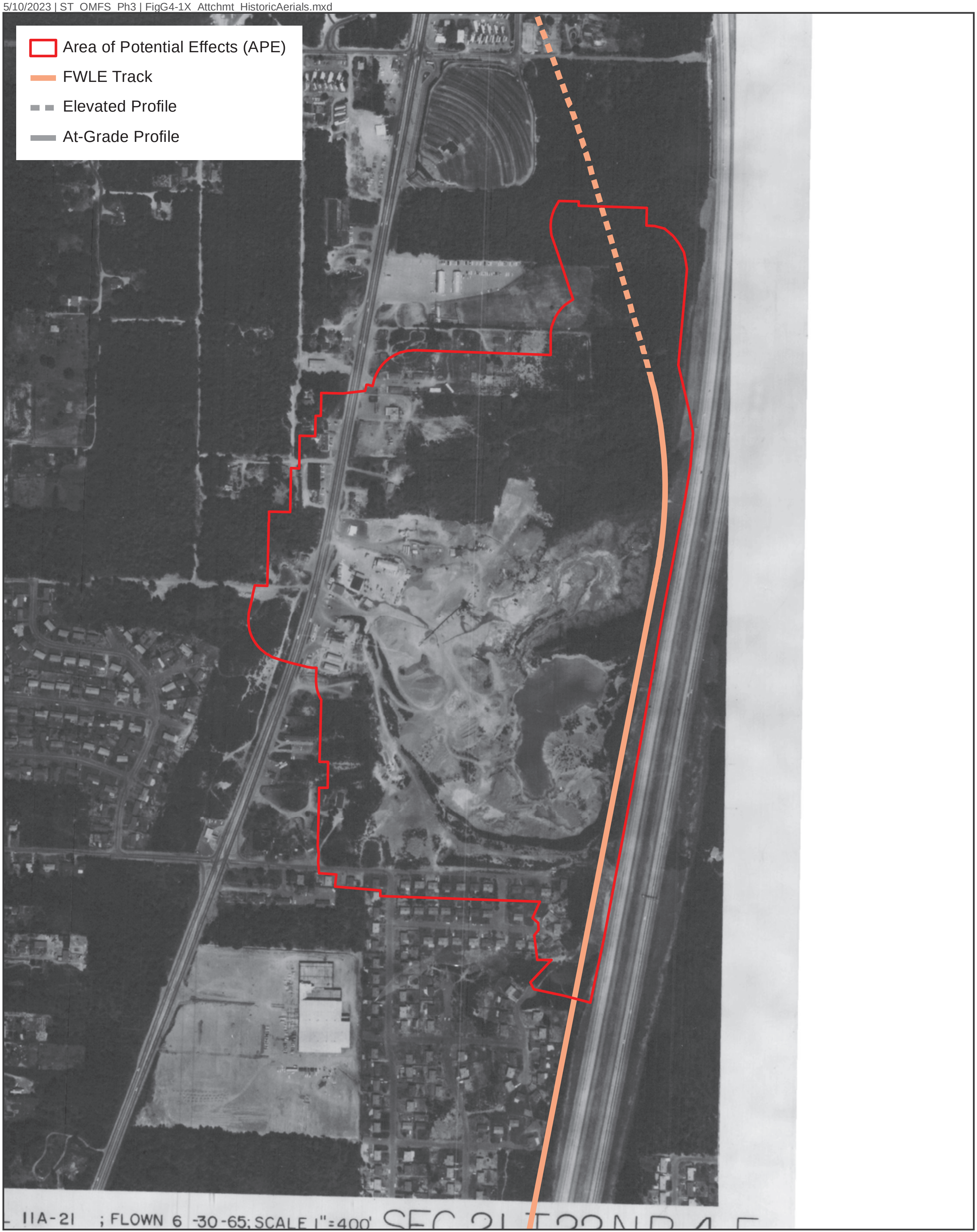
Data Sources: King County Map Vault; EarthExplorer.

N
0
500
1,000 Feet

FIGURE G4-1.2
1957 Historic Aerial
Midway Landfill Alternative

OMF South

5/10/2023 | ST OMFS Ph3 | FigG4-1X Attchmt HistoricAerials.mxd


Area of Potential Effects (APE)
FWLE Track
Elevated Profile
At-Grade Profile
IIA-21 ; FLOWN 6-30-65; SCALE 1"=400' SEC 21 T22N R4E

Data Sources: King County Map Vault; EarthExplorer.

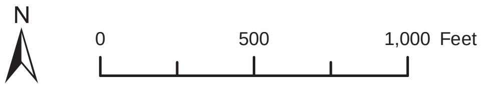
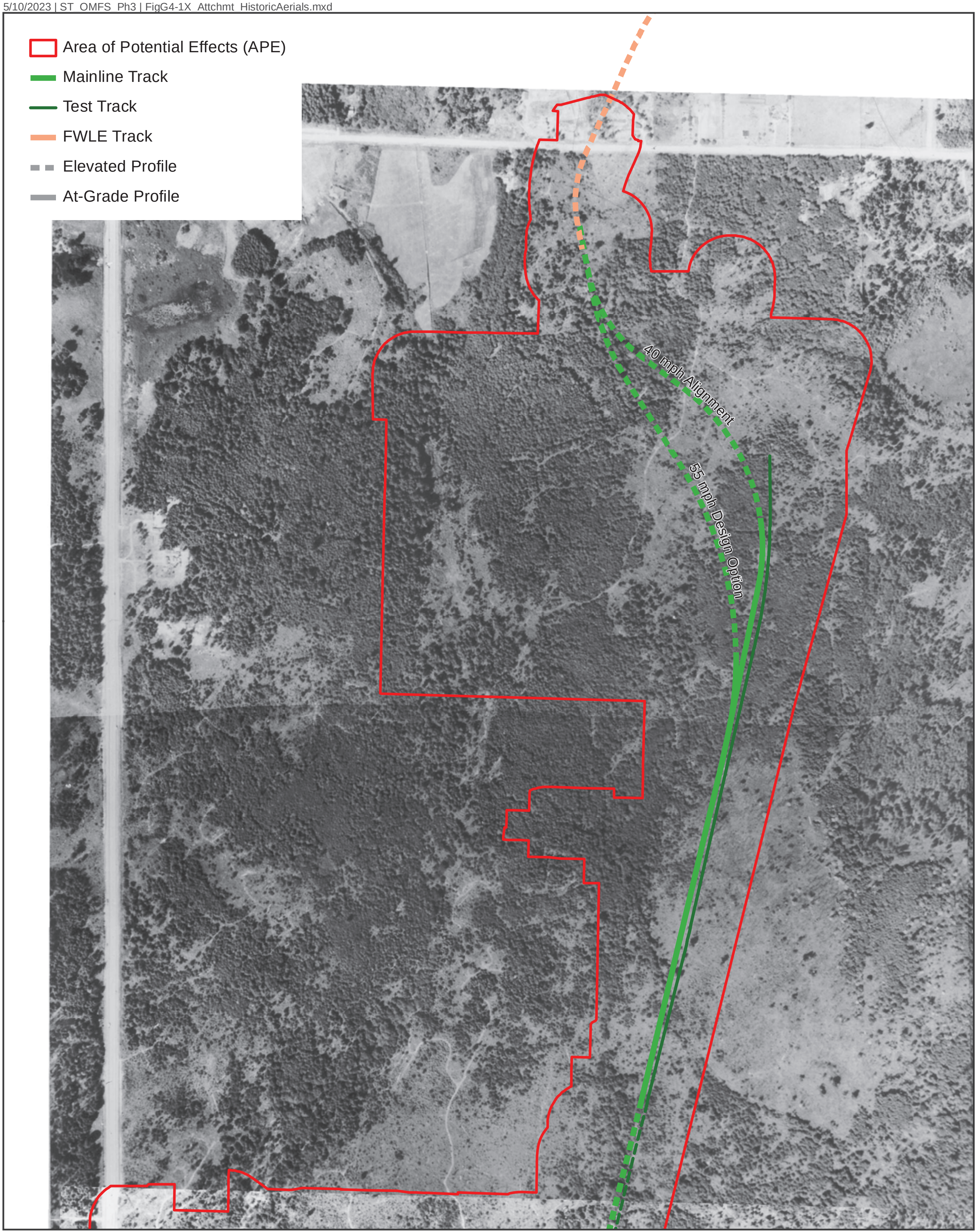

N
0
500
1,000 Feet

FIGURE G4-1.3
1965 Historic Aerial
Midway Landfill Alternative

OMF South

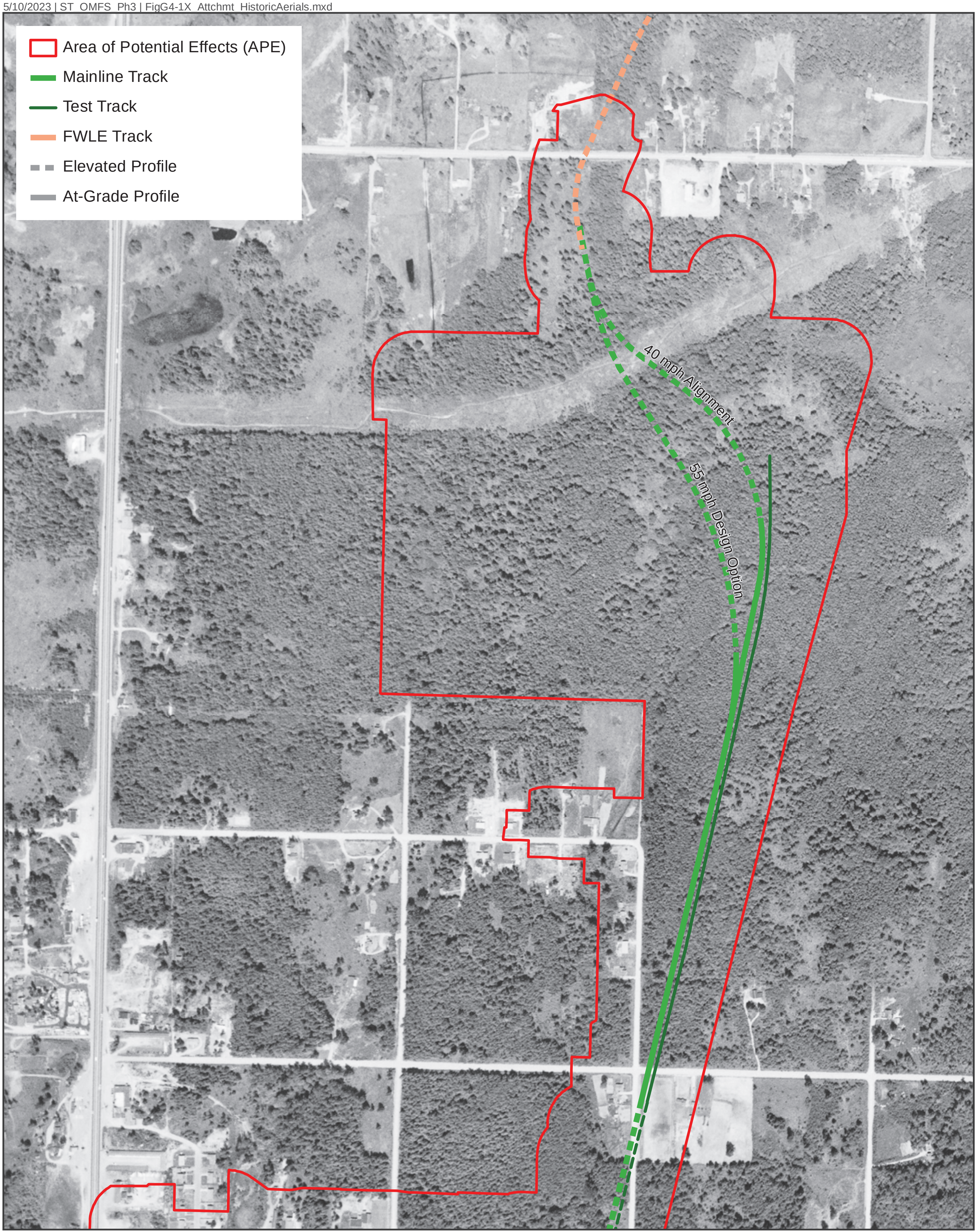

🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
FWLE Track
Elevated Profile
At-Grade Profile
40 mph Alignment
55 mph Design Option

Data Sources: King County Map Vault; EarthExplorer.

N
0
500
1,000 Feet

FIGURE G4-1.4
1935 Historic Aerial
Mainline Track Options

OMF South

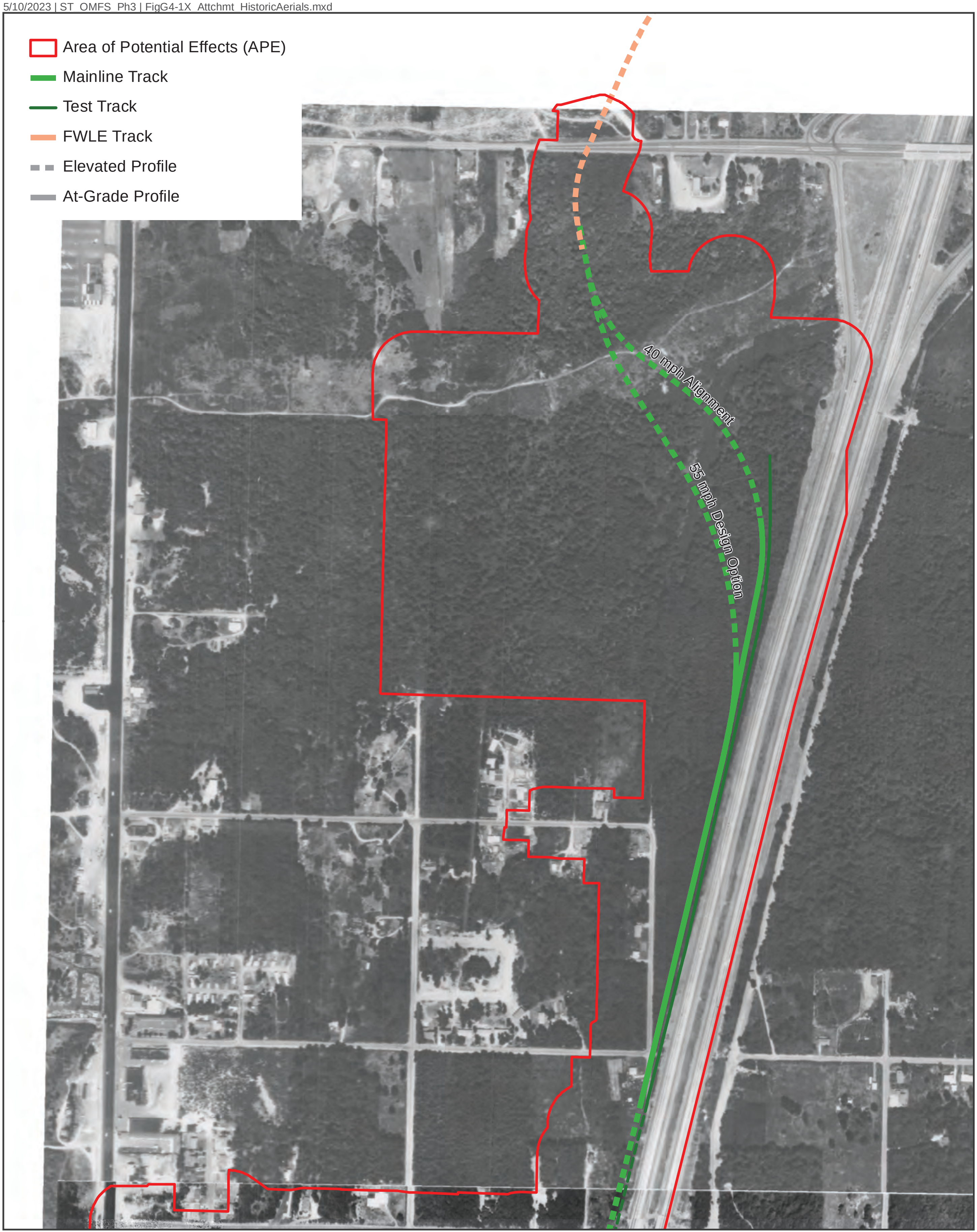

Area of Potential Effects (APE)
Mainline Track
Test Track
FWLE Track
Elevated Profile
At-Grade Profile
40 mph Alignment
55 mph Design Option

Data Sources: King County Map Vault; EarthExplorer.

N
0
500
1,000 Feet

FIGURE G4-1.5
1957 Historic Aerial
Mainline Track Options

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
FWLE Track
Elevated Profile
At-Grade Profile
40 mph Alignment
55 mph Design Option

Data Sources: King County Map Vault; EarthExplorer.

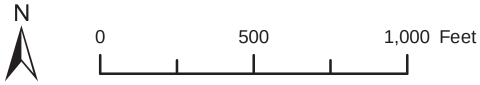
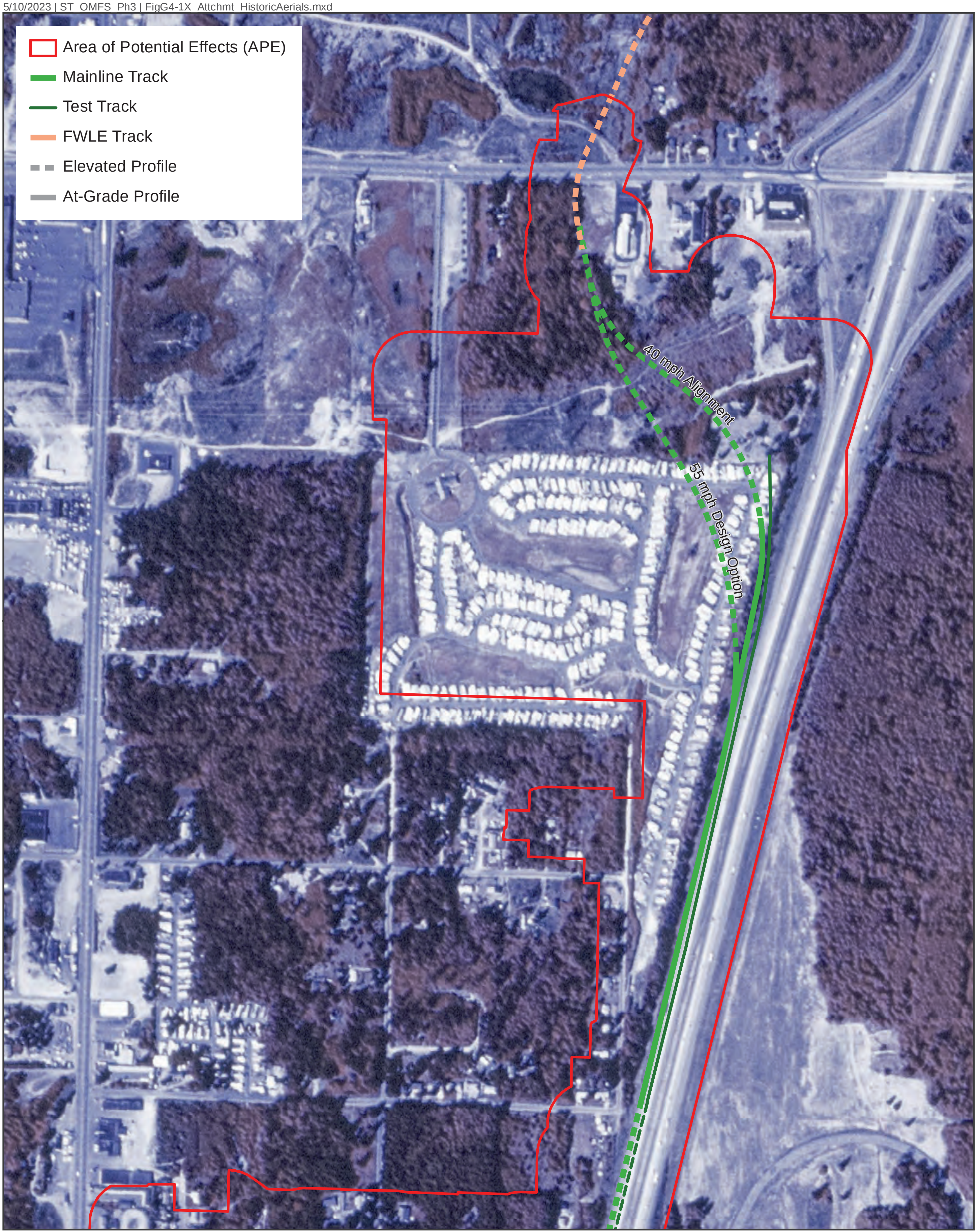

N
0
500
1,000 Feet

FIGURE G4-1.6
1965 Historic Aerial
Mainline Track Options

OMF South

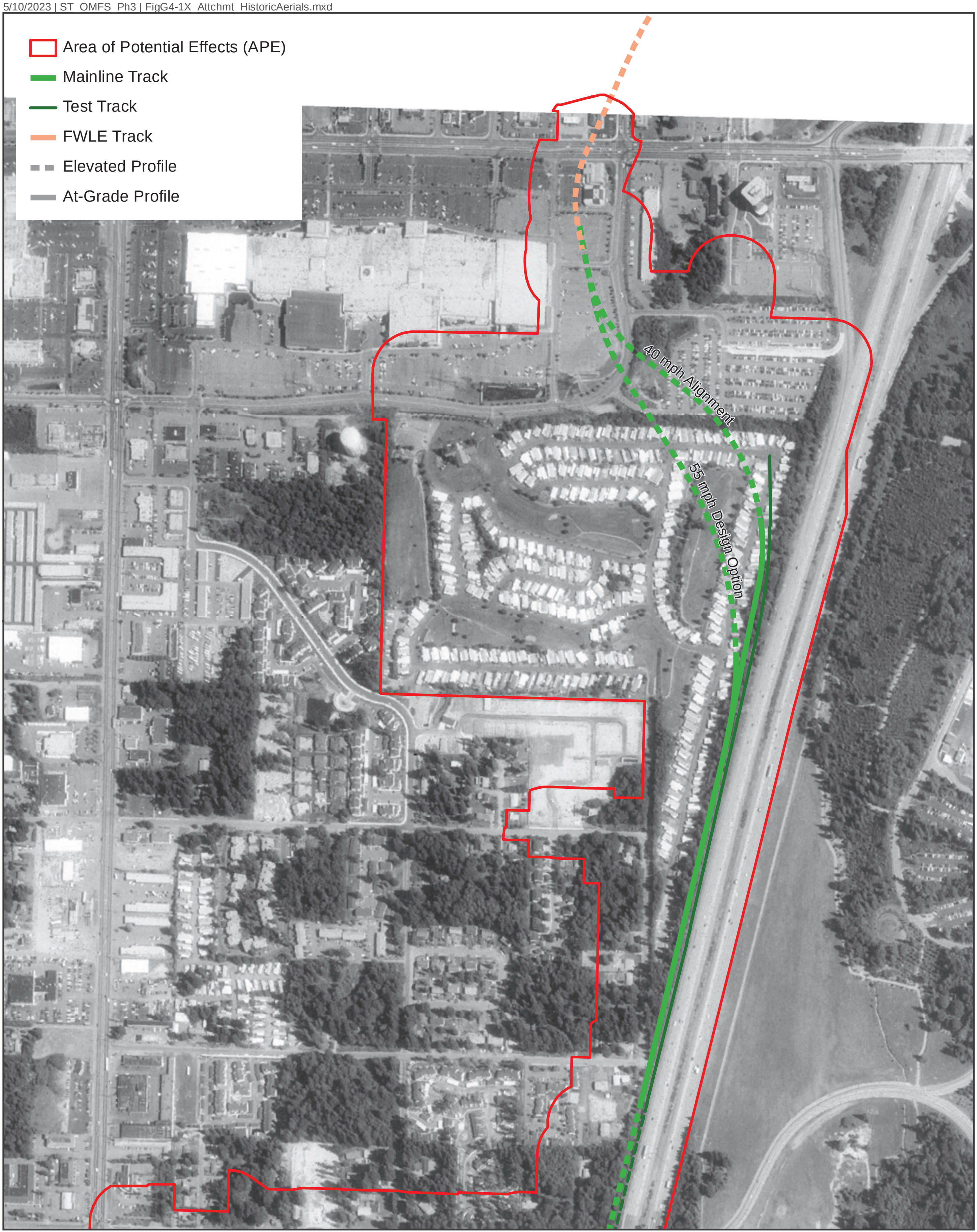

🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
FWLE Track
Elevated Profile
At-Grade Profile
40 mph Alignment
55 mph Design Option

Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.7
1972 Historic Aerial
Mainline Track Options

N
0
500
1,000 Feet

OMF South


Area of Potential Effects (APE)
Mainline Track
Test Track
FWLE Track
Elevated Profile
At-Grade Profile
40 mph Alignment
55 mph Design Option

Data Sources: King County Map Vault; EarthExplorer.

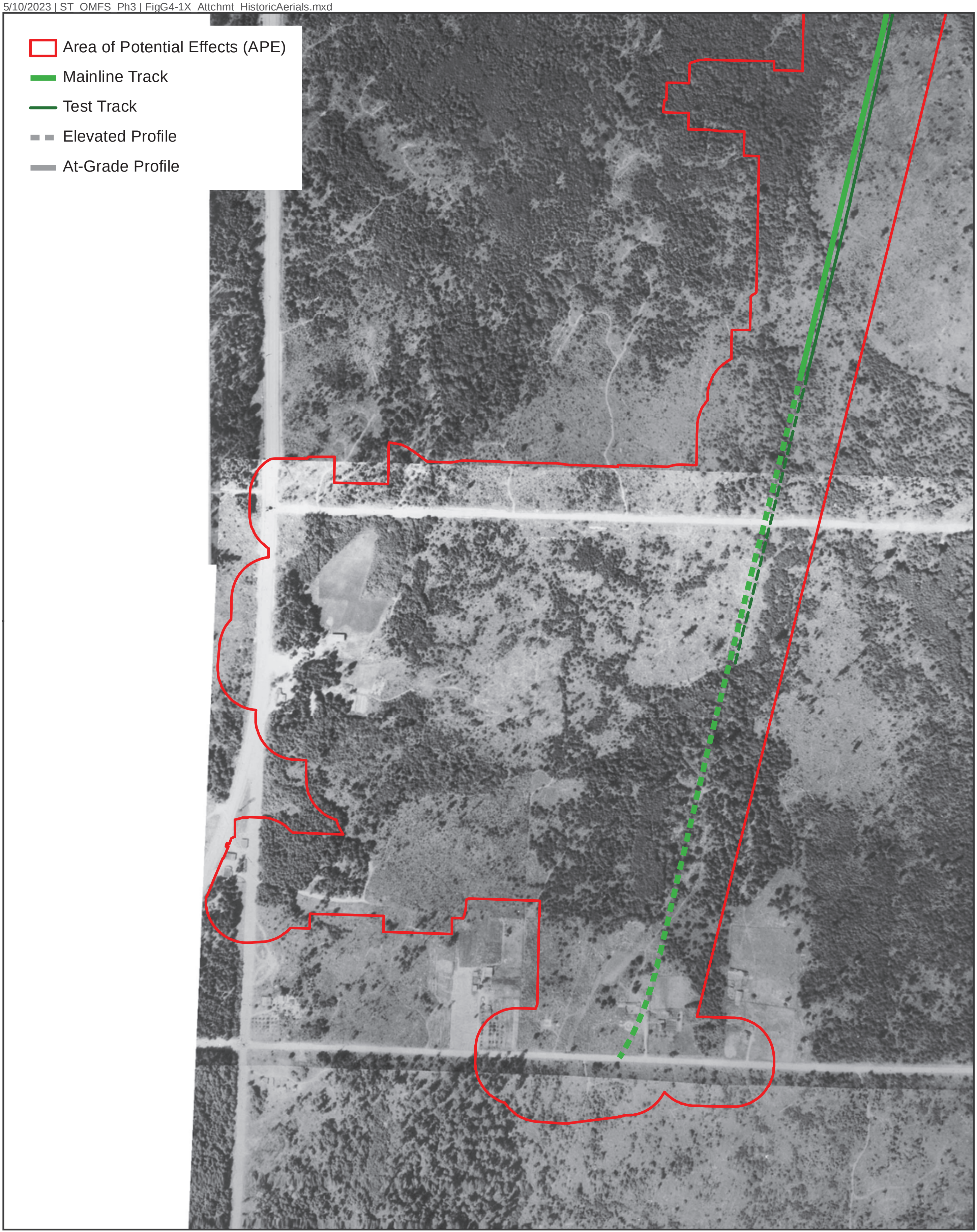
N
0
500
1,000 Feet

FIGURE G4-1.8

1991 Historic Aerial

Mainline Track Options

OMF South


Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile

Data Sources: King County Map Vault; EarthExplorer.

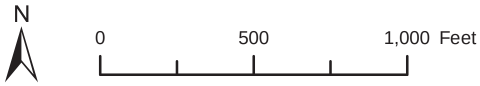
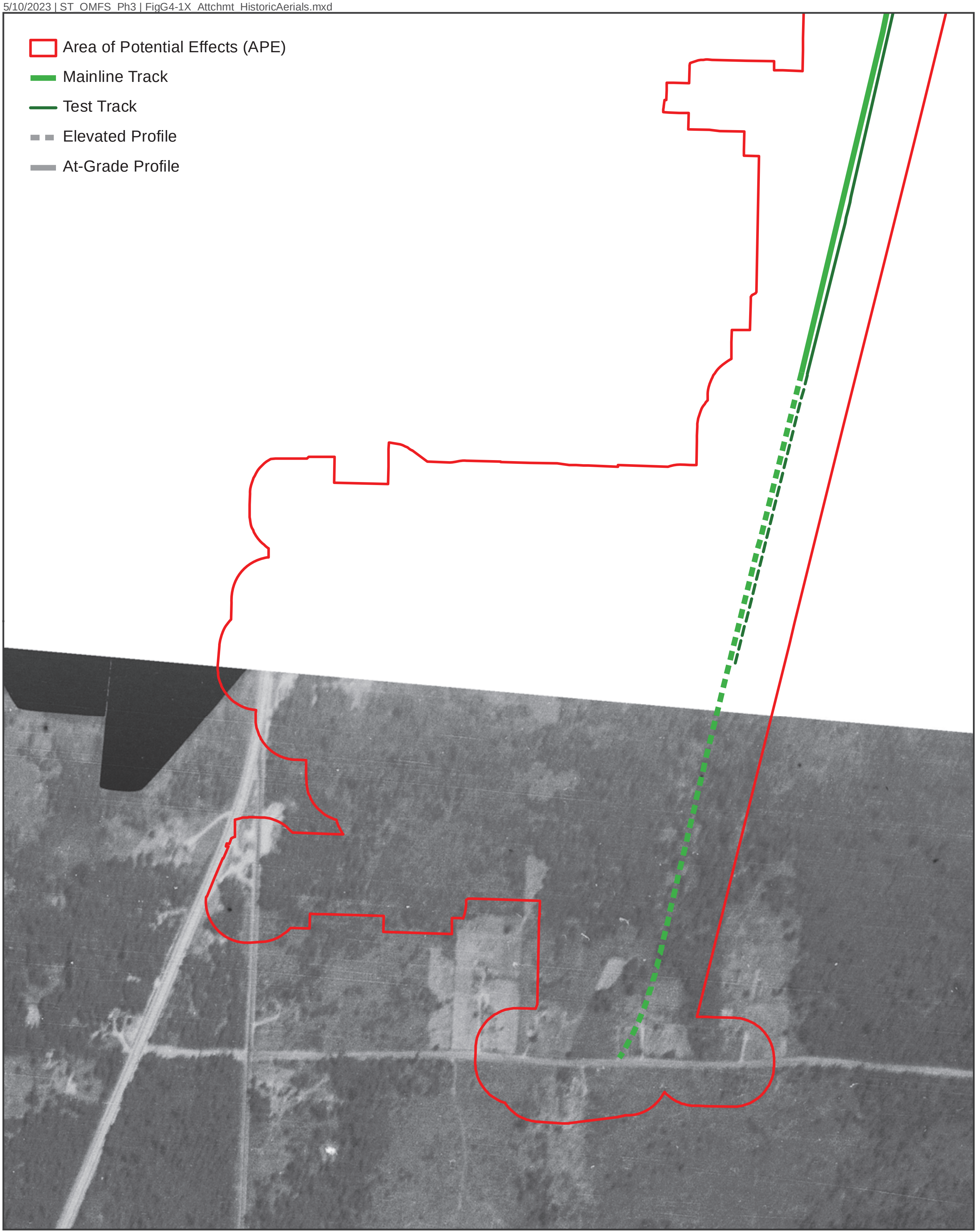

N
0
500
1,000 Feet

FIGURE G4-1.9
1935 Historic Aerial
Preferred Alternative

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile

Data Sources: King County Map Vault; EarthExplorer.

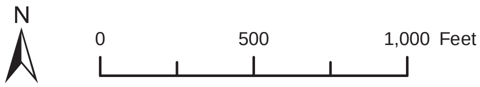
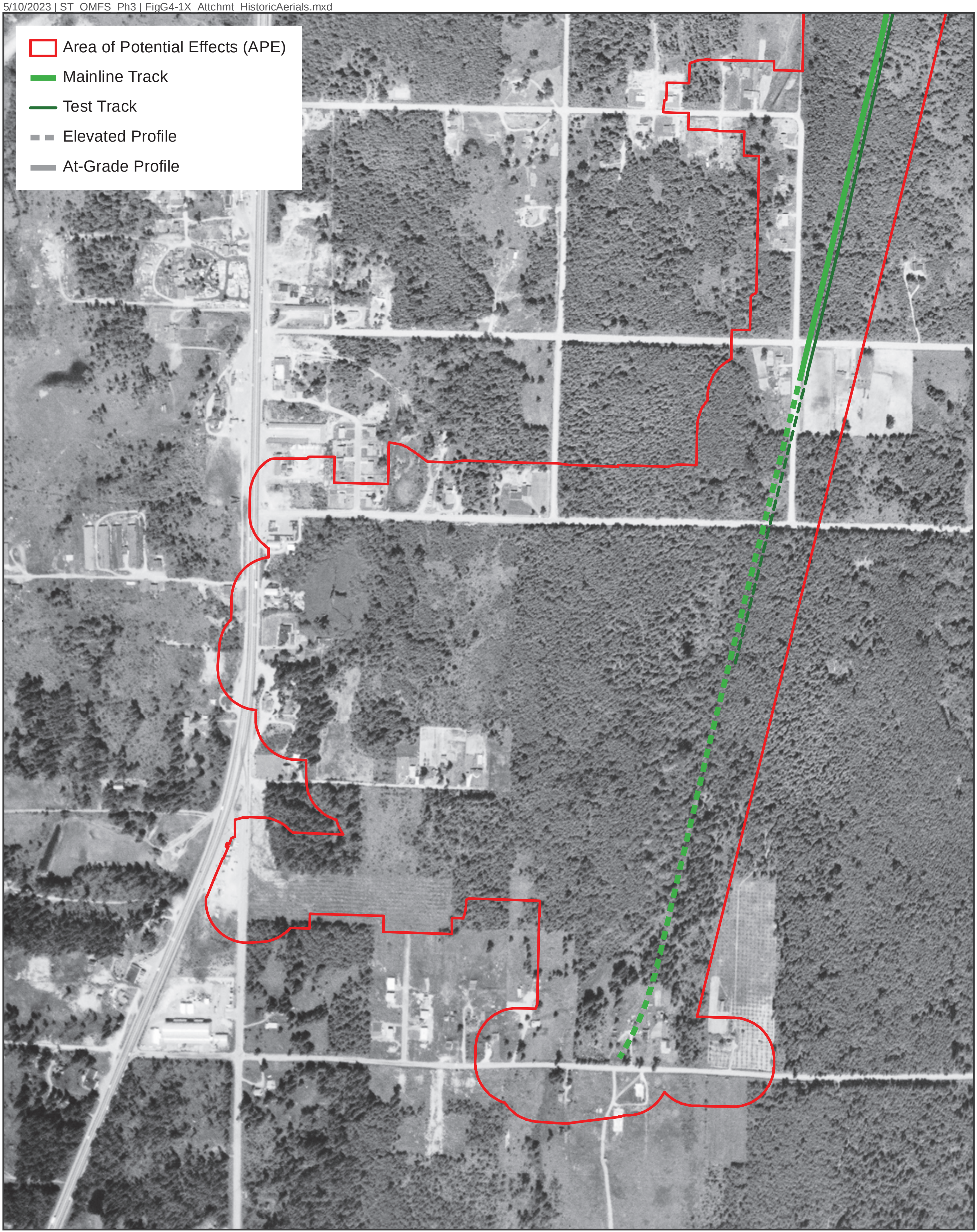

N
0
500
1,000 Feet

FIGURE G4-1.10
1941 Historic Aerial
Preferred Alternative

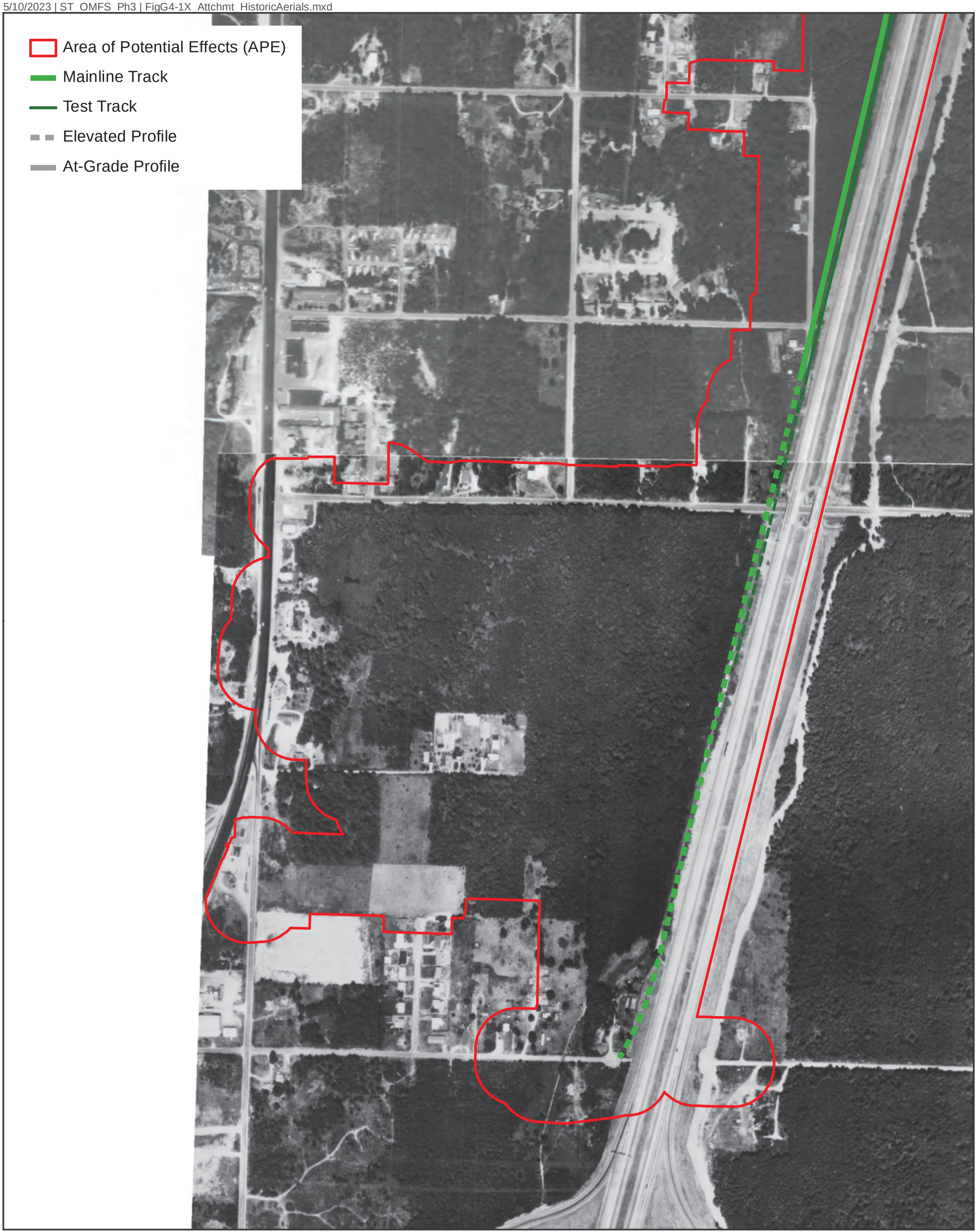
OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
N
0
500
1,000 Feet

Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.11
1957 Historic Aerial
Preferred Alternative

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile

Data Sources: King County Map Vault; EarthExplorer.

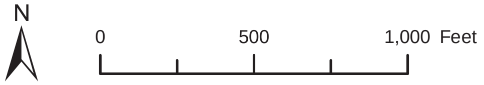
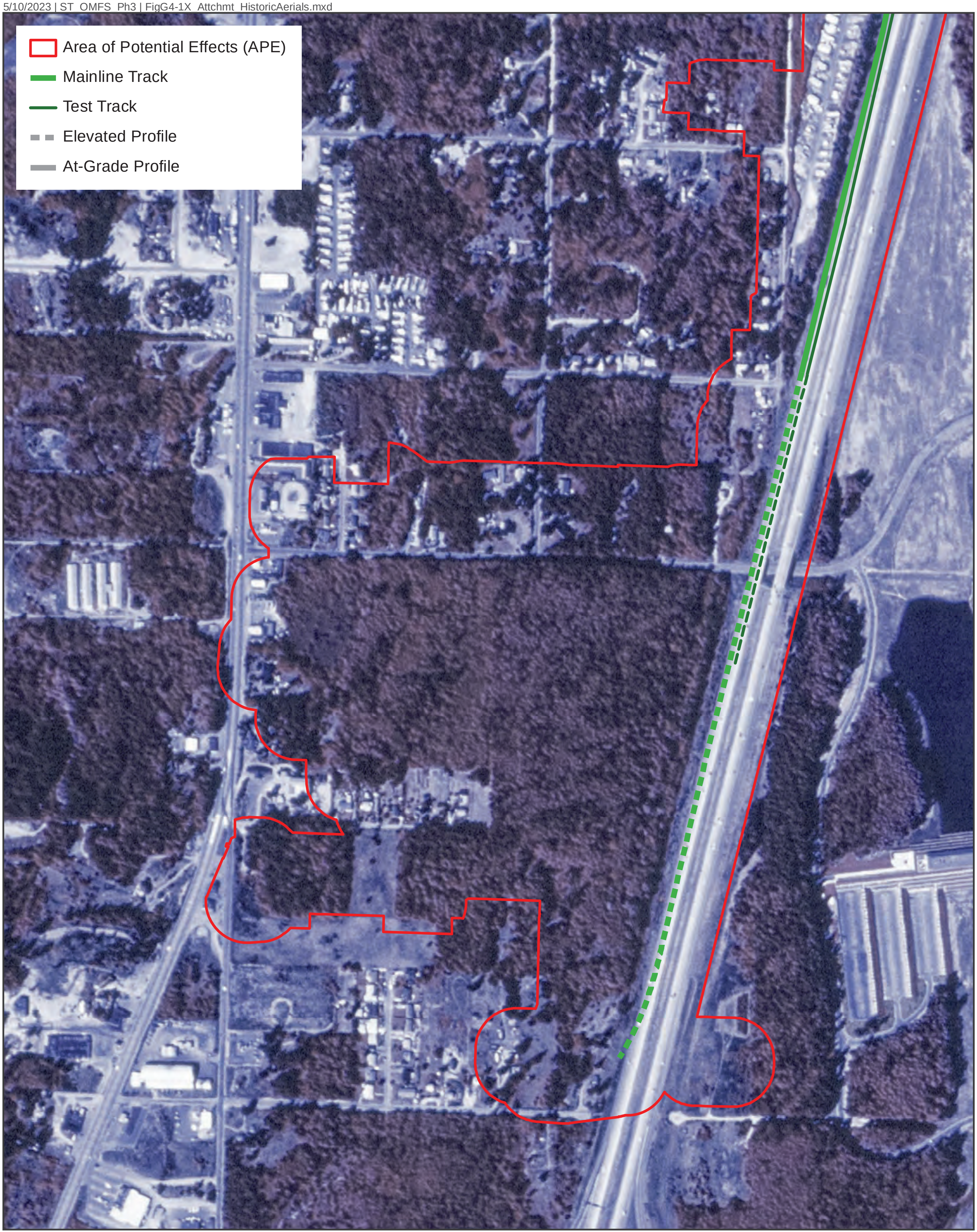

N
0
500
1,000 Feet

FIGURE G4-1.12
1965 Historic Aerial
Preferred Alternative

OMF South

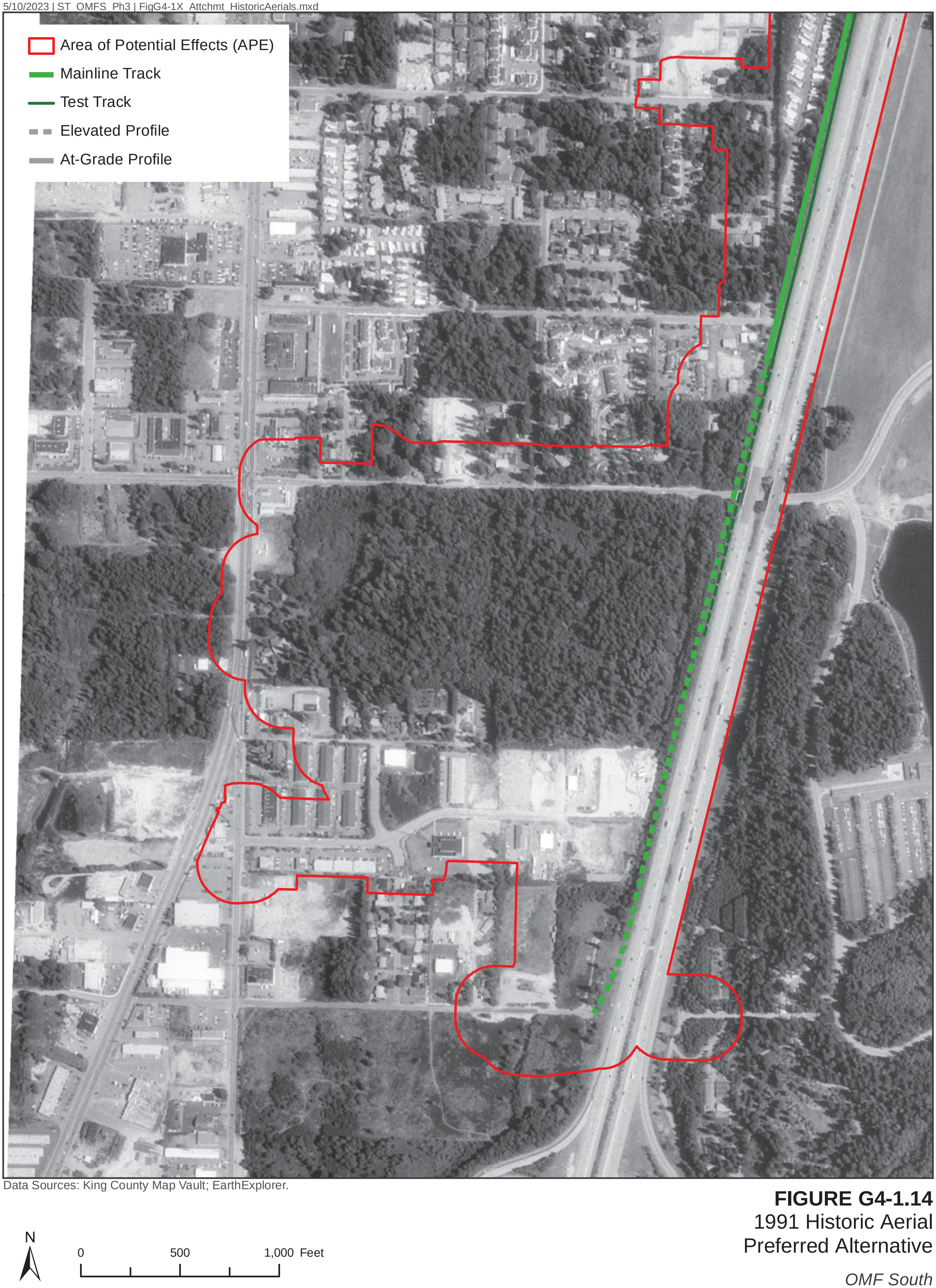

🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile

Data Sources: King County Map Vault; EarthExplorer.

N
0
500
1,000 Feet

FIGURE G4-1.13
1972 Historic Aerial
Preferred Alternative

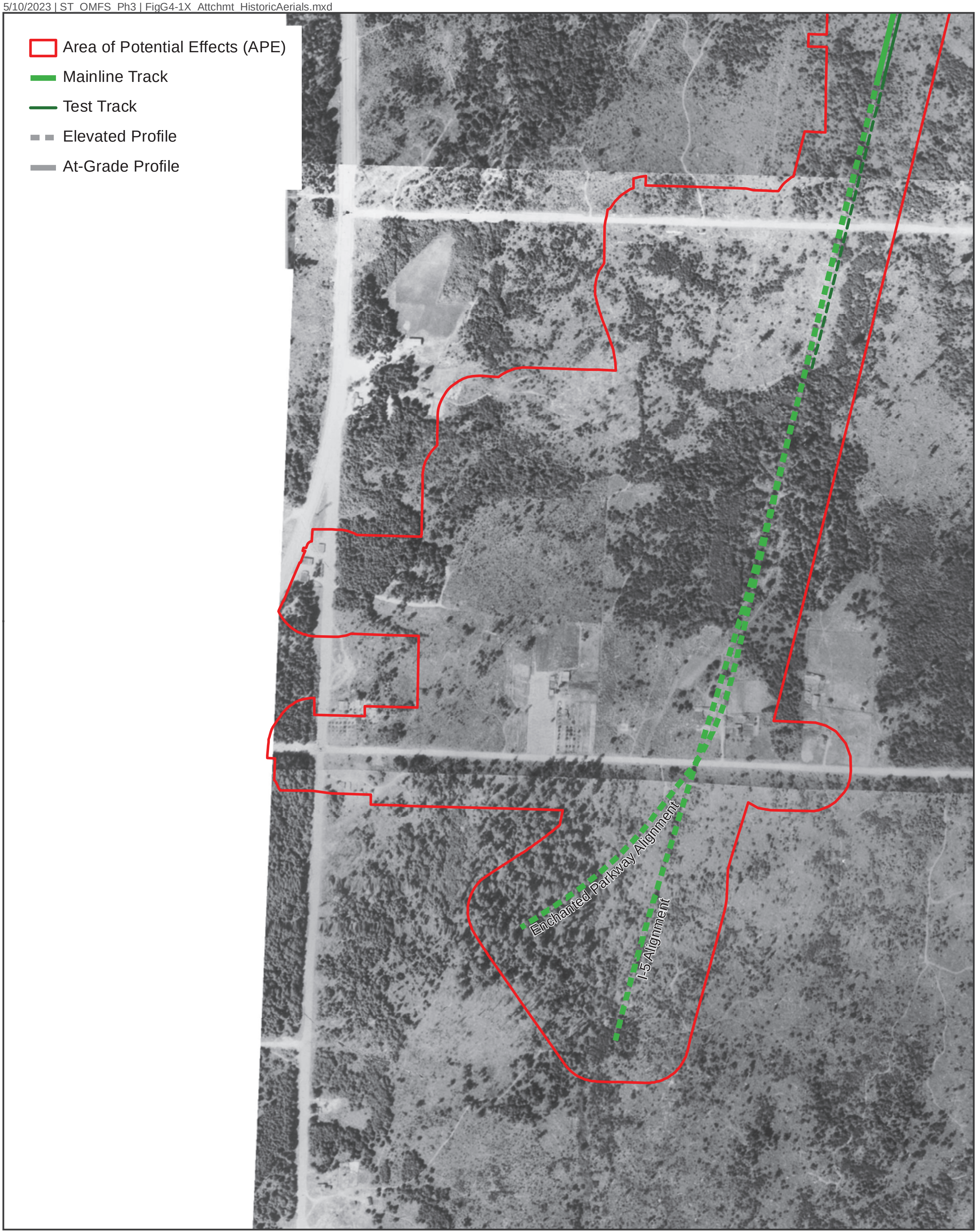
OMF South


Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
N
0
500
1,000 Feet

Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.14
1991 Historic Aerial
Preferred Alternative

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment
N
0
500
1,000 Feet

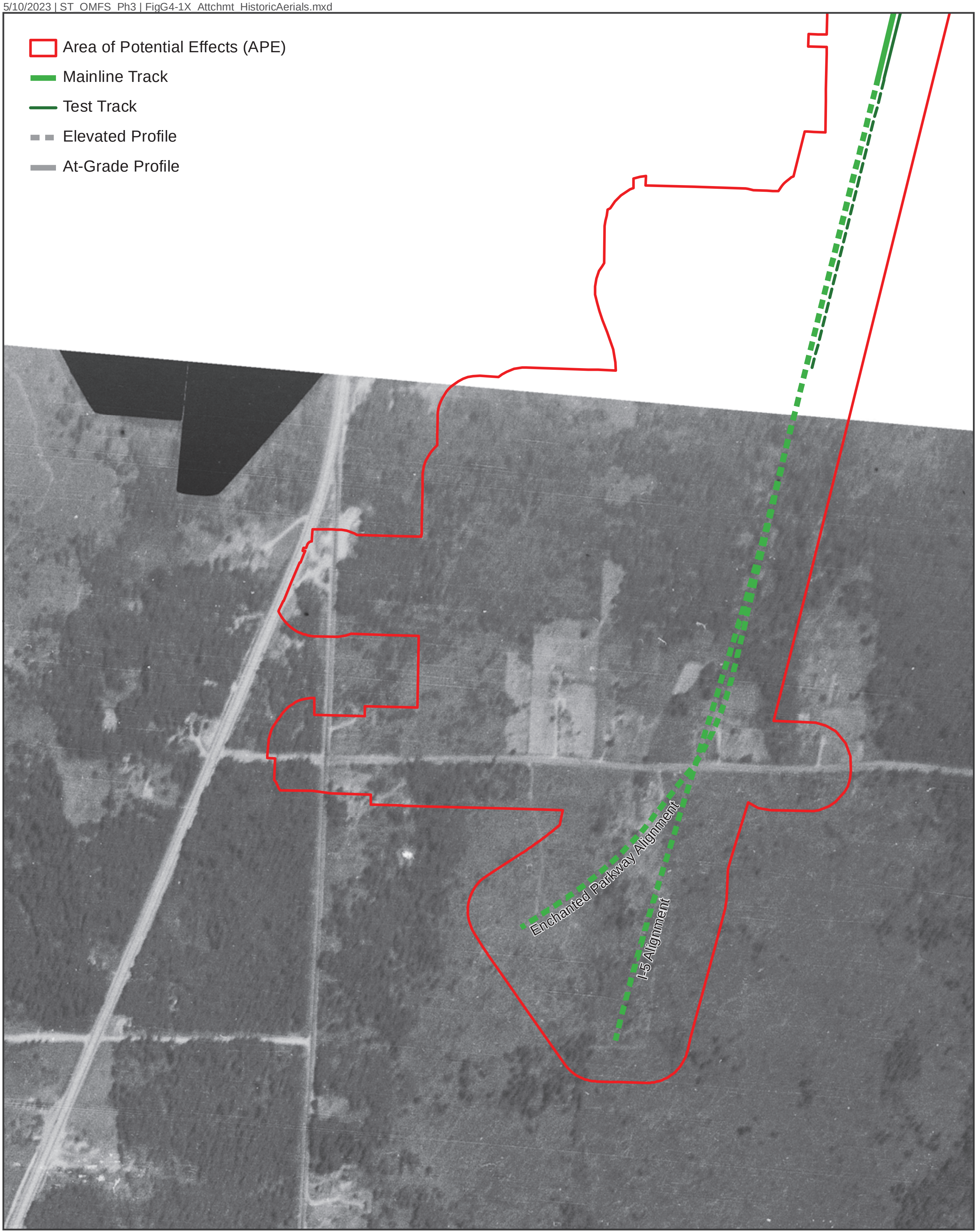
Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.15

1935 Historic Aerial

South 344th Street Alternative

OMF South


Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment

Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.16

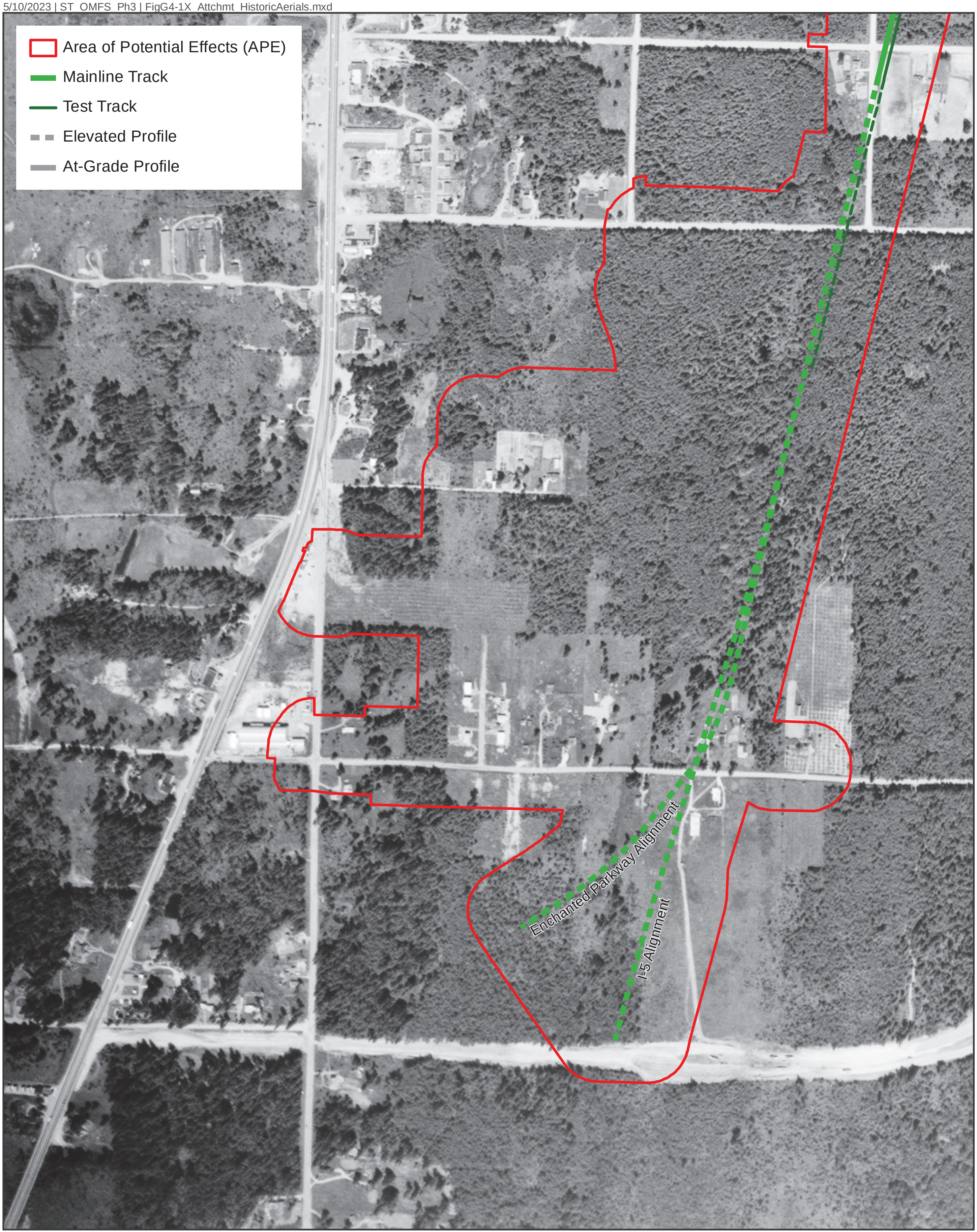
1941 Historic Aerial

South 344th Street Alternative

OMF South

N

0 500 1,000 Feet


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment

Data Sources: King County Map Vault; EarthExplorer.

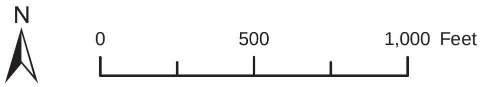
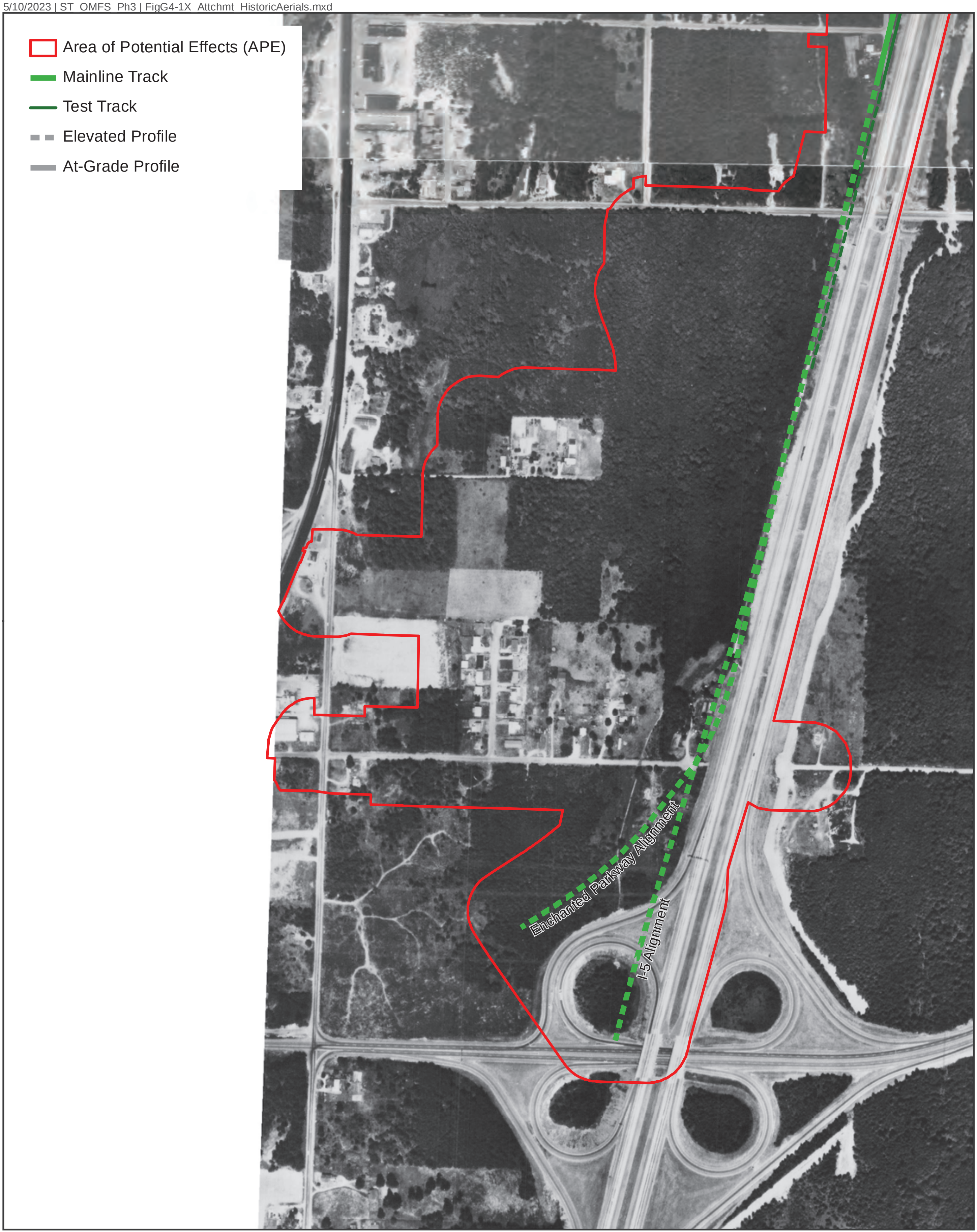

N
0
500
1,000 Feet

FIGURE G4-1.17
1957 Historic Aerial
South 344th Street Alternative

OMF South

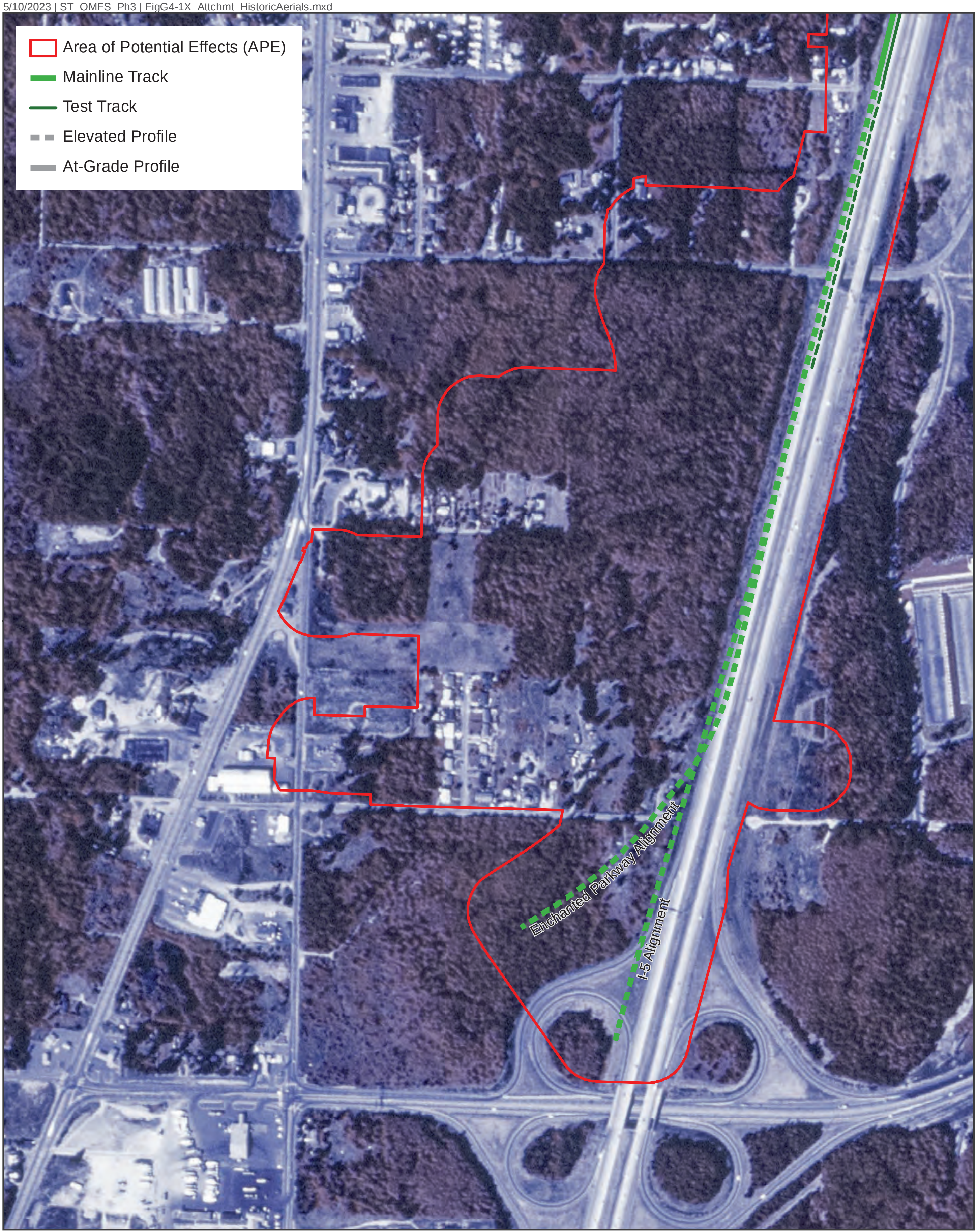

🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment

Data Sources: King County Map Vault; EarthExplorer.

N
0
500
1,000 Feet

FIGURE G4-1.18
1965 Historic Aerial
South 344th Street Alternative

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment

Data Sources: King County Map Vault; EarthExplorer.

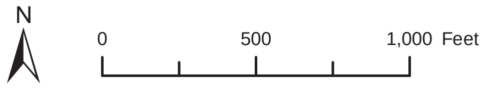
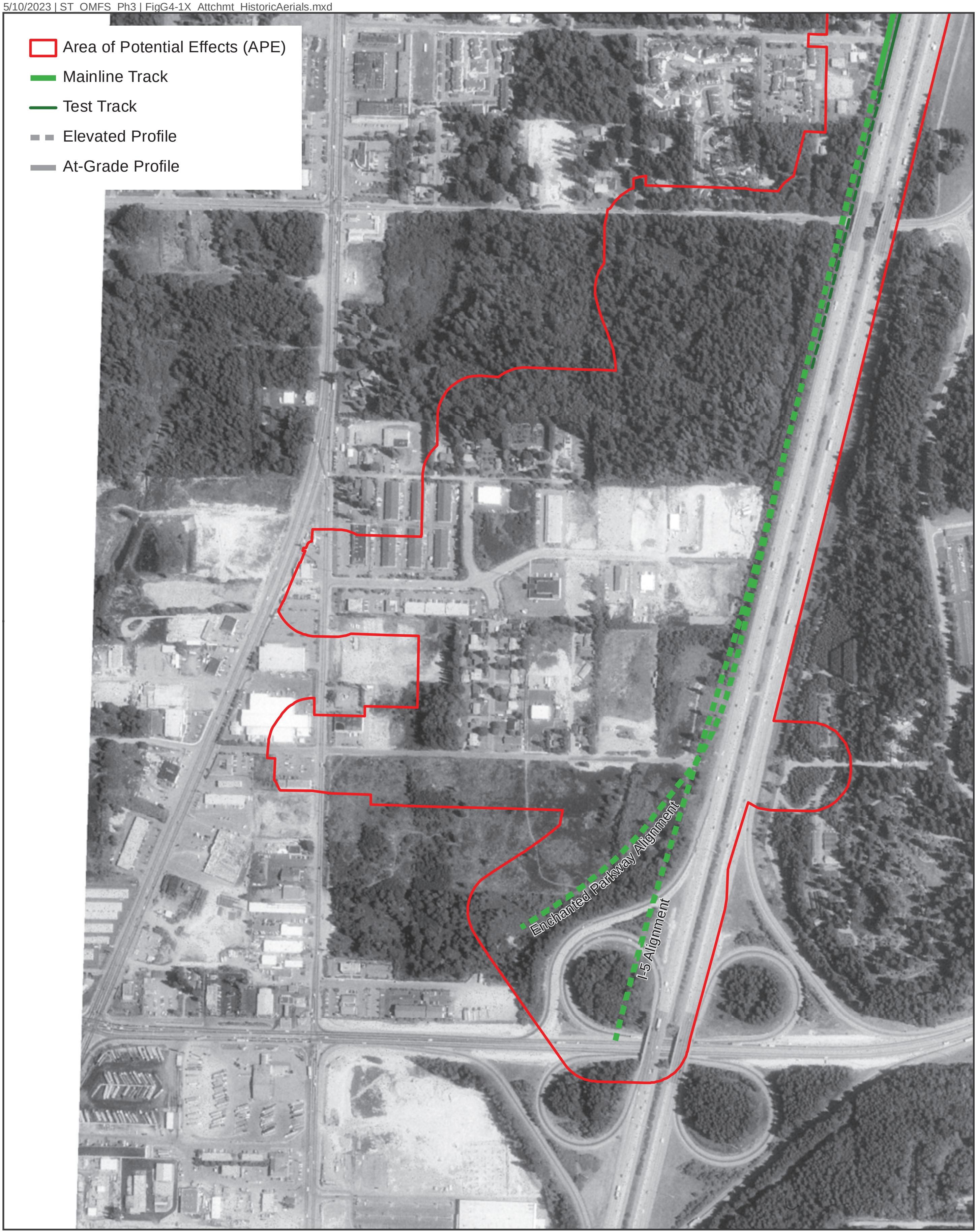

N
0
500
1,000 Feet

FIGURE G4-1.19
1972 Historic Aerial
South 344th Street Alternative

OMF South


🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
Enchanted Parkway Alignment
I-5 Alignment
N
0
500
1,000 Feet

Data Sources: King County Map Vault; EarthExplorer.

FIGURE G4-1.20
1991 Historic Aerial
South 344th Street Alternative

OMF South

Operations and Maintenance Facility South

ATTACHMENT G4-2

Archaeological Shovel Probe Log

Federal Transit Administration

SOUNDTRANSIT

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
1	NP6	1	28	Grey brown silty loam, 5% rounded gravels.	Negative	
		2	38	Light brown fine sandy loam, with 5% round gravels, concrete fragments.	Negative	
		3	48	Yellowish brown silty loam, 15% rounded to sub-rounded gravel - cobbles.	Negative	Glacial
		Lat (°N): -122.307762		Long (°W): 47.300495	Termination: Glacial Material	
2	NP5	1	10	Loose dry non-plastic dark brown sandy loam with roots and 2% gravel. Gradual smooth transition.	Negative	
		2	25	Loose dry non-plastic brown sandy loam with roots 4% gravel - cobbles. Smooth sharp transition.	Negative	Charcoal 15 35-40cm. Root burn.
		3	50	Loose soil non-plastic tan orange sandy loam with roots and 10% gravel - cobbles. Smooth sharp transition.	Negative	
		4	64	Yellowish brown silty loam, 15% rounded to sub-rounded gravel - cobbles.	Negative	Glacial
		Lat (°N): 47.300473		Long (°W): -122.308160	Termination: Glacial Material	
3	NP4	1	19	Grey brown silty loam, with 15% rounded to sub-rounded gravel - cobbles and rootlets.	Negative	
		2	38	Yellowish brown silty loam, 15% rounded to sub-rounded gravel - cobbles.	Negative	Glacial
		Lat (°N): 47.300528		Long (°W): -122.308511	Termination: Glacial Material	
4	NP3	1	18	Grey brown silty loam, 15% rounded to sub-rounded gravel and cobbles.	Negative	
		2	29	Yellowish brown silty loam, 15% round to sub-rounded gravel - cobbles.	Negative	Glacial
		Lat (°N): 47.300473		Long (°W): -122.308833	Termination: Glacial Material	
5	NP2	1	10	Loose hard dry non plastic dark brown sandy loam with many roots, 3% gravel. Clear smooth transition.	Negative	
		2	30	Dry loose non-plastic brown sandy loam, with many roots 5% gravel - cobbles. Sharp smooth transition.	Negative	
		2	40	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.300502		Long (°W): -122.309221	Termination: Glacial Material	
6	NP1	1	5	Brown silty loam, 10% rounded gravels. Rootlets.	Negative	
		2	22	Brown silty loam, mottled with grey silty loam, with >5% gravels.	Negative	
		3	44	Yellowy brown fine sandy loam with 15% round - sub-rounded gravel and cobbles.	Negative	Glacial
		Lat (°N): 47.300515		Long (°W): -122.309532	Termination: Glacial Material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
7	NC1	1	18	Dark brown soft moist loam, with 5% gravel and cobbles.	Negative	
		2	40	Grey brown moist semi-plastic sand-silt with clay pockets and 5% cobbles and gravel and charcoal.	Negative	
		3	60	Very loose moist non-plastic unsorted, brown and grey silty sand with 5% gravels and cobbles.	Negative	Auger beginning at 90cmbs
		4	105	Very loose, moist, non-plastic, unsorted, brown, grey, and orange silty sand with 5% gravels and cobbles.	Negative	
		5	110	Compact grey silt weathered to orange with >5% gravels.	Negative	Possible glacial material
		Lat (°N): -122.310115		Long (°W): 47.300388	Termination: Auger refusal	
8	NC2	1	25	Dark brownish loam with plenty of organics, with 5% gravels.	Negative	
		2	27	Red loam. Decomposed cedar and bark.	Negative	
		3	55	Grey brown plastic and soft silt and coarse sand with 10% gravel and 5% cobble.	Negative	
		4	62	Grey and yellow brown silt and coarse sand with 10% gravels and cobbles.	Negative	Glacial
		Lat (°N): -122.310144		Long (°W): 47.300117	Termination: Glacial material	
9	NC6	1	10	Humic layer. Brown loose loam with 10% round gravels.	Concrete 10+ cm	
		Lat (°N): -122.310060		Long (°W): 47.299762	Termination: Concrete, possible utility	
10	NC3	1	17	Dark brown soft and somewhat plastic silt/loam.	Negative	Fill
		2	40	Light brown dry soft and semi-plastic clayey silt with 5% pebbles.	Negative	Fill
		3	50	Gray slightly dry soft and semi-plastic clayey silt.	Negative	Fill
		4	55	Hard brown dry silt and coarse sand with 10% sub-rounded gravel.	Negative	Fill
		5	105	Grey highly plastic very soft clay with silt at top. Ground water at top.	Negative	
		Lat (°N): -122.310582		Long (°W): 47.299729	Termination: >100 cm	
11	NC4	1	3	Black brown loam with loose organics.	Negative	
		2	25	Grey brown dry hard semi-plastic silty/clay with 5% gravels.	Negative	
		3	44	Grey brown and red brown silty/clay and burnt root.	Negative	
		4	50	Grey dry soft semi-plastic silty loam with >5% gravels.	Negative	
		5	54	Orange brown coarse sand and silt with 15% gravels.	Negative	Glacial
		Lat (°N): -122.310687		Long (°W): 47.299482	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
12	NC5	1	5	Humic layer. Loose dark brown loam.	Negative	
		2	45	Very loose soft non-plastic dry brown silt with fragments of hard grayish silt and 5% rounded gravel.	Negative	
		3	90	Very loose soft dry non-plastic silt with 5% rounded gravel.	Negative	
		4	95	Soft grey moist and highly plastic silty clay.	Negative	
		5	100	Unsorted, somewhat firm, moist, semi-plastic silt with 10% gravels.	Plastic film	
		Lat (°N): -122.311027		Long (°W): 47.299164	Termination: Depth	
13	NC7	1	5	Humic layer. Brown loose loam with lots of organics.	Negative	
		2	55	Brown light brown loose semi coarse sand with 10% round gravels.	Negative	Construction fill.
		Lat (°N): -122.310746		Long (°W): 47.298896	Termination: Boulder	
14	NC8	1	25	Humic layer. Dark brown loam with lots of organics and 5% rounded gravels.	Negative	
		2	55	Grey brown very compact coarse loam and sand with 10% rounded gravels.	Negative	Glacial
		Lat (°N): -122.311013		Long (°W): 47.298673	Termination: Glacial material	
15	NC9	1	6	Dark brown soft slightly plastic loam.	Negative	
		2	25	Dry loose non-plastic tan/grey sandy loam, 15% sharp gravels and cobbles.	Negative	Glacial
		Lat (°N): -122.311195		Long (°W): 47.298475	Termination: Glacial material	
16	NC17	1	10	Dark brown loose soft loam with 5% gravel.	Negative	On Levee
		2	50	Brown loose loam with 5% round to angular gravel.	Negative	
		3	65	Grey very compact semi-coarse sand with 10% sub-rounded gravels.	Negative	Glacial Outwash
		Lat (°N): 47.299613		Long (°W): -122.312386	Termination: Extreme compaction, boulder (Glacial Material)	
17	NC16	1	7	Humic layer. Dark brown loam.	Negative	On Levee
		2	40	Very loose brown dry and non-plastic sandy silt with 8% gravel to cobbles.	Negative	
		3	52	Dry loose non-plastic tan/grey sandy loam, 15% gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.299137		Long (°W): -122.312447	Termination: Glacial material	
18	NC10	1	25	Brown compact loam with 15% sub-angular gravels.	Negative	
		2	40	Orange brown very compact silty loam with 10% rounded gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298578		Long (°W): -122.312419	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
19	NC11	1	5	Humic layer. Soft moist dark brown loam.	Negative	
		2	18	Dark brown soft and non-plastic loose silt with 8% coarse sand to small rounded cobbles.	Negative	
		3	26	Orange brown unsorted silt to large rounded pebbles.	Negative	Glacial
		Lat (°N): 47.298557		Long (°W): -122.312693	Termination: Glacial material	
20	NC12	1	10	Humic layer. Brown dark loam with >5% gravels.	Negative	
		2	20	Loose brown loam with 5% gravels.	Negative	
		3	30	Brown and red sand with 10% rounded gravels.	Negative	Glacial
		Lat (°N): 47.299120		Long (°W): -122.313082	Termination: Glacial material	
21	NC13	1	15	Humic layer. Dark brown loam.	Negative	
		2	62	Loose dark brown dry and non-plastic silt to sand with 5% rounded gravel with occasional slate fragments. Lens of firm grey clay between 42-54 and 35-39 disrupted halfway through the probe.	Negative	
		3	72	Non plastic very compact very coarse sand with 15+% gravels.	Negative	Compacted stream bed
		Lat (°N): 47.299358		Long (°W): -122.313077	Termination: Refusal: Cobbles	
22	NC14	1	20	Humic fill. Brown loose fill.	Negative	
		2	70	Dark brown compact fill.	Negative	
		Lat (°N): 47.299387		Long (°W): -122.312791	Termination: Refusal- Cobbles	
23	NC15	1	10	Dark brown loose loam with >5% gravels and rootlets.		
		2	30	Brown loose loam with 5% rounded gravels.	Red roof tile. Not historic.	
		3	45	Red-brown loose loam with 5% rounded gravels.	Negative	
		4	50	Orange brown coarse sand with 5-10% gravels.	Negative	Glacial
		Lat (°N): 47.299124		Long (°W): -122.312808	Termination: Glacial material	
24	NP14	1	5	Blackish brown silty loam, with many rootlets.	Negative	
		2	15	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact.	Negative	Fill. Highly compacted access roadway
		Lat (°N): 47.298583		Long (°W): -122.312045	Termination: Roadway	
25	NP15	1	20	Brown silty loam, many rootlets.	Negative	
		2	24	Yellowish brown fine sandy loam with 15% rounded to sub-rounded gravel - cobbles.	Negative	Glacial
		Lat (°N): 47.298337		Long (°W): 47.298337	Termination: Glacial material	
26	NP16	1	14	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact. Covered in light vegetation.	Negative	Compacted glacial covered in light vegetation
		Lat (°N): 47.298073		Long (°W): -122.312004	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
27	NP17	1	6	Humic layer loose dry non-plastic dark brown sandy loam, with 2% gravel.	Negative	
		2	57	Grey fine sandy loam, 15% sub-rounded to sub-angular cobbles and gravels, very compact.	Negative	Fill
		3	60	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298381		Long (°W): -122.311645	Termination: Glacial material	
28	NP18	1	10	Brown silty loam, many rootlets.	Negative	
		2	22	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298301		Long (°W): -122.311218	Termination: Glacial material	
29	NP19	1	7	Humic layer. Loose dry non-plastic dark brown sandy loam, with 3% gravels. Sharp transition.	Negative	
		2	38	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298129		Long (°W): -122.311003	Termination: Glacial material	
30	NP20	1	8	Humic layer. Brown silty loam.	Negative	
		2	35	Yellowish brown silty loam, with 15% rounded to sub-rounded cobbles and gravels and rootlets.	Negative	Glacial
		3	42	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.297936		Long (°W): -122.310704	Termination: Glacial material	
31	NP21	1	27	Humic layer. Loose dry, non-plastic, dark brown, sandy loam, with 1% gravel. Smooth gradual transition.	Negative	
		2	70	Dry loose non-plastic dark brown sandy loam, 15% gravels and cobbles.	Negative	Fill
		Lat (°N): 47.297940		Long (°W): -122.310179	Termination: Refusal- root	
32	NP22	1	5	Humic layer. Loose dry, non-plastic dark brown, sandy loam, with 1% gravels.	Negative	
		2	32	Yellowish brown compact silty loam, 15% rounded to sub-rounded cobbles and gravels.	Negative	Glacial
		Lat (°N): 47.297913		Long (°W): -122.309790	Termination: Glacial material	
33	NP23	1	8	Blackish brown silty loam, with rootlets.	Negative	
		2	38	Yellowish brown compact silty loam, 15% rounded to sub-rounded cobbles and gravels.	Negative	Glacial
		Lat (°N): 47.297923		Long (°W): -122.309523	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
34	NP24	1	8	Dark brown silty loam, with many rootlets.	Negative	
		2	34	Yellowish brown compact silty loam, 15% rounded to sub-rounded cobbles and gravels.	Negative	Glacial
		3	44	Grayish brown sandy loam, 15% rounded to sub-rounded cobbles and gravel.	Negative	Glacial
		Lat (°N): 47.297929		Long (°W): -122.308835	Termination: Glacial material	
35	NP25	1	10	Brown silty loam, many rootlets.	Negative	
		2	29	Yellowish brown fine sandy loam, 15% sub-rounded to sub-angular cobbles and gravels.	Negative	Glacial
		3	39	Grayish brown sandy loam, 15% rounded to sub-rounded cobbles and gravel.	Negative	Glacial
		Lat (°N): 47.297901		Long (°W): -122.308488	Termination: Glacial material	
36	NP26	1	6	Humic layer. Brown silty loam, many rootlets.	Negative	
		2	25	Yellowish brown fine sandy loam, with 15% rounded to sub-rounded cobbles and gravels.	Negative	Glacial
		3	35	Grayish brown sandy loam, 15% rounded to sub-rounded cobbles and gravel.	Negative	Glacial
		Lat (°N): 47.297840		Long (°W): -122.308203	Termination: Glacial material	
37	NP27	1	15	Dark brown silty loam, with many roots.	Negative	
		Lat (°N): 47.297637		Long (°W): -122.308197	Termination: Extensive root system	
38	NP28	1	10	Dark brown silty loam, with many rootlets.	Negative	
		Lat (°N): 47.297391		Long (°W): -122.308154	Termination: Utilities (PVC pipe)	
39	NP29	1	7	Dark brown silty loam with many rootlets.	Negative	
		2	32	Yellowish brown fine sandy loam, 15% rounded to subrounded cobbles and gravels.	Negative	Glacial
		Lat (°N): 47.297291		Long (°W): -122.308198	Termination: Glacial material	
40	NP7	1	4	Humic layer. Loose dry non-plastic dark brown sandy loam with 4% gravel. Clear smooth transition.	Negative	
		2	24	Loose damp, non-plastic brown sandy loam, with 7% gravel - cobbles. Sharp smooth transition.	Negative	
		3	60	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298063		Long (°W): -122.306225	Termination: Glacial Material	
41	NP8	1	8	Brown silty loam, with grass rootlets.	Negative	
		2	12	Grey fine sandy loam with many round to sub-round gravel - cobbles. Very compact.	Negative	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
		3	22	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298111		Long (°W): -122.305770	Termination: Glacial Material	
42	NP9	1	5	Humic layer. Brown gravelly fill.	Negative	
		2	30	Grey-brown sandy loam, with many rounded to sub-round gravels and cobbles.	Negative	Glacial
		Lat (°N): 47.298366		Long (°W): -122.306260	Termination: Glacial Material	
43	NP10	1	14	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact.	Negative	Fill
		Lat (°N): 47.298413		Long (°W): -122.305910	Termination: Fill Verification (Mound created 2015-Google Earth)	
44	NP11	1	15	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact.	Negative	Fill
		Lat (°N): 47.298368		Long (°W): -122.305510	Termination: Fill Verification (Mound created 2015-Google Earth)	
45	NP12	1	12	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact.	Negative	
		Lat (°N): 47.298283		Long (°W): -122.305712	Termination: Fill Verification (Mound created 2015-Google Earth)	
46	NP13	1	10	Grey fine sandy loam, 15% sub-rounded to sub-angular gravel - cobbles, very compact.	Negative	Fill
		Lat (°N): 47.298269		Long (°W): -122.306011	Termination: Fill Verification (Mound created 2015-Google Earth)	
47 A	NC28A	1	15	Brown loose loam with 5% gravels.	Negative	
		2	20	Brick fragments in black loose semi-burnt soil.	Modern brick fragments and burnt unidentified material.	
		Lat (°N): -122.307409		Long (°W): 47.296970	Termination: Densely packed unset modern bricks	
47B	NC28B	1	15	Brown loose loam with 5% gravels.	Negative	Offset 5-meters West of NC28A
		2	30	Skewed brick fragments in black loose semi-burnt soil.	Modern brick fragments two >1cm, clear glass fragments, one ceramic fragments, 1 stone brick, 1 fragment of charcoal	No diagnostic material
		3	40	Orange brown coarse sand with 15% rounded cobbles and gravel.	Negative	Glacial
		Lat (°N): -122.307454		Long (°W): 47.296941	Termination: Glacial material	
48	NC29	1	8	Medium brown semi-plastic soft loam.	Negative	
		2	30	Poorly sorted loose non-plastic brown silt with 5% rounded cobbles.	Negative	
		3	42	Glacial Unsorted hard and nonplastic orange and brown silt with 10% rounded gravels.	Negative	
		Lat (°N):		Long (°W):	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
49	NP30	1	35	Grey fine compact sandy loam with 15% round to sub-rounded cobbles and gravels.	Negative	Modified gravel roadway, ca. 2005, utilities to east, boulder to north, slope west
		Lat (°N): 47.296648		Long (°W): -122.307306	Termination: Extreme compaction	
50	NC30	1	15	Black brown soft wet semi-plastic loam.	Negative	
		2	45	Very compact grey sandy silty clay with 15+% sub-angular rounded gravels and 1 rounded boulder.	Negative	
		Lat (°N): -122.307462		Long (°W): 47.296493	Termination: Boulder and extreme compaction	
51	NP31	1	35	Dark brown silty loam, with 15% subangular cobbles and gravels.	Brick fragments and burnt unidentified material.	SE corner of landform with utilities to east and south
		Lat (°N): 47.296287		Long (°W): -122.307250	Termination: Extreme compaction	
52	NC20	1	60	Brown loose loam and sand with 15-20% gravels. Concrete rubble and cobbles.	Negative	Modern fill
		Lat (°N): -122.308395		Long (°W): 47.296557	Termination: Refusal	
53	NC19	1	70	Modern fill. Brown loose loam with fine sand and 10% round gravels and 5% round cobbles.	Negative	
		Lat (°N): -122.308503		Long (°W): 47.296430	Termination: Concrete	
54	NC18	1	15	Modern trash pile.	Negative	
		Lat (°N): -122.308681		Long (°W): 47.296289	Termination: Refusal / Concrete	
55	NC27	1	1	Bark chips.	Negative	
		2	20	Moist, soft, grey, semi-plastic, silty loam.	Negative	Topsoil
		3	25	Grey and orange non-plastic and unsorted silt with 5% pebbles and gravels.	Negative	Glacial
		Lat (°N): -122.309580		Long (°W): 47.295965	Termination: Glacial material	
56	NC26	1	1	Bark chips.	Negative	
		2	10	Moist, soft, grey, semi-plastic, silty loam.	Negative	Topsoil
		3	17	Grey and orange non-plastic and unsorted silt with 5% pebbles and gravels.	Negative	Glacial
		Lat (°N): -122.309985		Long (°W): 47.295748	Termination: Glacial material	
57	NC25	1	20	Brown grey semi plastic loose loam with >3% rounded gravels.	Negative	Topsoil
		2	35	Orange mottled brown coarse sand with 10% rounded gravels.	Negative	Glacial
		Lat (°N): -122.309861		Long (°W): 47.295562	Termination: Glacial material	
58	NC24	1	1	Bark chips.	Negative	
		2	10	Moist, soft, grey, semi-plastic, silty loam.	Negative	Topsoil
		3	30	Unsorted brown soft, loose, non-plastic silt with 5% subangular pebbles.	Negative	Modern fill
		Lat (°N): -122.309996		Long (°W): 47.295361	Termination: Sprinkler system	
59	NC23	1	1	Bark chips.	Negative	

OMF South: ATCRC Shovel Probe Log – First Field Session, February 2020 (continued)

SP	Field ID	Strata #	Depth (cm)	Description	Cultural Materials	Notes
		2	10	Topsoil. Moist, soft, grey, semi-plastic, silty loam.	Negative	
		3	15	Glacial Grey and orange non-plastic and unsorted silt with 5% pebbles and gravels.	Negative	
		Lat (°N): -122.309798		Long (°W): 47.295334	Termination: Glacial material	
60	NC22	1	12	Dark brown loam soft and somewhat plastic clayey silt with high organic content.	Negative	In standing water
		2	20	Dark brown dry and loose non-plastic silt with low clay content.	Negative	
		3	30	Glacial Orange silt with small rounded gravel.	Negative	
		Lat (°N): -122.308641		Long (°W): 47.295251	Termination: Glacial material	
61	NC21	1	12	Dark brown loam soft and somewhat plastic clayey silt with high organic content.	Negative	
		2	20	Dark brown dry and loose non-plastic silt with low clay content.	Negative	
		3	30	Orange silt with small rounded gravel.	Negative	Glacial
		Lat (°N): -122.308353		Long (°W): 47.295252	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1542 Historic Period Foundation, June 2020

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
01-1	C3	1	20	Dark brown loose, unsorted silty loam/trash.	Glass, plastic	
		2	78	Loose brown silty fill.	Negative	Moist below ~75 cm
		3	85	Beige, compact, unsorted silt to cobbles, 20% gravel-cobbles.	Negative	Glacial
		Latitude: -122.312232		Longitude: 47.299105	Termination: Glacial material	
01-2	C1	1	26	Medium brown loose, unsorted silty loam/trash, 25% gravel-gobbles.	Glass, hair band, plastic, charcoal	
		2	40	Compact, unsorted beige silt to cobbles, 40% gravel-cobbles.	Negative	Glacial
		Latitude: -122.312229		Longitude: 47.299061	Termination: Glacial material	
01-3	JM3	1	40	Dark brown silty loam and trash with gravel to cobbles.	Metal barrel tie fragment, twist knob, nail/key	
		2	70	Orangish brown glacial material with rodent burrows.	Negative	Glacial
		Latitude: -122.312128		Longitude: 47.299088	Termination: Glacial material	
01- 4	C2	1	12	Dark brown loose, unsorted silty loam/trash, 20% gravel-cobbles.	Glass, metal fragments, cloth, plastic, terra cotta	
		2	60	Medium brown loose cobbly silt.	Negative	Fill
		3	100	Light gray sandy silty material	Negative	Fill (?) auger from 60 cmbs
		Latitude: 47.299046		Longitude: -122.312121	Termination: cobble layer	
01- 5	JM1	1	25	Loose dark brown loam with modern debris.	Marbles, crack pipe	
		2	40	Light brown to light orange-brown sandy silt.	Sampling contaminated by wall collapse	Glacial
		Latitude: 47.299012		Longitude: -122.312236	Termination: Glacial material	
01- 6	JM2	1	~15	Dark brown loam and modern trash.	Plastics, foil, charcoal, assorted modern trash	
		2	~35	Bright orange silt, mottled below 30 cm	Charcoal	Burned wood layer around 30 cm interrupting orange silt
		3	70	Mottled orange glacial material.	Negative	Glacial, auger from 60 cmbs
		Latitude: 47.299009		Longitude: -122.312164	Termination: Glacial material	
01- 7	JM6	1	10	Dark brown loam and trash.	Glass, plastics, crack pipe	
		2	25	Mottled light brown silty sand with gravel-cobbles.	Red brick, Fiestaware fragments	
		3	60	Orange glacial material.	Negative	Glacial
		Latitude: 47.299021		Longitude: -122.312038	Termination: Glacial material	
01- 8	C4	1	10	Dark brown loose, unsorted silty loam/trash.	Glass	
		2	40	Orange-beige compact, unsorted silt to pebbles.	Negative	Glacial
		Latitude: 47.298965		Longitude: -122.312216	Termination: Glacial material	
01- 9	JM7	1	20	Dark brown loam.	Negative	
		2	50	Brown silty sand to sand with gravel and cobbles.	Negative	
		3	70	Orange glacial material.	Negative	Glacial
		Latitude: 47.298981		Longitude: -122.312023	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1542 Historic Period Foundation, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
01- 10	C5	1	8	Dark brown loose, unsorted silty loam/trash.	Glass shards, glass bottle, plastic shards, plastic bag, needle cap	
		2	25	Light brown gravelly silt.	Negative	Fill
		3	45	Light orange/beige compact, unsorted silt to cobbles.	Negative	Glacial
		Latitude: 47.298915		Longitude: -122.312232	Termination: Glacial material	
01- 11	JM4	1	15	Brown loam	Negative	
		2	35	Orange glacial material	Negative	
		Latitude: -122.312134		Longitude: 47.298941	Termination: Glacial material	
01- 12	JM5	1	10	Brown loam.	Melted glass, crack pipe fragment, glass fragments	
		2	20	Light brown loam.	Negative	
		3	30	Orange glacial material	Negative	Glacial
		Latitude: 47.298932		Longitude: -122.312071	Termination: Glacial material	
01- 13	ND3	1	30	Black brown loose sandy loam with 5% rounded gravels.	Modern nails, glass, metal fragments @ 5 cm	
		2	40	Orange-brown compact coarse sand with 10-15% gravels.	Negative	Glacial
		Latitude: 47.298937		Longitude: -122.311991	Termination: Glacial material	
01- 14	C6	1	26	Dark brown loose, unsorted silty loam/trash.	Glass, plastic	
		2	37	Orange-beige compact, unsorted silt to pebbles	Negative	Glacial
		Latitude: 47.298904		Longitude: -122.312152	Termination: Glacial material	
01- 15	ND1	1	12	Black brown loose wet loam with 5% rounded gravels (3-7 cm).	Negative	
		2	33	Orange very compact coarse sand with 15% rounded gravel.	Negative	Glacial
		Latitude: 47.298935		Longitude: -122.311990	Termination: Glacial material	
01- 16	C9	1	16	Dark brown loose, unsorted silty loam.	Negative	
		2	30	Dark beige compact, unsorted silt to cobbles.	Negative	Glacial
		Latitude: 47.298888		Longitude: -122.311991	Termination: Glacial material	
01- 17	C10	1	20	Dark brown loose, unsorted silty loam	Aluminum can, brick, roof tile, metal rod	
		2	35	Beige, compact, unsorted silt to cobbles.	Negative	Glacial
		Latitude: 47.298863		Longitude: -122.312232	Termination: Glacial material	
01- 18	C7	1	25	Dark brown loose, unsorted silty loam/trash.	Pants, shoe, reflector, glass	Moved, too close to ant colony
		2	35	Beige, compact, unsorted silt to cobbles, 40% gravel-cobbles	Negative	Glacial
		Latitude: 47.298860		Longitude: -122.312150	Termination: Glacial material	
01- 19	C8	1	30	Dark brown loose, unsorted silty loam.	Negative	
		2	42	Orange-beige compact, unsorted silt to pebbles.	Negative	Glacial
		Latitude: 47.298855		Longitude: -122.312052	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1542 Historic Period Foundation, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
01- 20	ND2	1	20	Black brown loose sandy loam with 5% rounded gravels (3-7 cm).	Negative	
		2	35	Mixed brown loam and gray sand with 3% gravel (1-5 cm).	Negative	
		3	60	Red-brown sandy loam w/ 10% subangular gravel.	Negative	
		4	66	Orange-brown coarse sand with 10% subrounded gravel.	Negative	Glacial
		Latitude: 47.298866		Longitude: -122.311947	Termination: Glacial material / Aggressive ant attack	

OMF South: ATCRC Shovel Probe Log – 45KI1543 Historic Period Debris Scatter, June 2020

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
02- 1	ND4	1	5	Brown loose sandy loam.	6+ brick fragments 2 glass fragments 1 brown beer bottle	
		2	30	Brown loose sandy loam with layer of jumbled bricks.	12+ brick fragments 6+ roof tile fragments (smooth on one side) 3 clear glass shards	
		3	35	Gray and brown mottled soil with ceramic inclusions.	20+ small brick fragments (<5 cm) 4 large brick fragments 1 whole brick 2 plastic fragments	
		4	42	Gray silty loam with 5% rounded gravel.	None	Fill
		5	44	Brown/gray sandy loam with 5% rounded gravel.	None	Fill
		6	50	Orange/brown compact silt to coarse sand with 10% gravel.	None	Glacial
		Latitude: 47.296956		Longitude: -122.307414	Termination: Glacial material	
02- 2	ND5	1	20	Brown loose sandy loam with 5% rounded gravel and 5% brick fragments.	12+ brick fragments	
		2	30	Brick rubble and charcoal in sandy loam.	None	
		Latitude: 47.296985		Longitude: -122.307412	Termination: brick density	
02- 3	ND6	1	20	Brown loose sandy loam with 5% gravel and 5% brick fragments.	None	Whole brick density at 20 cm
		Latitude: 47.297003		Longitude: -122.307413	Termination: brick density	
02- 4	ND7	1	22	Brown loose sandy loam with 5% gravel.	2 ceramic fragments	
		2	32	Orange compact silt to coarse sand with 10% rounded gravel.	None	Glacial
		Latitude: 47.297017		Longitude: -122.307409	Termination: Glacial material	
02- 5	ND8	1	12	Brown loose sandy loam with 5% rounded gravel.	None	Fill
		2	25	Orange/brown compact silt to coarse sand with 10% rounded gravel.	None	Glacial
		Latitude: 47.297033		Longitude: -122.307411	Termination: Glacial material	
02- 6	ND12	1	20	Brown loose sandy loam with 5% rounded gravel.	None	Fill
		2	30	Orange compact silt to coarse sand with 15% rounded gravel.	None	Glacial
		Latitude: 47.297013		Longitude: -122.307459	Termination: Glacial material	
02- 7	ND11	1	20	Brown loose sandy loam with 5% rounded gravel.	None	Fill
		2	40	Orange/brown compact silt to coarse sand with 10% rounded gravel.	None	Glacial
		Latitude: 47.296988		Longitude: -122.307460	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1543 Historic Period Debris Scatter, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
02- 8	ND10	1	25	Brown loose sandy loam with 5% rounded gravel and large cedar roots.	2 brick fragments between 10 and 15 cm	
		2	35	Orange/brown compact silt to coarse sand with 10% subrounded gravel.	None	
		Latitude: 47.296966		Longitude: -122.307455	Termination: Glacial material	
02- 9	ND9	1	25	Brown loose sandy loam with 5% rounded gravel and 1 large (10 by 20 cm) angular cobble	5 brick fragments 1 charcoal fragment	
		2	36	Orange/brown compact silt to coarse sand with 10% subrounded gravel.	None	Glacial
		Latitude: 47.296943		Longitude: -122.307457	Termination: Glacial material	
02- 10	ND13	1	16	Brown loose sandy loam with 5% rounded gravel.	1 brick fragment	
		2	26	Orange compact silt to coarse sand with 10% rounded gravel.	None	Glacial
		Latitude: 47.296931		Longitude: -122.307468	Termination: Glacial material	
02- 11	ND14	1	20	Brown loose sandy loam with 10% rounded gravel	Plastic sheet at 20 cm	Fill
		2	37	Light brown loose sandy loam with 10% rounded gravel.	None	Fill
		3	43	Orange compact silt to coarse sand with 15% rounded gravel	None	Glacial
		Latitude: 47.296932		Longitude: -122.307493	Termination: Glacial material	
02- 12	ND15	1	25	Brown loose sandy loam with 5% rounded gravel.	None	Fill
		2	35	Orange compact silt to coarse sand with 10% rounded gravel.	None	Glacial
		Latitude: 47.296933		Longitude: -122.307517	Termination: Glacial material	
02- 13	C11	1	20	Loose brown sandy cobbly loam and brick fragments.	5 clear unleaded glass shards, 1-2 cm 2 leather patches, 1-4 cm 1 plastic fragment, 3 cm ~50 brick fragments, 0.5-10 cm	
		2	36	Gray sand and brick.	13 clear unleaded glass shards 4 whole bricks ~30 brick fragments	
		3	46	Compact cobbly brown silt to sand.	None	Glacial
		Latitude: 47.296937		Longitude: -122.307374	Termination: Glacial material	
02- 14	C12	1	30	Loose brown silty loam and brick fragments with 10% gravel.	10 cm length wire 5 clear unleaded glass shards ~25 brick fragments, 0.5-10 cm	
		2	40	Compact cobbly brown silt to sand.	None	Glacial
		Latitude: 47.296937		Longitude: -122.307342	Termination: Glacial material	
02- 15	C13	1	10	Extremely compact light gray silt with 5% rounded to subrounded gravel.	None	Pro-glacial lacustrine sediment
		Latitude: 47.296920		Longitude: -122.307271	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1543 Historic Period Debris Scatter, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
02- 16	C14	1	29	Loose brown sandy loam and brick fragments with 10% gravel.	6 clear unleaded glass shards, 0.75-3 cm 1 fragment stone countertop, 8 cm ~50 brick fragments	
		2	39	Compact cobbly brown silt to sand	None	Glacial
		Latitude: 47.296910		Longitude: -122.307430	Termination: Glacial material	
02- 17	C15	1	12	Loose brown sandy loam and brick fragments with 10% grave.l	5 clear unleaded glass shards, 0.25-3 cm ~60 brick fragments	
		Latitude: 47.296884		Longitude: -122.307433	Termination: brick density	
02- 18	C16	1	21	Loose brown sandy loam and brick fragments with 10% grave.l	8 clear unleaded glass shards 1 white unleaded glass shard 1 green unleaded glass shard ~40 brick fragments	
		Latitude: 47.296854		Longitude: -122.307439	Termination: brick density	
02- 19	C17	1	29	Loose brown sandy loam and brick fragments with 10% gravel.	~30 clear unleaded glass shards 2 white unleaded glass shards 1 green unleaded glass shard 2 leather patches ~40 brick fragments	
		2	39	Compact cobbly brown silt to sand	None	Glacial
		Latitude: 47.296816		Longitude: -122.307439	Termination: Glacial material	
02- 20	C18	1	20	Loose brown sandy loam and brick fragments with 10% gravel to cobbles.	5 clear unleaded glass shards 2 white plastic fragments 2 leather patches ~30 brick fragments	
		2	30	Compact cobbly brown silt to sand	None	Glacial
		Latitude: 47.296775		Longitude: -122.307439	Termination: Glacial material	
02- 21	C19	1	15	Loose brown sandy loam with 10% gravel.	1 white tile fragment	Fill
		2	25	Compact cobbly tan silt to sand	None	Glacial
		Latitude: 47.296706		Longitude: -122.307440	Termination: Glacial material	
02- 22	ND16	1	15	Brown loose sandy loam with 5% rounded gravel.	None	Fill
		2	33	Extremely compact gray silt with 20% gravel to cobbles	None	Pro-glacial lacustrine sediment
		Latitude: 47.296682		Longitude: -122.307445	Termination: Glacial material	
02- 23	C20	1	12	Loose brown silty loam with 10% gravel.	None	Fill
		2	40	Extremely compact light gray silt with 5% rounded to subrounded gravel and pebbles.	None	Pro-glacial lacustrine sediment
		Latitude: 47.296652		Longitude: -122.307450	Termination: Glacial material	

OMF South: ATCRC Shovel Probe Log – 45KI1543 Historic Period Debris Scatter, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
02- 24	C21	1	94	Compact pale to tan very fine arkosic sand with 10% gravel and cobbles.	Asphalt masses at 25-40 cm and 40-60 cm Brick fragments below 50 cm	
		2	100	Extremely compact light gray very fine sand with gravel to cobbles.	None	Pro-glacial lacustrine sediment
		Latitude: 47.296282		Longitude: -122.307344	Termination: Glacial material	
02- 25	C22	1	20	Compact brown sand with 10% gravel to cobbles	Unmarked PVC pipe	Fill
		Latitude: 47.296281		Longitude: -122.307379	Termination: Unmarked PVC pipe pair, no wire found or odor detected	
02- 26	C22.1 Moved 30cm east	1	15	Loose light brown sandy loam with 3% pebbles.	None	Fill
		2	45	Extremely compact light gray very fine sand with moderate mottling. Contains 20% gravel to small cobbles including identifiably metamorphic clasts.	None	Pro-glacial lacustrine sediment
		Latitude: 47.296281		Longitude: -122.307379	Termination: Glacial material	
02- 27	AV1	1	10	Dark yellowish brown sandy loam with 30% sub round-subangular pebbles and cobbles.	3 brick fragments	Fill
		2	22	Yellowish brown sandy loam with 40% sub round-angular pebbles and cobbles.	2 brick fragments	Fill
		3	28	Light olive brown silty sand with 30% round pebbles, cobbles, and boulders.	3 brick fragments	Fill
		4	45	Strong brown silty sand 45% round-angular pebbles, cobbles, and boulders.	None	Fill
		5	70	Olive brown, silty sand with 45% round-sub round pebbles, cobbles, and boulders.	2 brick fragments	Fill
		6	90	Light brownish grey silty sand with >45% round-sub round pebbles, cobbles, boulders	None	Fill
		7	95	Light grey silt with 50% well rounded pebbles and cobbles.	None	Pro-glacial lacustrine sediment
		Latitude: 47.296305		Longitude: -122.307311	Termination: Glacial material	
		Notes for SP: Auger and shovel refusal- breaker bar used to proceed with excavation from 15cm.				
		All strata boundaries are sharp, clear, and well defined.				

OMF South: ATCRC Shovel Probe Log – 45KI1543 Historic Period Debris Scatter, June 2020 (continued)

SP	Field #	Strata #	Depth (cm)	Description	Cultural Materials	Notes
02- 28	AV2	1	18	Very dark greyish brown sandy loam with 20% round-subangular pebbles and cobbles.	Numerous machine-made brick fragments, cut stone block fragments, a ceramic tile fragment, and charcoal films and degraded concentrations	Fill
		2	20	Black sandy loam with 20% round-subangular pebbles and cobbles	Nondiagnostic clear glass fragments; numerous machine-made brick fragments, cut stone block fragments, a wire nail, an unidentified metal fragment, and charcoal films and degraded concentrations.	Fill
		3	45	Yellowish brown silty sand with 35% rounded-subangular pebbles, cobbles, and boulders.	None	Fill
		4	65	Brown silty sand 45% rounded-subangular pebbles, cobbles, and boulders.	None	Fill
		5	90	Light grey silt with 45% well rounded pebbles and cobbles.	None	Pro-glacial lacustrine sediment from the early Vashon Stade
		Latitude:47.296333		Longitude: -122.307309	Termination: Glacial material	
		Notes for SP: Auger and shovel refusal, breaker bar used to proceed with excavation from 15cm.				
		All strata boundaries are sharp, clear, and well defined.				

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
1	50	0–30: 10YR 2/2; loose sandy loam with 10% 3–5 cm rounded gravel and many cedar roots; clear basal contact 30–40: Broken concrete and groundwater; clear basal contact 40–50: 10YR 3/2; fine sandy loam with 10% 5–10 cm rounded gravel *Terminated due to inhibitive cobbles and standing water*	No recovery
2	68	0–3: 7.5YR 2.5/1; black sandy loam and moss; clear basal contact 3–68: 7.5YR 5/1, 7.5YR 6/1; compact sand and gravel fill with subangular to rounded cobbles up to 20 cm; contains large pockets of mostly clean medium to coarse sand; fill to 68+ cmbs; slow groundwater seepage up to at least 65 cmbs *Terminated due to inhibitive cobbles*	No recovery
3	75	0–75: 10YR 4/1; compact very coarse sand with 25–50% 5–10 cm angular to rounded gravels, increasing with depth *Terminated due to inhibitive cobbles*	No recovery
4	120	0–20: 10YR 2/2; loam with 5% 3–5 cm subrounded gravel; clear basal contact 20–78: 10YR 3/6; loose sandy loam with 15% 3–5 cm subrounded gravel and 10–15 cm rounded cobbles; clear basal contact 78–120: 10YR 5/6; compact glacial sediments up to 15 cm subrounded gravel, increasing density and clast size with depth *Augered from 100 cmbs *Terminated due to inhibitive boulder*	No recovery
5	100	0–90: 10YR 4/3; sandy silt construction fill with abundant angular and subangular pebbles and small cobbles; many roots from 0–70 cm, one band of 10YR 4/2 fill at 20–25 cm; clear basal contact 90–100: Olive-brown glacial outwash; coarse sandy silt with common subrounded and subangular pebbles and small cobbles *Terminated due to inhibitive cobbles in glacial sediment*	80–90 cmbs: Temporally non-diagnostic metal/rubber fragment
6	77	0–20: 10YR 2/2; loose sandy loam with 10% rounded gravel; clear basal contact 20–40: Compact reddish sandy loam with 15% rounded gravel; gradual basal transition 40–77: 10YR 5/3; very compact sandy loam with 15% rounded gravel *Terminated due to inhibitive cobbles within glacial sediment*	No recovery
7	54	0–10: 10YR 2/2; loose sandy loam with 10% 3–5 cm rounded gravel; clear basal contact 10–54: 10YR 5/3; increasingly compact sandy loam with 15% 3–10 cm subangular gravel *Terminated due to inhibitive cobbles*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
8	60	0–12: 10YR 2/2; loose sandy loam with 10% 3–5 cm rounded gravel; clear basal contact 12–25: 10YR 5/5; fine sand; clear basal contact 25–60: 10YR 5/3; increasingly compact sandy loam with 15% 3–10 cm subangular gravel *Terminated due to inhibitive cobbles*	No recovery
9	55	0–30: 10YR 2/2; wet loam with 10% 3–5 cm rounded gravel; clear basal contact 30–55: 10YR 5/3; compact glacial sediments up to 10 cm rounded gravel with groundwater seepage *Terminated due to auger refusal in glacial and standing water*	No recovery
10	35	0–3: Black wood chips; clear basal contact 3–23: 7.5YR 3/2; wet plastic silt; clear basal contact 23–35: 2.5Y 7/3; compact glacial clay through 10 cm rounded pebbles; unsorted and plastic with groundwater saturation and rapid seepage *Augered from 24.5 cmbs *Terminated due to auger refusal in glacial and standing water*	No recovery
11	45	0–10: 10YR 2/2; loose, very clumpy loam with 10% 3–5 cm rounded gravel; clear basal contact 10–45: 10YR 5/3; very compact glacial sediments up to 10 cm rounded to subangular gravel *Terminated at depth in glacial sediment*	No recovery
12	50	0–40: 7.5YR 4/2; compact 5 cm angular gravel fill; fill to 40 cmbs; clear basal contact 40–50: 2.5Y 7/3; compact glacial clay through 15 cm rounded cobbles; unsorted and plastic *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
13	50	0–40: 7.5YR 4/2; soft, wet loam with rounded cobbles up to 20 cm; clear basal transition 40–50: 2.5Y 7/3; compact glacial clay through 20 cm rounded cobbles with groundwater saturation and rapid seepage *Augered from 42 cmbs *Terminated due to inhibitive cobbles and standing water*	No recovery
14	100	0–25: 10YR 4/2; loose clumpy sandy loam with 10% 3–5 cm rounded gravel; clear basal contact 25–100: 10YR 5/3; compact glacial sediments up to 12 cm rounded to subangular gravel *Terminated at target depth in glacial sediment*	No recovery
15	52	0–6: 7.5 YR 3/2; roots and silty humic layer; gradual basal transition 6–45: 7.5YR 4/2; subrounded gravelly loam; clear basal contact 45–52: 2.5Y 7/3; compact glacial clay through 8 cm rounded gravel *Augered from 35 cmbs *Terminated due to inhibitive cobbles*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
16	45	0–20: 10YR 4/2; loose clumpy loam with 10% 3–5 cm rounded gravel; clear basal contact 20–45: 10YR 5/3; compact glacial clay through 12 cm subrounded to subangular pebbles *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
17	47	0–23: Subangular cobbles to boulders up to 25 cm diameter with accumulated conifer needles; original trench surfacing to 27 cmbs; clear basal contact 23–27: 7.5YR 4/2; subangular cobbles to 25 cm boulders in thin loam matrix; clear basal contact 27–47: 2.5Y 7/3; compact glacial clay through 10 cm rounded cobbles *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
18	70	0–20: 10YR 4/2; loose sandy loam with 10% 3–5 cm rounded gravel; clear basal contact 20–70: 10YR 5/3; compact glacial sediments up to 12 cm subrounded to subangular pebbles *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
19	58	0–15: 2.5YR 3/2; humic layer and roots; gradual basal transition 15–58: 7.5Y 4/4; brown loam with 20% < 7 cm rounded gravel, two < 27 cm boulders, and large tree roots *Augered from 40 cmbs *Terminated due to inhibitive cobbles and tree roots*	No recovery
20	70	0–16: 10YR 2/2; loose clumpy loam with 10% 3–5 cm rounded gravel; clear basal contact 16–27: Large boulder 27–70: 10YR 5/3; compact glacial sediments up to 10 cm subrounded to subangular pebbles *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
21	100	0–25: 10YR 2/2; loose sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 25–100: 10YR 5/3; loose to increasingly compact coarse sandy glacial sediments *Augered from 98 cmbs *Terminated at auger refusal in glacial sediment*	No recovery
22	39	0–17: 7.5YR 3/2; loam; clear basal contact 17–39: 2.5Y 6/3; compact glacial clay through 10 cm rounded cobbles *Terminated at depth in glacial*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
23	91	0–22: 7.5YR 3/2; loam and roots; clear basal contact 22–90: 7.5YR 5/4, tinting to 2.5Y 6/3 with depth; silty sand with minor clay and 5–10% 1–8 cm rounded gravel; clear basal contact 90–91: Compact unsampled gravel or pebble surface with groundwater seepage *Augered from 49 cmbs *Terminated due to inhibitive gravel density, presumed glacial sediment*	No recovery
24	40	0–17: 7.5YR 3/2; loose loam with roots; clear basal contact 17–36: 7.5YR 4/2; sandy loam with > 20% rounded gravel up to 6 cm; clear basal contact 36–40: 2.5Y 6/3; compact glacial clay to rounded cobbles, attempted auger from 40 cm *Terminated due to inhibitive cobbles in glacial*	No recovery
25	35	0–17: 7.5YR 3/2; loose loam and roots; gradual basal transition 17–35: 7.5YR 3.5/2 to 7.5YR 4/2, tinting with depth; sandy loam with > 20% cobbles up to at least 6 cm *Terminated due to inhibitive cobbles*	No recovery
26	86	0–15: 7.5YR 4/1; loam; messy basal contact 15–65: 7.5YR 4/4; sandy loam with up to 15 cm rounded gravel and cobbles; clear basal contact 65–86: 2.5Y 6/3; wet glacial silt through 7 cm rounded gravel and cobbles of unknown size *Augered from 55 cmbs *Terminated due to inhibitive cobbles*	5 cmbs: Modern black plastic trash bag fragment
27	43	0–21: 7.5YR 3/1; gravelly loam with a 23 cm subrounded cobble; clear basal contact 21–43: 2.5Y 7/3; compact glacial clay through 25 cm rounded cobbles; soil is plastic even when relatively dry *Terminated at depth in glacial sediment*	5 cmbs: Temporally non-diagnostic paper and white plastic debris within top
28	95	0–16: 10YR 3/3; loose sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 16–45: 10YR 4/3; very loose fine sandy loam; clear basal contact 45–55: 10YR 5/6; loose sandy loam with 10% 3–10 cm rounded gravel; gradual basal transition 55–95: 10YR 5/4; compact glacial sediments with 15% 5–12 cm rounded cobbles *Terminated due to refusal in glacial sediment*	20–40 cmbs: Temporally non-diagnostic black plastic trash bag containing trash
29	75	0–19: 7.5YR 4/1; loam; slightly messy basal contact 19–55: 7.5YR 4/4; sandy loam with up to 8 cm rounded gravel; clear basal contact 55–75: 2.5Y 6/3; compact glacial clay through 8 cm rounded gravel and cobbles of unknown size *Augered from 52 cmbs *Terminated due to inhibitive cobbles*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
30	80	0–25: 10YR 3/3; loose clumpy sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 25–60: 10YR 6/1; loose to soft sandy loam with 10% 3–5 cm rounded gravel; gradual basal transition 60–80: 10YR 5/4; compact glacial sediments with 15% 3–10 cm rounded gravel *Terminated due to auger refusal in glacial sediment*	No recovery
31	70	0–17: 7.5YR 4/1; loam and roots; messy basal contact 17–60: 7.5YR 4/4; sand and up to 6 cm gravel with silt; clear basal contact 60–70: 2.5Y 6/3; compact glacial clay through 10 cm pebbles and cobbles of unknown size *Augered from 50 cmbs *Terminated due to inhibitive cobbles*	No recovery
32	110	0–5: 10YR 2/2; wet clumpy sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 5–80: 10YR 5/4; loose sandy loam with 10% 3–7 cm rounded gravel; clear basal transition 80–110: 10YR 6/3; compact clayey loam with 5% 3–5 cm rounded gravel *Augered from 100 cmbs *Terminated at depth in standing water*	No recovery
33	62	0–51: 7.5YR 4/2; loam with up to 15 cm cobbles and many roots; clear basal contact 51–62: 2.5Y 6/3; compact glacial clay through 8 cm gravel and cobbles of unknown size *Augered from 48 cmbs *Terminated due to inhibitive cobbles*	No recovery
34	70	0–60: 10YR 2/2; loose to compact sandy loam with 5% 3–5 cm rounded gravel and large roots; clear basal contact 60–70: 10YR 5/3; compact glacial sediments with 15% 3–12 cm rounded to subangular cobbles *Terminated due to inhibitive cobbles and roots*	No recovery
35	62	0–10: 7.5YR 3/1; humic layer; gradual basal transition 10–52: 7.5YR 3/2; organics–rich, slightly sandy loam with < 10% gravel and pebbles and thick roots; clear basal contact 52–62: 7.5YR 4/4; sandy loam with < 10% rounded gravel and thick tree roots *Augered from 45 cmbs *Terminated due to inhibitive tree roots*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
36	90	0–12: 10YR 2/2; loose sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 12–30: 10YR 4/6; compact sandy loam with 10% 3–5 cm rounded gravel; gradual basal transition 30–90: 10YR 5/3; compact coarse sand with 15% 5–10 cm rounded gravel *Terminated due to inhibitive cobbles*	No recovery
37	74	0–15: 7.5YR 3/2; loam and roots; messy basal contact 15–55: 7.5YR 4/4; sandy loam with up to 15 cm rounded cobbles; clear basal contact 55–74: 2.5Y 6/3; compact glacial clay through 15 cm rounded cobbles *Augered from 57 cmbs *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
38	85	0–57: 10YR 2/2; loose, very cobbly sandy loam with 15% 3–5 cm rounded gravel and 10–15+ cm rounded pebbles; clear basal contact 57–85: 10YR 5/3; wet clayey loam with 15% 5–10 cm rounded gravel *Terminated due to auger refusal below groundwater*	No recovery
39	42	0–14: Gray gravelly sandy loam with rounded clasts up to 6 cm in diameter, likely weathered glacial deposits; gradual basal transition 14–42: 2.5Y 6/2; somewhat compact but mostly loose and nonplastic very fine sand through 15 cm rounded cobbles, likely glacial outwash *Terminated at depth in glacial sediment*	No recovery
40	75	0–38: 10YR 2/2; loose clayey loam with 10% 3–5 cm rounded gravel; clear basal contact 38–50: 10YR 6/3 to 10YR 5/3, shading with depth; moderately compact sandy loam with 10% 3–10 cm rounded gravel; gradual basal transition 50–75: 10YR 5/3; compact sandy loam with 15% 3–10 cm rounded gravel *Terminated due to auger refusal*	No recovery
41	24	0–20: 7.5YR 3/2; loam, groundwater seepage below 5 cmbs; fill to 25+ cmbs; clear basal contact 20–24: Wet light brown silt through rounded cobbles of unknown size, probably glacial; attempted auger from 22 cmbs, lack of retrieval *Terminated due to sidewall collapse and lack of retrieval in standing water*	No recovery
42	25	0–25: 10YR 5/2; 70% 1–3 cm and 5–10 cm angular to rounded gravel fill with a coarse sand matrix; froundwater seepage; fill to 42 cmbs *Terminated due to inhibitive cobbles in standing water*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
43	53	0–5: 7.5YR 3/1; gravelly loam; gradual basal transition 5–42: 2.5Y 6/2; compact gravel fill with asphalt chunks up to 23 cmbs; clear basal contact 42–53: 7.5YR 4/4; sandy loam and wood fragments with sparse rounded gravel; attempted auger from 52 cmbs *Terminated due to refusal on large cobble*	No recovery
44	40	0–30: 10YR 5/1; compact 70% 3–10 cm angular gravel fill with a coarse sand matrix; fill and concrete to 40+ cmbs; groundwater seepage; clear basal contact 30–40: 10YR 3/1; very compact sandy loam with 30% 3–7 cm rounded gravel *Terminated at concrete blockage in standing water*	No recovery
45	25	0–25: 2.5Y 6/2; compact gravel fill, groundwater seepage below 20 cmbs; fill to 25+ cmbs *Terminated due to compact gravel and standing water*	No recovery
46	30	0–10: 10YR 5/1; compact 70% 3–10 cm angular gravel fill with a coarse sand matrix; fill to 30+ cmbs; clear basal contact 10–30: Black, very compact 3–5 cm angular gravel fill with a coarse sand matrix *Terminated due to inhibitive fill density*	No recovery
47	80	0–30: 10YR 5/1; compact 70% 3–10 cm angular gravel fill with a coarse sand matrix; fill to 30 cmbs; clear basal contact 30–70: 10YR 3/1; compact sandy loam with 10% 3–5 cm rounded gravel; clear basal contact 70–80: 10YR 5/3; compact sandy glacial sediments with 15% 3–10 cm angular to rounded gravel *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
48	30	0–10: 10YR 2/2; loose wet clayey loam with 3% gravel; clear basal contact 10–30: 10YR 5/3; very compact wet glacial sediments with 15% rounded to angular gravel *Terminated at depth in glacial sediment*	No recovery
49	36	0–15: 7.5YR 4/4; loam and grass roots; imported topsoil to 15 cmbs; clear basal contact 15–36: 2.5Y 7/4; compact glacial clay to 14 cm rounded cobbles *Terminated at depth in glacial sediment*	No recovery
50	45	0–25: 10YR 2/2; loose wet clayey loam with 3% gravel; clear basal contact 25–45: 10YR 5/4; very compact glacial sediments with 15% rounded to angular gravel; groundwater seepage *Terminated at depth in glacial sediment*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
51	33	0–27: 7.5YR 4/4; wet loam and grass roots; imported topsoil to 27 cmbs; clear basal contact 27–33: 2.5Y 7/4; compact glacial clay through 10 cm cobbles, groundwater seepage below 28 cmbs *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
52	40	0–20: 10YR 2/2; loose wet clayey loam with 3% 3–5 cm rounded gravel; clear basal contact 20–40: 10YR 5/4; very compact sandy glacial sediments with 15% 3–7 cm rounded to angular gravel *Terminated at depth in glacial and standing water*	No recovery
53	39	0–27: Brown loam and grass roots with rounded cobbles up to 14 cm; imported topsoil to 27 cmbs; clear basal contact 27–39: 2.5Y 7/4; compact glacial clay to 20 cm rounded cobbles with slow groundwater seepage *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
54	60	0–15: 10YR 2/2; very loose sandy loam with 3% 3–7 cm rounded gravel; clear basal contact 15–20: 10YR 5/3; very loose fine sand; clear basal contact 20–60: 10YR 2/2; very loose sandy loam with 5% 3–5 cm rounded gravel *Terminated due to inhibitive boulder*	No recovery
55	100	0–90: 10YR 3/2; loose fine sand; clear basal contact 90–100: 10YR 5/3; very compact sandy glacial sediments with 15% 3–10 cm rounded gravel. *Augered from 90 cmbs *Terminated due to auger refusal in glacial sediment*	No recovery
56	42	0–12: Subangular clean gravel fill; fill to 42 cmbs; clear basal contact 12–42: 10YR 4/2; sandy loam fill with rounded gravel and cobbles up to 20 cm *Terminated due to inhibitive tree roots*	No recovery
57	60	0–60: 7.5YR 5/1, 7.5YR 6/1; compact sand and gravel fill with < 20 cm subangular to rounded cobbles and asphalt chunks; contains pockets of mostly clean medium to coarse sand; moderate groundwater seepage up to 50 cmbs; fill to 60+ cmbs *Terminated due to inhibitive cobble and standing water*	No recovery
58	80	0–20: 10YR 3/2; sandy loam with 5% 3–5 cm rounded gravel; clear basal contact 20–40: 10YR 5/2; very compact coarse sandy loam with 18% 3–10 cm subrounded to subangular gravel; clear basal contact 40–80: 10YR 5/4; clayey loam with 5% 3–5 cm rounded gravel; groundwater seepage below 40 cmbs *Terminated due to sidewall collapse and infill*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
59	50	0–20: 10YR 2/2; loose humic layer with 5–10% 3–5 cm subrounded gravel and abundant roots; clear basal contact 20–50: 10YR 5/4; very wet loose loam with 5% 1–3 cm rounded gravel and 5% 5–10 cm rounded pebbles *Terminated due to sidewall collapse and infill*	No recovery
60	26	0–26: 7.5YR 4/3; loose brown gravelly loam and roots with rounded cobbles up to 18 cm in diameter; groundwater saturation and rapid seepage below 22 cmbs leading to sidewall collapse *Terminated due to sidewall collapse and infill*	No recovery
61	30	0–30: 7.5YR 4/3; loose brown gravelly loam and tree roots with rounded pebbles up to 12 cm diameter; groundwater saturation and rapid seepage below 24 cmbs leading to sidewall collapse; small oil slicks on pooled groundwater *Terminated due to sidewall collapse and infill*	No recovery
62	73	0–22: 5YR 3/2; brown loam with abundant rounded gravel and cobbles up to 18 cm in diameter; clear basal contact 22–73: 5Y 6/3; beige clayey silt with minor sand; fine sediments are fairly clean near the top with < 15% rounded 1 cm gravel increasing to > 25% rounded 16 cm cobbles; soil is highly plastic when wet, contains minimal iron staining next to some clasts; very slow groundwater seepage up to 72 cmbs *Terminated due to inhibitive cobbles*	No recovery
63	50	0–50: 10YR 5/3; compact coarse sandy loam with 15% 3–5 cm rounded gravel and 10–12 cm rounded cobbles *Terminated due to inhibitive cobbles*	No recovery
64	85	0–35: 10YR 2/2; clumpy loose wet loam with 10% rounded 3–5 cm gravel; clear basal contact 35–85: 10YR 5/4; compact wet sandy loam with 15% rounded 3–10 cm gravel *Augered from 14 cmbs *Terminated due to refusal*	No recovery
65	57	0–20: 10YR 3/4; loam with small subrounded gravel; clear basal contact 20–30: 10YR 5/6; clayey loam with gravel and small pebbles; gradual basal transition 30–57: 10YR 4/6; silty sand with abundant subrounded gravel and pebbles *Terminated at depth in glacial sediments*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
66	70	0–20: 10YR 2/2; loose wet loam with 10% angular 3–5 cm gravel; fill; clear basal contact 20–50: 10YR 5/2; compact coarse sandy loam with 10% rounded to angular 3–10 cm gravel; mixed fill and disturbed glacial; clear basal contact 50–70: 10YR 5/3; compact coarse sandy loam with 15% subrounded to subangular 3–10 cm gravel *Augered from 50 cmbs *Water table at 50 cmbs *Terminated due to refusal in glacial sediment*	No recovery
67	45	0–25: 10YR 3/4; loam with small subrounded gravel; clear basal contact 25–45: 10YR 4/6; silty sands with abundant subrounded to angular pebbles and cobbles *Terminated at depth in glacial sediment*	No recovery
68	110	0–110: 10YR 6/1; coarse sand with 20% rounded 1–7 cm gravel *Terminated due to refusal*	No recovery
69	30	0–10: 10YR 3/4; loam with small subrounded gravel; clear basal contact 10–30: 10YR 4/6; saturated silty sands with subrounded gravel and cobbles *Terminated at depth in glacial sediment*	No recovery
70	60	0–30: 10YR 2/2; sandy loam with 10% rounded 3–8 cm gravel; clear basal contact 30–60: 10YR 4/3; clayey loam with > 3% rounded 1–3 cm gravel and groundwater *Terminated due to refusal*	No recovery
71	50	0–20: 10YR 3/4; loam with small subrounded gravel; gradual basal transition 20–30: 10YR 4/6; loam with no gravel; gradual basal transition 30–50: 10YR 4/6; silty sands with subrounded gravel and cobbles *Terminated at depth in glacial sediment*	No recovery
72	80	0–10: 10YR 2/2; loose humic loam with 5% rounded 3–5 cm gravel; clear basal contact 10–55: 10YR 4/3; compact medium to fine sand with 10% rounded 3–5 cm gravel; clear basal contact 55–80: 10YR 5/3; silty loam with 15% subangular 5–7 cm gravel *Augered from 55 cmbs *Terminated due to refusal in glacial sediment*	No recovery
73	35	0–20: 10YR 3/4; loam with small subrounded gravel; clear basal contact 20–35: 10YR 4/6; silty sands with subrounded gravel and cobbles *Terminated at depth in glacial sediment*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
74	35	0–5: 10YR 3/4; loam with small subrounded gravel; clear basal contact 5–35: 10YR 4/6; silty sands with subrounded gravel and cobbles *Terminated at depth in glacial sediment*	No recovery
75	60	0–10: 10YR 2/2; humic loam with 5% rounded 3–5 cm gravel; clear basal contact 10–50: 10YR 5/3; compact sandy loam with 10% subangular to rounded 3–10 cm gravel 50–60: 10YR 2/4; sandy loam with 5% rounded gravel and roots *Terminated due to refusal on roots*	No recovery
76	75	0–1.3: 10YR 2/2; humic loam with 5–10% rounded 3–8 cm gravel; clear basal contact 1.3–50: 10YR 5/3; silty sandy loam with 15% subangular to rounded 5–7 cm gravel; gradual basal transition 50–75: 10YR 5/3; silty loam with > 3% rounded gravel *Augered from 50 cmbs *Terminated at depth in glacial with auger refusal*	No recovery
77	40	0–20: 10YR 3/4; loam with small subrounded gravel and many small roots; gradual basal transition 20–40: 10YR 4/6; clay through sand with subrounded pebbles and cobbles and many roots *Terminated at depth in glacial, on inhibitive root*	No recovery
78	80	0–40: 10YR 3/2; slightly sticky gravelly sandy loam with common rounded to subrounded pebbles and small cobbles; gradual basal transition 40–50: 10YR 4/4; fravelly sandy loam with common rounded to subrounded pebbles and small cobbles 50–70: 5YR 4/4; saturated, possibly burnt sandy silt with abundant subrounded to subangular pebbles 70–80: 2.5Y 6/2; silty sand outwash with abundant subrounded to subangular pebbles *Augered from 65 cmbs *Terminated due to hole collapse from groundwater*	No recovery
79	30	0–10: 10YR2/2; loose sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 10–30: 10YR 5/3; very compact coarse sandy loam with 15% subrounded 5–10 cm gravel *Terminated due to refusal at depth in glacial sediment*	No recovery
80	40	0-10 10YR 3/4; Silt loam with no gravels; gradual boundary 10–20: 10YR 4/6; Silty sandy loam with some subrounded pebbles; abrupt boundary 20–40: 10YR 6/3; sandy claayey loam with abundant subrounded to angular gravel and cobbles *Terminated at depth in glacial sediment*	No recovery
81	45	0–45: 10YR 2/2; wet sandy loam with 5% rounded 3–5 cm gravel. *Terminated in groundwater*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
82	30	0–3: 10YR 3/4; loam; gradual basal transition 3–13: 10YR 4/6; sandy loam; clear basal contact 13–30: 10YR 6/3; sandy clayey loam with abundant subrounded to angular gravel and cobbles; groundwater at 25 cmbs *Terminated in groundwater within glacial sediment*	No recovery
83	40	0–10: 10YR 2/2; loose sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 10–40: 10YR 2/2; wet sandy loam and coarse sands with 5% rounded gravel and 5% wood chips; standing water at 10 cmbs; fill *Terminated in groundwater*	No recovery
84	60	0–5: 10YR 2/2; loose sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 5–15: 10YR 5/2; compact sandy loam with 15% subrounded gravel; disturbed glacial; clear basal contact 15–50: 10YR 2/2; loose sandy loam with 5% rounded gravel and 5% woodchips; fill; clear basal contact 50–60: 10YR 5/2; very compact sandy loam with 15% subrounded 5–10 cm gravel *Terminated due to refusal in glacial sediment*	No recovery
85	30	0–30: 10YR 3/4; saturated, slightly compact sandy loam with some subrounded gravels and cobbles; standing groundwater near 30 cmbs *Terminated in groundwater with sidewall collapse*	No recovery
86	40	0–25: 10YR 3/4; sandy loam with no gravel; gradual basal transition 25–35: 10YR 4/6; sandy, clayey loam with small subrounded gravel; gradual basal transition 35–40: 10YR 6/3; compact sandy, clayey glacial loam with subrounded gravel to large cobbles *Terminated due to refusal in glacial sediment*	No recovery
87	80	0–80: 10YR 2/2; normally graded sandy loam with 5–15% rounded 3–7 cm gravel; water at 20 cmbs *Terminated due to refusal in groundwater*	No recovery
88	50	0–10: 10YR 2/2; sandy loam with 10% rounded 3–5 cm gravel; clear basal contact 10–50: 10YR 5/2; compact, wet coarse sandy loam with 15% subrounded 3–7 cm gravel *Terminated at depth in glacial sediment with standing water*	No recovery
89	60	0–30: 10YR 3/4; loam with some subrounded gravel and cobbles; clear basal contact 30–32: 10YR 4/6; pocket of clayey loam with no gravel; clear basal contact 32–60: 10YR 3/4; loam with some subrounded gravel and cobbles; groundwater near 60 cmbs *Terminated in groundwater with sidewall collapse*	No recovery
90	40	0–40: 10YR 3/4; loam with subrounded gravel and cobbles; groundwater near 40 cmbs *Terminated in groundwater with sidewall collapse*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
91	30	0–30: 10YR 3/4; sandy loam with subrounded gravel and cobbles; groundwater at 30 cmbs *Terminated in groundwater with sidewall collapse*	No recovery
92	50	0–50: 10YR 3/4; sandy loam with some subrounded gravel and cobbles; groundwater at 50 cmbs *Terminated in groundwater with sidewall collapse*	No recovery
93	40	0–5: 10YR 3/4; loam with no gravel; clear basal contact 5–7: 10YR 3/1; charcoally brown loam with abundant small, subrounded gravel; no significant charcoal fragments; clear basal contact 7–40: 10YR 4/6; clayey glacial loam with subrounded gravels and small cobbles *Terminated at depth in glacial sediment*	No recovery
94	40	0–5: 10YR 3/4; loam, no gravel; gradual basal transition 5–40: 10YR 4/6; silty clay loam with small subrounded gravel and some cobbles, many moderately thick roots *Terminated due to refusal on roots*	No recovery
95	33	0–33: Mottled 10YR 5/2 and 2.5Y 6/1; silty sand construction fill, likely cut glacial material from elsewhere on the property; abundant rounded to subrounded pebbles and small cobbles; groundwater at 30 cmbs *Terminated due to inhibitive cobbles in fill*	No recovery
96	80	0–60: 10YR 4/3; loose sandy loam with 5% rounded 3–5 cm gravel; gradual basal transition 60–70: 10YR 4/2; loose sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 70–80: 10YR 4/2; very wet loose sandy loam with 5% rounded 3–5 cm gravel and 5% wood chips; water at 70 cmbs *Terminated in groundwater*	No recovery
97	66	0–66: 10YR 5/2; coarse sand with 20% unsorted rounded to subangular 3–10 cm gravel and 5% rounded 12–15 cm cobbles; fill/disturbed *Terminated due to inhibitive cobbles in fill*	No recovery
98	50	0–20: 10YR 2/2; loose but clumpy sandy loam with many rootlets and 5% rounded 3–5 cm gravel; clear basal contact 20–50: 10YR 4/3; loose, nonplastic sandy loam with large roots and 5% rounded 3–5 cm gravel *Terminated due to inhibitive root*	No recovery
99	83	0–83: Mottled 10YR 5/2 and 2.5Y 6/1; silty sand construction fill, likely cut glacial material from elsewhere on the property; abundant rounded to subrounded pebbles and small cobbles; groundwater at 50 cmbs *Terminated due to inhibitive cobbles in fill*	No recovery
100	50	0–15: 10YR 5/2; sandy silt with abundant rounded to subrounded pebbles and small cobbles; gradual basal transition 15–50: 2.5Y 6/1; very compact silty sand outwash with abundant rounded to subrounded pebbles and small cobbles; groundwater to 25 cmbs *Terminated at inhibitive cobbles at depth in glacial sediment*	0–10 cmbs: Temporally non-diagnostic flat, colorless glass fragment (n=1)

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
101	30	0–30: 10YR 2/2; loose wet coarse sandy loam with 15% rounded 3–10 cm gravel; standing water at 5 cmbs *Terminated in standing water*	No recovery
102	50	0–50: 10YR 2/2 and 2/1; saturated sandy loam with 10% rounded 3–10 cm gravel, 10% wood detritus, > 3% charcoal; standing water by 15 cmbs *Terminated in standing water*	No recovery
103	80	0–15: 10YR 3/2; humic silty sand with common rounded to subrounded pebbles and many salal roots; gradual basal transition 15–55: 10YR 5/4; sandy silt with common to abundant rounded to subrounded pebbles and cobbles; gradual basal transition 55–80: 2.5Y 6/2; sandy silt outwash with abundant rounded to subrounded pebbles and cobbles *Terminated at depth in glacial sediment*	No recovery
104	60	0–10: 10YR 2/2; humic loam with 5% rounded 3–5 cm gravel and roots; clear basal contact 10–60: 10YR 5/4; loose cobbly coarse sandy loam with 15% rounded 5–10 cm gravel *Terminated due to refusal on cobbles*	No recovery
105	70	0–20: 10YR 2/2; sandy loam with 10% rounded 3–5 cm gravel and many roots; clear basal contact 20–70: 10YR 5/4; loose very cobbly coarse sandy loam with 15% rounded 3–5 cm gravel, 7+ cm cobbles, one 40 cm boulder from 30 to 70 cm depth *Terminated due to refusal on cobbles*	No recovery
106	80	0–10: 10YR 2/2; loose humic sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 10–80: 10YR 3/6 to 4/3 with depth; nonplastic sandy loam with 10% subrounded 3–7 cm gravel *Terminated due to refusal on rocks*	No recovery
107	75	0–15: 10YR 2/2; loose somewhat plastic humic loam with 5% rounded 3–5 cm gravel and roots; clear basal contact 15–60: 10YR 3/3; loose somewhat plastic loam with 10% subrounded 3–7 cm gravel; clear basal contact 60–75: 10YR 5/3; loose wet somewhat plastic loam; water at 60 cmbs *Terminated in standing water*	No recovery
108	70	0–15: 10YR 2/2; somewhat plastic humic loam with 5% rounded gravel; clear basal contact 15–50: 10YR 4/2; nonplastic sandy loam with 5% subrounded gravel; clear basal contact 50–70: 10YR 3/2; somewhat plastic sandy loam with 5% subrounded gravel *Terminated in standing water*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
109	70	0–10: 10YR 2/2; somewhat plastic humic loam with 5% rounded gravel; clear basal contact 10–70: 10YR 4/2 to 3/2 with depth; nonplastic sandy loam with 5% subrounded gravel; water at 60 cmbs *Terminated in standing water*	No recovery
110	67	0–23: 10YR 3/4; silty sand with some rounded to subangular pebbles and many rootlets; gradual basal transition 23–45: 10YR 5/4; sandy silt with common rounded to subangular pebbles and small cobbles; clear basal contact 45–67: 2.5Y 6/2; moderately sticky sandy silt outwash with common subrounded to subangular pebles and cobbles *Terminated at depth in glacial sediment*	No recovery
111	51	0–15: 10YR 3/4; compact silty sand with some rounded to subangular pebbles; gradual basal transition 15–30: 10YR 5/4; compact, slightly sticky sandy silt with some rounded to subangular pebbles; clear basal contact 30–51: 2.5Y 6/2; moderately sticky sandy silt outwash with moderate to abundant rounded to subangular pebbles *Terminated at depth in glacial sediment*	0–10 cm: Temporally non-diagnostic fragment of colorless, flat glass
112	21	0–10: 10YR 3/4; humus-mantled loam with no gravel; gradual basal transition 10–21: 10YR 4/6; clayey loam with abundant subrounded gravel and cobbles, roots *Terminated due to inhibitive root*	No recovery
113	75	0–25: 10YR 2/2; loose humic sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 25–60: 10YR 5/1; loose sandy loam with 10% subrounded to subangular 3–7 cm gravel; patches of 10YR 6/4, possibly cedar roots; clear basal contact 60–75: 10YR 5/2; very compact sandy loam with 15% subrounded 5–10 cm gravel *Terminated due to refusal on cobbles*	No recovery
114	60	0–10: 10YR 3/4; humus-mantled loam with no gravel; gradual basal transition 10–60: 10YR 4/6; clayey loam with abundant subrounded gravel and cobbles *Terminated at depth in glacial sediment*	No recovery
115	70	0–20: 10YR 2/2; loose humic sandy loam with 7% rounded 3–7 cm gravel 20–40: 10YR 5/1; moderately compact sandy loam with 10% subrounded 3–10 cm gravel 40–70: 10YR 5/3; very compact sandy loam with 15% subrounded 3–10 cm gravel *Terminated at depth in glacial sediment*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
116	60	0–5: 10YR 3/4; humus-mantled loam with no gravel; gradual basal transition 5–60: 10YR 4/6; clayey loam with some subrounded gravel, sparse subrounded cobbles, and a tree root *Terminated due to inhibitive root at depth in glacial*	No recovery
117	85	0–10: 10YR 2/2; loose humic sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 10–85: 10YR 6/2; somewhat plastic sandy loam with 7% subangular 3–7 cm gravel *Terminated in groundwater*	No recovery
118	95	0–25: 10YR 3/2; loose sandy loam with 15% rounded 1–3 cm gravel; clear basal contact 25–95: 10YR 6/3; clayey loam with 10% subangular to angular 3–7 cm gravel *Terminated due to refusal on cobbles, in groundwater*	No recovery
119	57	0–10: 10YR 3/4; humus-mantled loam with no gravel; gradual basal transition 10–57: 10YR 5/6; saturated clayey loam with abundant subrounded gravel and some small subrounded cobbles *Terminated at depth in glacial sediment*	No recovery
120	32	0–2: 10YR 3/4; loam with no gravel, tree debris on top; clear basal contact 2–32: 10YR 5/6; wet clayey loam with some subrounded gravel and small cobbles *Terminated due to inhibitive root at depth in glacial sediment*	No recovery
121	70	0–10: 10YR 2/2; humic sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 10–55: 10YR 4/3; Loose silty loam with 5% rounded 1–3 cm gravel and > 3% rootburn charcoal; clear basal contact 55–70: 10YR 5/3; very compact sandy loam with 10% subrounded 5–7 cm gravel *Terminated due to refusal in glacial*	No recovery
122	57	0–5: 10YR 3/4; humus-mantled loam with no gravel; gradual basal transition 5–10: 10YR 5/6; wet clayey loam with some subrounded gravel and small cobbles 10–57: 10YR 4/6; clayey loam with some small subrounded gravel and tree roots *Terminated due to inhibitive root at depth in glacial sediment*	No recovery
123	90	0–2: 10YR 2/2; humic sandy loam with 5% rounded 3–5 cm gravel; clear basal contact 2–30: 10YR 5/3; compact sandy loam with 15% rounded 3–7 cm gravel; disturbed glacial; clear basal contact 30–55: 10YR 6/1; loose sandy loam with 20% rounded 3–10 cm gravel; disturbed; clear basal contact 55–90: 10YR 4/2; compact, wet clayey loam with 5% rounded 3–10 cm gravel *Terminated in groundwater*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
124	43	0–15: 10YR 3/4; loam with tree debris, no gravel; gradual basal transition 15–43: 10YR 5/6; wet clayey loam with abundant subrounded gravel to medium cobbles, large root at 43 cmbs *Terminated due to inhibitive roots in glacial sediment*	No recovery
125	50	0–35: 10YR 4/2; sandy loam with abundant rounded to subrounded pebbles and many tree roots; groundwater at 30 cmbs; gradual basal transition 35–50: 2.5Y 6/2; sandy silt outwash with abundant rounded to subangular pebbles and cobbles *Terminated due to inhibitive cobbles and wall collapse*	0–10 cmbs: Temporally non-diagnostic blue metal fragment
126	20	0–20: 10YR 3/4; loam with some small to large subrounded gravel; groundwater at 30 cmbs *Terminated in groundwater with sidewall collapse*	No recovery
127	95	0–20: 10YR 2/2; humic sandy loam with cedar duff; clear basal contact 20–50: 10YR 5/4; sandy loam with 5% rounded gravel; gradual basal transition 50–95: 10YR 5/3; wet sandy loam with 5% rounded gravel; groundwater at 90 *Terminated in groundwater*	No recovery
128	55	0–15: 10YR 2/2; loose somewhat plastic loam with 5% rounded 3–5 cm gravel; clear basal contact 15–25: 10YR 5/4; loose loam with 3% rounded 3–5 cm gravel; clear basal contact 25–40: 10YR 5/2; loose sandy loam with 3% rounded 3–5 cm gravel; clear basal contact 40–55: 10YR 6/3; wet sandy loam with 5% rounded 3–5 cm gravel; water at 50 cmbs *Terminated in standing water*	No recovery
129	74	0–12: 7.5YR 3/4; loose sandy loam with < 5% fine rounded to subrounded gravel; gradual basal transition 12–47: 7.5YR 4/6; loose sandy loam with < 5% fine rounded to subrounded gravel; clear basal contact 47–71: 2.5Y 6/4; soft clayey silt with 5–10% very fine to medium sand; clear basal contact 71–74: 2.5Y 6/4; soft clayey silt with 5–10% assorted sands and 20–30% subrounded to rounded gravel and cobbles, up to at least 13 cm diameter *Terminated due to inhibitive cobbles*	No recovery
130	60	0–20: 10YR 3/2; loose humic sandy loam with 5% rounded 3–5 cm gravel and roots; clear basal contact 20–45: 10YR 5/4; loose sandy loam with 3% rounded 3–5 cm gravel and roots; clear basal contact 45–60: 10YR 5/2; loose sandy loam with 3% subrounded 3–5 cm gravel and roots *Terminated due to inhibitive roots*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
131	75	0–11: 7.5YR 3/3; loose loamy humic layer with roots; gradual basal transition 11–42: 7.5YR 4/6; loose sandy loam with 5% rounded to subangular gravel to 14 cm cobbles, increasing to 10% at depth; gradual basal transition 42–75: 2.5Y 6/4; loose sandy loam with 15% subrounded to rounded 1–15 cm gravel and cobbles; very slightly cohesive but nonplastic *Terminated due to inhibitive cobbles*	No recovery
132	95	0–10: 10YR 2/2; loose humic sandy loam with 5% rounded 3–5 cm gravel 10–90: 10YR 4/4; loose silt with 3% rounded 7–10 cm gravel 90–95: 10YR 5/3; clayey loam with 5% rounded 3–10 cm gravel *Terminated due to inhibitive cobbles*	No recovery
133	75	0–10: 7.5YR 3/4; soft loamy humic layer and roots; gradual transition to unit 3, clear contact with unit 2 10-22: 10YR 5/6; compact silty medium sand to 0.7 cm rounded gravel in a clearly defined pocket with 5% small charcoal fragments; clear basal contact 10–65: 7.5YR 4/2; loose sandy loam with 5–10% subrounded to rounded 0.3–5 cm gravel and large chunks of burned wood; clear basal contact 65–75: 2.5Y 6/4; soft wet clayey silt with 5–10% very fine to medium sand and some rounded gravel and cobbles up to at least 15 cm diameter; slow groundwater seepage *Terminated due to inhibitive cobbles*	No recovery
134	100	0–15: 10YR 2/2; loose sandy loam with 3% rounded 3–5 cm gravel; clear basal contact 15–40: 10YR 4/4; loose silt with >3% rounded 3–5 cm gravel; gradual basal transition 40–77: 10YR 5/4; loose to compact silt and sandy loam with > 3% gravel; gradual basal transition 77–100: 10YR 5/3; wet clayey loam with > 3% gravel *Terminated at depth in groundwater*	No recovery
135	70	0–26: 7.5YR 3/3; loose sandy loam and humic layer with < 5% rounded to subrounded 1 cm gravel; clear basal contact 26–70: 10YR 4/6; compact but noncohesive sandy loam with 30% subangular to rounded 1–19 cm gravel and cobbles *Terminated due to inhibitive cobbles*	No recovery
136	100	0–20: 10YR 2/2; loose humic loam with 5% rounded 3–7 cm gravel; clear basal contact 20–80: 10YR 4/4; loose sandy loam with 5% subrounded 3–10 cm gravel and 5% subrounded 12–15 cm cobbles; clear basal contact 80–100: 10YR 5/2; loose coarse sand with 10% subrounded to subangular 3–7 cm gravel *Terminated at target depth*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
137	20	0–20: 10YR 2/2; loam with abundant medium roots, no gravel *Terminated inhibitive medium root density*	No recovery
138	40	0–5: 10YR 2/2; humic loam with sparse medium tree roots and no gravel; clear basal contact 5–40: 10YR 5/6; loam with abundant subrounded gravel and medium to large rounded cobbles; compact at base *Terminated at depth in glacial sediment*	No recovery
139	61	0–47: 7.5YR 4/6; loose sandy loam; clear basal contact 47–61: 10YR 6/6; soft clayey silt with 5–10% very fine to medium sand and 10% rounded to subangular 0.3–1 cm gravel; very wet with rapid groundwater seepage *Terminated in standing water*	No recovery
140	100	0–5: 10YR 2/2; loose humic loam with 3% subrounded to rounded 3–5 cm gravel; clear basal contact 5–15: 10YR 4/4; loose silt with 3% subrounded to rounded 3–5 cm gravel; clear basal contact 15–100: 10YR 5/3; wet clayey loam with > 3% subrounded 3–5 cm gravel; water at 90 cmbs *Terminated in standing water*	No recovery
141	80	0–15: 10YR 2/2; heavy humic sandy loam with 5% rounded 3–5 cm gravel; cedar wood; clear basal contact 15–40: 10YR 4/4; loose silt with > 3% subrounded 3–5 cm gravel; clear basal contact 40–80: 10YR 5/3; loose clayey loam with > 3% subrounded 3–5 cm gravel; water at 75 cmbs *Terminated in standing water*	No recovery
142	100	0–5: 10YR 2/2; loose humic loam with 3% rounded 3–5 cm gravel; clear basal contact 5–30: 10YR 4/4; loose silt with 3% subrounded 3–5 cm gravel; clear basal contact 30–70: 10YR 5/3; gravelly loam with 15% subangular 3–10 cm gravel and 3% rounded 10–13 cm cobbles; contains pockets of 10YR 5/2 gravelly coarse sands and silts; gradual basal transition 70–100: 10YR 5/2; gravelly coarse sand and silt with subangular to angular 3–10 cm gravel; fill/disturbed *Terminated at target depth*	No recovery
143	100	0–84: 7.5YR 4/3; sandy loam with wood fragments and 10–20% subangular to rounded 0.5–15 cm gravel and cobbles; contains clearly defined pockets of 2.5Y 7/1 compact but non-cohesive silty sand and < 2 cm rounded to subangular gravel; disturbed native and mixed fill; clear basal contact 84–100: 2.5Y 6/4; wet clayey silt with 10% sand and minor gravel to cobbles; slow groundwater seepage below 98 cmbs *Terminated at target depth*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
144	84	0–15: 2.5Y 7/1; loamy angular gravel fill; clear basal contact 15–33: 10YR 3/2; sandy loam with 15–20% angular to subrounded 0.3–6 cm gravel; fill; gradual basal transition 33–78: 7.5YR 5/6; compact sandy loam with 20–25% subangular to rounded gravel, cobbles, and a 23+ cm boulder; lower boundary marked by dark band of organic–rich material; fill/disturbed; clear basal contact 78–84: 2.5Y 6/4; compact silt through rounded 12 cm pebbles and cobbles *Terminated due to inhibitive cobbles*	No recovery
145	65	0–5: 10YR 4/2; clayey loam with 10% gravel; clear basal contact 5–25: 10YR 5/2; coarse sandy fill with 10% angular to subangular 3–7 cm gravel; fill; clear basal contact 25–45: 10YR 4/4; coarse sandy loam with 5% subrounded 3–5 cm gravel and 5% subrounded 10–12 cm cobbles; clear basal contact 45–65: 10YR 5/3; coarse sandy loam with 10% subangular 3–10 cm gravel *Terminated at depth in glacial sediment*	5–25 cmbs: Modern plastic landscape sheeting
146	100	0–30: 10YR 4/2; loose clayey loam with 5% subrounded 3–7 cm gravel; clear basal contact 30–60: 10YR 4/4; loose silt with 7% subrounded to subangular 3–7 cm gravel; clear basal contact 60–100: 10YR 5/3; loose outwash(?) silt with 10% subrounded to subangular 3–12 cm gravel and pebbles *Terminated at target depth*	No recovery
147	67	0–25: 10YR 3/2; sandy loam with 15% angular to subrounded 0.3–8 cm gravel and an 18 cm diorite cobble; fill; gradual basal transition 25–44: 7.5YR 5/6; sandy loam with 15% angular to subrounded 0.3–10 cm gravel and small cobbles; fill; clear basal contact 44–67: 2.5Y 6/4; firm clayey silt with 15% sands and 5–10% rounded < 1.5 cm gravel *Terminated at depth in glacial sediment*	No recovery
148	30	0–25: 10YR 3/2; wet loose loam with 3% subrounded 3–5 cm gravel; gradual basal transition 25–30: 10YR 3/2; saturated loam with 3% subrounded 3–5 cm gravel; groundwater seepage *Terminated on inhibitive angular cobble in standing water*	No recovery
149	50	0–30: 10YR 4/2; clayey loam with 5% rounded 7–10 cm pebbles; clear basal contact 30–50: 10YR 5/2; very compact coarse sandy loam with 15% subrounded 3–10 cm gravel and pebbles *Terminated at depth in glacial sediment*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
150	70	0–28: 2.5Y 7/3; 30% rounded < 20 cm cobbles in firm, highly plastic clayey silt; probably slumped fill material from adjacent slope; clear basal contact 28–70: 2.5Y 6/4; clay through 15 cm pebbles; wet with slow groundwater seepage below 62 cmbs; highly plastic *Terminated in standing water in glacial sediment*	No recovery
151	30	0–5: 10YR 4/4; soft loam with some small subrounded gravel and cobbles and many fine rootlets; clear basal contact 5–30: 10YR 6/6; compact glacial silt through large subrounded and subangular cobbles *Terminated at depth in glacial sediment*	No recovery
152	40	0–20: 10YR 3/3; clayey loam wih abundant subrounded gravel and cobbles, many roots 20–40: 10YR 6/4; compact clay with abundant subrounded gravel *Terminated due to inhibitive soil density*	No recovery
153	100	0–25: 10YR 3/2; sandy loam with 15% angular 3–10 cm gravel and concrete fragments; fill; clear basal contact 25–50: 10YR 4/3; sandy loam with 10% subrounded to angular 3–10 cm gravel; clear basal contact 50–55: 10YR 4/6; silt with 15% angular 3–5 cm gravel; clear basal contact 55–100: 10YR 4/3; sandy loam with 10% subrounded to angular 3–10 cm gravel *Terminated at target depth*	No recovery
154	67	0–19: 7.5YR 5/4; sandy loam with 20% subrounded to rounded 0.3–7 cm gravel; fill; gradual basal transition 19–67: 2.5Y 7/3; compact sand and 35% rounded to subrounded 0.3–10 cm gravel fill *Terminated due to inhibitive gravel and cobbles*	No recovery
155	100	0–10: 10YR 2/2; humic loam with 5% rounded 3–5 cm gravel 10–70: 10YR 3/3; loose silty loam with 5% subrounded 3–10 cm gravel 70–100: 10YR 4/4; loose silt with 10% subrounded to angular 3–10 cm gravel *Terminated at target depth*	No recovery
156	50	0–30: 10YR 3/2; clayey loam with 5% subrounded 3–7 cm gravel; clear basal contact 30–50: 10YR 3/2; saturated clayey loam with 5% subrounded 3–7 cm cobbles *Terminated on inhibitive cobbles in standing water*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
157	100	0–5: 10YR 2/2; loose clayey loam with 3% rounded 3–5 cm gravel; clear basal contact 5–30: 10YR 3/3; silty loam with 5% rounded 3–5 cm gravel; clear basal contact 30–35: 10YR 4/4; silt with 5% rounded 3–5 cm gravel; clear basal contact 35–100: 10YR 3/3; silty loam with 5% rounded 3–5 cm gravel *Terminated at target depth*	No recovery
158	62	0–56: 7.5YR 3/2; soft loam with 10% rounded to subangular 0.3–6 cm gravel, a 20 cm subangular cobble, and large roots; clear basal contact 56–62: 2.5Y 6/4; hard, compact silt through 18 cm cobbles; generally non–plastic and noncohesive *Terminated due to inhibitive cobbles in glacial sediment*	No recovery
159	45	0–30: 10YR 3/2; clayey loam with 5% rounded 3–5 cm gravel; clear basal contact 30–45: 10YR 5/3; very compact coarse sandy loam with 15% subangular 3–10 cm gravel *Terminated in glacial sediment*	No recovery
160	50	0–30: 10YR 4/2; loam with 5% subrounded 3–7 cm gravel; gradual basal transition 30–50: 10YR 6/1; wet compact silt with 5–7% rounded 3–10 cm gravel *Terminated due to inhibitive cobbles*	No recovery
161	53	0–53: 2.5Y 7/3; compact sandy gravel fill with large tree roots and small rounded cobbles up to 14 cm in diameter; fill *Terminated due to inhibitive gravel cobbles*	No recovery
162	68	0–5: 10YR 3/2; loam with roots and 5% rounded 3–5 cm gravel; clear basal contact 5–68: 10YR 6/2 grading to 6/1; coarse sandy loam with 15% subrounded 3–13 cm gravel and cobbles; groundwater seepage at 50 cmbs *Terminated on inhibitive cobbles*	No recovery
163	58	0–58: 7.5YR 3/2; soft loam, plastic when wet. Moderate groundwater seepage below 52 cmbs *Terminated in standing water*	No recovery
164	50	0–20: 10YR 3/2; loam with roots and 5% rounded 3–5 cm gravel; clear basal contact 20–50: 10YR 6/2; coarse sandy loam with 15% subrounded 3–13 cm gravel and cobbles; groundwater seepage at 50 cmbs *Terminated on inhibitive cobbles*	No recovery
165	50	0–15: 7.5YR 3/2; loamy sand and gravel; gradual basal transition 15–50: 7.5YR 5/4; compact sand and rounded 0.3–14 cm gravel and cobbles with minor silt; probably fill *Terminated due to inhibitive gravel and cobbles*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
166	48	0–14: 7.5YR 3/2; loamy sand and rounded 0.3–5 cm gravel with roots; gradual basal transition 14–48: 7.5YR 5/4; compact sand and 35% rounded 0.3–13 cm gravel and small cobbles; fill *Terminated due to inhibitive cobbles*	0–14 cmbs: Temporally non-diagnostic 12 cm curved fragment of clear, unleaded 2/16" glass (n=1), possibly from large bottle
167	58	0–18: 7.5YR 3/2; loamy sand and 0.3–25 cm subrounded gravel and cobbles with roots; gradual basal transition 18–54: 7.5YR 5/4; compact sand and 35% subrounded to rounded 0.3–13 cm gravel and small cobbles; fill; clear basal contact 54–58: 2.5Y 6/4; compact silt to rounded 8 cm gravel; dry and nonplastic *Terminated in glacial sediment due to inhibitive gravel*	No recovery
168	60	0–10: 10YR 2/2; humic loam with sparse medium blackberry roots and no gravel; clear basal contact 10–60: 10YR 5/6; loam with abundant subrounded gravel and some small cobbles *Terminated at depth in glacial sediment*	No recovery
169	70	0–20: 10YR 2/2; loam with sparse small roots, no gravel; clear basal contact 20–70: 10YR 5/6; increasingly sandy silt with abundant subrounded gravel and some small cobbles; compact at base *Terminated at depth in glacial sediment*	No recovery
170	63	0–24: 7.5YR 3/3; loose sandy loam with 10% rounded 0.5–5 cm gravel; clear basal contact 24–63: 7.5YR 5/4; loose very fine to fine and coarse to very coarse sands with 15–20% subangular to rounded 0.5–10 cm gravel and small cobbles; outwash? *Terminated due to inhibitive cobbles*	No recovery
171	70	0–10: 10YR 2/2; loam with sparse small roots and no gravel; gradual basal transition 10–70: 10YR 5/6; sandy loam grading to wet dense sandy silty clay with abundant subrounded gravel and sparse large cobbles *Terminated at depth in glacial sediment*	No recovery
172	50	0–36: 7.5YR 3/3; loose sandy loam and modern trash with 5–10% subangular to rounded 0.5–7 cm gravel; clear basal contact 36–50: 7.5YR 5/4; loose very fine to fine and very coarse sand with 15–20% subangular to rounded 0.5–12 cm gravel *Terminated due to inhibitive roots*	0–36 cmbs: Crushed modern soda can and plastic drink bottle label
173	30	0–10: 10YR 3/4; compact loam with abundant angular gravel and few medium tree roots; fill; clear basal contact 10–30: 10YR 5/6; compact silty sand with abundant angular gravel layers *Terminated due to inhibitive compact gravels*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
174	67	0–19: 7.5YR 3/2; loamy rounded to angular 0.3–3 cm gravel fill with roots; fill; gradual basal transition 19–67: 7.5YR 5/4; sandy gravel fill and roots with a rounded 25 cm boulder; fill *Terminated due to inhibitive root below boulder*	No recovery
175	50	0–10: 10YR 3/4; loam with abundant angular gravel and some medium tree and blackberry roots; fill; clear basal contact 10–50: 10YR 5/6; silty sand with abundant angular to subangular gravel; compact layer at base. *Terminated due to inhibitive compact gravels*	No recovery
176	55	0–18: 7.5YR 3/2; loamy gravel fill and roots; gradual basal transition 18–55: 2.5Y 6/3; compact sandy subangular to rounded 0.3–7 cm gravel fill *Terminated due to inhibitive gravel density*	No recovery
177	30	0–10: 10YR 3/4; loam with abundant medium angular gravel; fill; clear basal contact 10–30: 10YR 5/6; very compact sandy silt with abundant angular to subangular gravel *Terminated inhibitive compaction in glacial sediment*	No recovery
178	95	0–68: Mixed 10YR 5/2 and 6/2; moderately sticky sandy loam with abundant subrounded to subangular pebbles and small cobbles; many roots from 0–40 cm; clear basal contact 68–85: 10YR 4/2 with light 6/6 mottling; moderately sticky loam with abundant subrounded to subangular pebbles and small cobbles; gradual basal transition 85–95: 10YR 7/2 and 6/6; clayey loam with abundant rounded to subrounded pebbles and small cobbles *Terminated due to refusal on cobbles*	0–10 cmbs: Modern red plastic flashlight
206	70	0–50: 10YR 4/3; sandy loam with 10% subangular 3–5 cm gravel; clear basal contact 50–70: 10YR 2/2; wet sandy loam with 10% subangular 3–5 cm gravel; groundwater seepage to 65 cmbs *Terminated in standing water*	No recovery
207	75	0–25: 10YR 3/2; clayey loam with 5% rounded 3–5 cm gravel; clear basal contact 25–55: 10YR 4/6; sandy loam with 5% rounded 1–3 cm gravel, 5% subangular 5–7 cm gravel, and 5% charcoal fragments; gradual basal transition 55–70: 10YR 3/6; wet sandy loam with 5% rounded 1–3 cm gravel, 5% subangular 5–7 cm gravel, and 5% charcoal fragments; clear basal contact 70–75: 2.5Y 5/3; wet sandy loam with 5% subangular 3–5 cm gravel; groundwater seepage to 70 cmbs *Terminated in standing water*	No recovery

OMF South: ATCRC Shovel Probe Log – OMF South / TDLE Overlap Area, January 2021 (continued)

Shovel Probe	Maximum Depth (cmbs)	Description (cmbs): Description—Comments	Cultural Materials
208	40	0–20: 10YR 4/4; wet loam with some small subrounded gravel and large roots; clear basal contact 20–40: 10YR 6/6; damp compact glacial silt through subrounded cobbles *Terminated at depth in glacial sediment*	No recovery
209	85	0–50: 10YR 4/2; sandy loam with 10% subangular 3–5 cm gravel; clear basal contact 50–85: 2.5Y 4/4; increasingly compact sandy glacial loam with 10% subangular to subrounded 3–5 cm gravel; large root on north side from 50 to 65 cm *Terminated at depth in glacial sediment*	No recovery
210	31	0–31: 10YR 4/4; wet loam with some small subrounded gravel and very large roots *Terminated on inhibitive large root*	No recovery
215	50	0–30: 10YR 4/2; sandy loam with 15% subrounded 3–10 cm gravel; clear basal contact 30–50: 10YR 3/6; compact sandy glacial loam with 15% subrounded to subangular 3–15 cm gravel and cobbles *Terminated at depth in glacial on inhibitive cobbles*	No recovery
216	66	0–30: 10YR 4/4; loam with some small subrounded gravel and many small roots; clear basal contact 30–50: 10YR 5/6; loam with abundant subrounded gravel and fine rootlets; gradual basal transition 50–66: 10YR 6/6; glacial silt through large subrounded cobbles *Terminated at depth in glacial sediment*	No recovery
217	40	0–20: 10YR 3/2; sandy loam with 10% subrounded 3–5 cm gravel; clear basal contact 20–40: 10YR 3/6; compact sandy glacial loam with 15% subrounded to subangular 3–15 cm gravel and cobbles, one boulder *Terminated at depth in glacial on inhibitive boulder*	No recovery

ATTACHMENT G4-3

Archaeological Site Forms

STATE OF WASHINGTON
ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian Number: 45KI1542

County: King

Date: 8/14/2020 **Human Remains?** ☐ **DAHP Case No.:**

Compiled By: Edgar Huber Aqua Terra Cultural Resource Consultants

Archaeological Sites are exempt from public disclosure per RCW 42.56.300

SITE DESIGNATION

Site Name:	Historic Period Concrete Foundation
Field/Temporary ID:	Historic Period Concrete Foundation (ATCRC-2020-01)
Site Type:	Historic Agriculture
	Historic Structures Not Specified

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this request for determination of eligibility meet the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the site

☐ meets ☑ does not meet the National Register Criteria.

I recommend that this property be considered significant at the following level(s) of significance:

Criteria

Statement of Significance

Located off of SR 99, the foundation is the remains of a barn associated with John Danielson, who owned the barn. It was constructed in 1932, at the beginning of the Great Depression (King County Structure Assessment Form). It appears that the barn's demolition occurred between 1940 and 1950. The former structure was likely a west-facing gable. The two-story building has a dirt and concrete floor. The foundation was associated with the important economic collapse of the 1930s and the agricultural development of the area from the 1920s through the early 1960s.
The site does not contribute to the broad patterns of local, state, or national history and is recommended as not eligible for listing in the NRHP under Criterion A. Although multiple individuals have owned the land where the site is located, the foundation is closely linked with ownership by John Danielson. Research has not demonstrated that the resource is associated with individuals who are significant in local, state, or national events and is recommended as not eligible for listing in the NRHP under Criterion B. The foundation is not considered significant in terms of engineering, architecture, or artistic distinction nor does it embody distinctive characteristics of a type, period, or method of construction. It is not the work of a master and is not eligible for listing in the NRHP under Criterion C. The foundation itself has minimal data content and is common to concrete construction methods of the 1930s. Subsurface investigations (shovel probes) around the foundation failed to identify any subsurface cultural materials or features associated with the site. The site lacks the potential to contribute significant information that might contribute to our understanding of rural farming and its social and economic context in this area of Washington in the 1930s. It is not eligible for listing in the NRHP under Criterion D.
In summary, site 45KI1542 lacks integrity and does not meet criteria to be considered significant under Criteria A through D of the NRHP and does not meet criteria necessary for listing in the WHR or local registers.

Integrity

The site's structural remnants are still in the original construction location, thereby retaining the integrity of geographic location. However, due to the removal and demolition of the building's superstructure, the resource lacks integrity of design. The setting, feeling, and association no longer retain integrity as the setting has been substantially altered from its period use. The original rural landscape setting is now heavily urbanized, thereby removing all aspects of the structure's former setting. The associated pasture, once and integral portion of the structure's setting and feeling has been substantially altered and its current use is as a wooded water catchment basin. In sum, the site no longer retains significance or integrity in the majority of its aspects.

SHPO Determination

Eligibility Potentially Eligible **Determined On** 12/16/2020

Determined By

SHPO Comments

SITE LOCATION

USGS Quad Map Name(s): POVERTY BAY

T:	21	**R:**	04	**E/W:**	E	**Section:**	21
UTM: Zone:	10	**Easting:**	552012	**Northing:**	5238619		
Latitude:	47.299	**Longitude:**	-122.312	**Elevation (ft/m):**			
Drainage, Major:	Puyallup	**Drainage, Minor:**	Hylebos Creek-Frontal Commencement Bay	**River Mile**			

Aspect east-northeast **Slope** 1 degree

Location Description (General to Specific):

The site is located in King County, Federal Way, north of Kitts Corner, off of the SR 99 entrance to the Christian Faith Center within King County Parcel No. 2121049026.

Directions (For Relocation Purposes):

From the corner of SR99 and 16th Ave South, proceed north for 210ft. Turn right onto the access road for the Christian Faith Center. Proceed for 100ft, turn left onto the access levee for the water catch basin, proceed for 30ft., turn right and proceed for another 30ft.

SITE DESCRIPTION

Narrative Description (Overall Site Observations)**:**

Site 45KI1542 is a historic-period concrete slab and perimeter wall foundation located within parcel OMF 152, immediately south of the waterline within the City of Federal Way Stormwater Pond No. 159 (Figure G4.6-18). The foundation is located at a slightly higher elevation than the average water level of the pond, which is regulated by a stormwater filtration system approximately 20 meters north of the foundation. At the time of this survey, the waterline was approximately1 meter east of the foundation (Figure G4.6-18). The vegetation surrounding and over the foundation consisted of dense thickets of nettles, Himalayan blackberry, salmonberry, partially collapsed and sprawling white oak, Douglas-fir, and Western hemlock Substantial modern debris, including biohazard materials, are regularly cleared from this area (Personal Communication, David Rafael, Facilities Engineer Christian Faith Center, June 10, 2020).

Before an additional subsurface survey was conducted near this foundation, historic aerial photographs were reviewed in detail for this area. The earliest aerial imagery of this location is from 1936 and illustrates a building in the location of the identified foundation at the southwestern corner of a prairie (King County Map Vault 1935, Figure G4.6-22). The structure is no longer visible in aerial photographs by 1957 (EarthExplorer 1957, Figure G4.6-22). The tax assessment records for this area were accessed through the Puget Sound Regional Archives, who hold the historic King County Tax Assessors Records. Of the seven structures listed for the historic tax parcel, one matched the general description and location of the identified foundation (King County Structure Assessment Form). The likely structure was a 30-foot by 60-foot two-story barn with a concrete foundation, dirt and concrete floors, and a 10-foot by 12-foot concrete single room basement. The barn was built in 1932 and likely demolished between 1940 and 1950, given that it was assessed in 1940 by King County and noted as “gone” during the 1950 assessment.

The concrete perimeter foundation is oriented east-west with a total length of61 feet, 6 inches (east-west), and a width of 30 feet, 6 inches (north-south). The foundation is a 6-inch footing with an inner lip that defines the outer perimeter of the foundation. The eastern section of the foundation has a 6-inch thick concrete pad that is 10 feet long by 30 feet, 6 inches wide (Figure G4.6-18). The northeastern corner of the foundation was originally a basement and measured 22 feet long by 8 feet, 4 inches wide (Figures G4.6-18). Two 8-inch square posts that would have supported a subfloor or interior wall were identified offset from the southern basement wall by 3 feet. These structural details match the general details of the potential structure identified during archival research (King County Property Assessment Form).

Site Dimensions (Overall Site Dimensions)**:**

Length:	61 ft	**Direction:**	east-west	**Width:**	30 ft 6 inches	**Direction:**	north-south

Method of Horizontal Measurement: measuring tape

Depth: surface-6 inches **Method of Vertical Measurement:** measuring tape

Vegetation (On Site)**:**

Local:	The vegetation surrounding and over the foundation consisted of dense thickets of nettles, Himalayan blackberry, salmonberry, partially collapsed and sprawling white oak, Douglas-fir, and Western hemlock.	**Regional:**	The site is located in the Puget Sound variant of the Western Hemlock Zone.

Landforms (On Site)**:**

Local:	The foundation is located on an upland section of a water catchment basin - wetland.	**Regional:**	The site is located on a glacial plateau north of the Puyallup River Valley.

Water Resources (Type):	West fork of Hylebos Creek.	**Distance:**	~ 1 meter east-northeast.	**Permanence:**	Year round

CULTURAL MATERIALS AND FEATURES

Narrative Description (Specific Inventory Details)**:**

The concrete perimeter foundation is oriented east-west with a total length of 61 feet, 6 inches (east-west), and a width of 30 feet, 6 inches (north-south). The foundation is a 6-inch footing with an inner lip that defines the outer perimeter of the foundation. The eastern section of the foundation has a 6-inch thick concrete pad that is 10 feet long by 30 feet, 6 inches wide (Figure G4.6-18). The northeastern corner of the foundation was originally a basement and measured 22 feet long by 8 feet, 4 inches wide (Figures G4.6-18). Two 8-inch square posts that would have supported a subfloor or interior wall were identified offset from the southern basement wall by 3 feet. These structural details match the general details of the potential structure identified during archival research (King County Property Assessment Form).

Method of Collection:

None.

Location of Artifacts (Temporary/Permanent)**:**

No cultural materials associated with the use of the 1932 structure were identified during pedestrian survey or in the subsurface shovel probe investigations.

SITE AGE

Component Type	Historic
Dates	1932
Dating Method	Assessor records
Phase	
Basis for Phase Designation	

SITE RECORDERS

Observed By	**Address**
Edgar Huber	8525 Stoney Creek Lane SW, Olympia, WA 98512
Jessica Morris	8525 Stoney Creek Lane SW, Olympia, WA 98512

Date Recorded: 2/27/2020

Recorded by (Professional Archaeologist)**:** Edgar Huber

Organization:	Aqua Terra Cultural Resource Consultants	**Phone Number:**	520-904-5247
Address:	8525 Stoney Creek Lane SW, Olympia, WA 98512	**Email:**	edgar@aquaterracrc.com

SITE HISTORY

Previous Archaeological Work:

None.

LAND OWNERSHIP

Owner	**Address**	**Parcel**
CHRISTIAN FAITH CENTER	33832 PACIFIC HWY S , Federal Way, WA, 98003	2121049026

RESEARCH REFERENCES

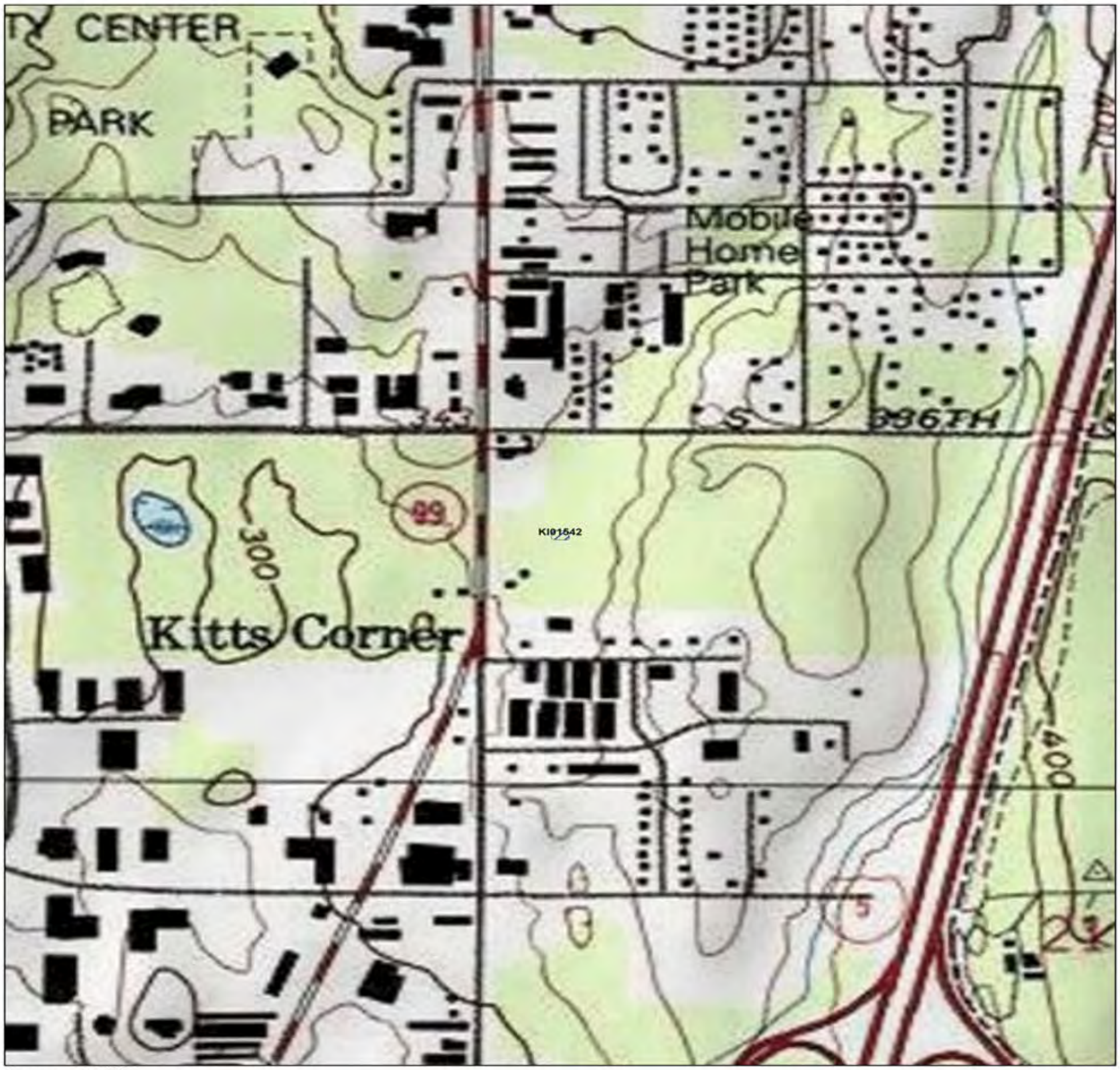
Items/Documents Used in Research:

Earth Explorer. Digital Database: https://earthexplorer.usgs.gov/. Accessed January2020.
1957 Aerial Photograph, A550460020182
1972 Aerial Photograph AR6212002900137
1991 Aerial Photograph, AR1VFOAC0020185

Google Earth. 2020. January 2020, South 336th Street and South 344th Street Areas of Impact,
https://earth.google.com/web/

King County (Map Vault). Digital database:
https://info.kingcounty.gov/transportation/kcdot/roads/mapandrecordscenter/mapvault/. Accessed January2020.
1935 Aerial Photograph- Section 21, Township 21 N Range 4 E.
1965 Aerial Photograph- Section 16, Township 21 N Range 4 E

USGS MAP


TY CENTER
PARK
Mobile
Home
Park
343
S 336TH
99
KI01542
300
Kitts Corner
400
5

January 11, 2021

1:8,088

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

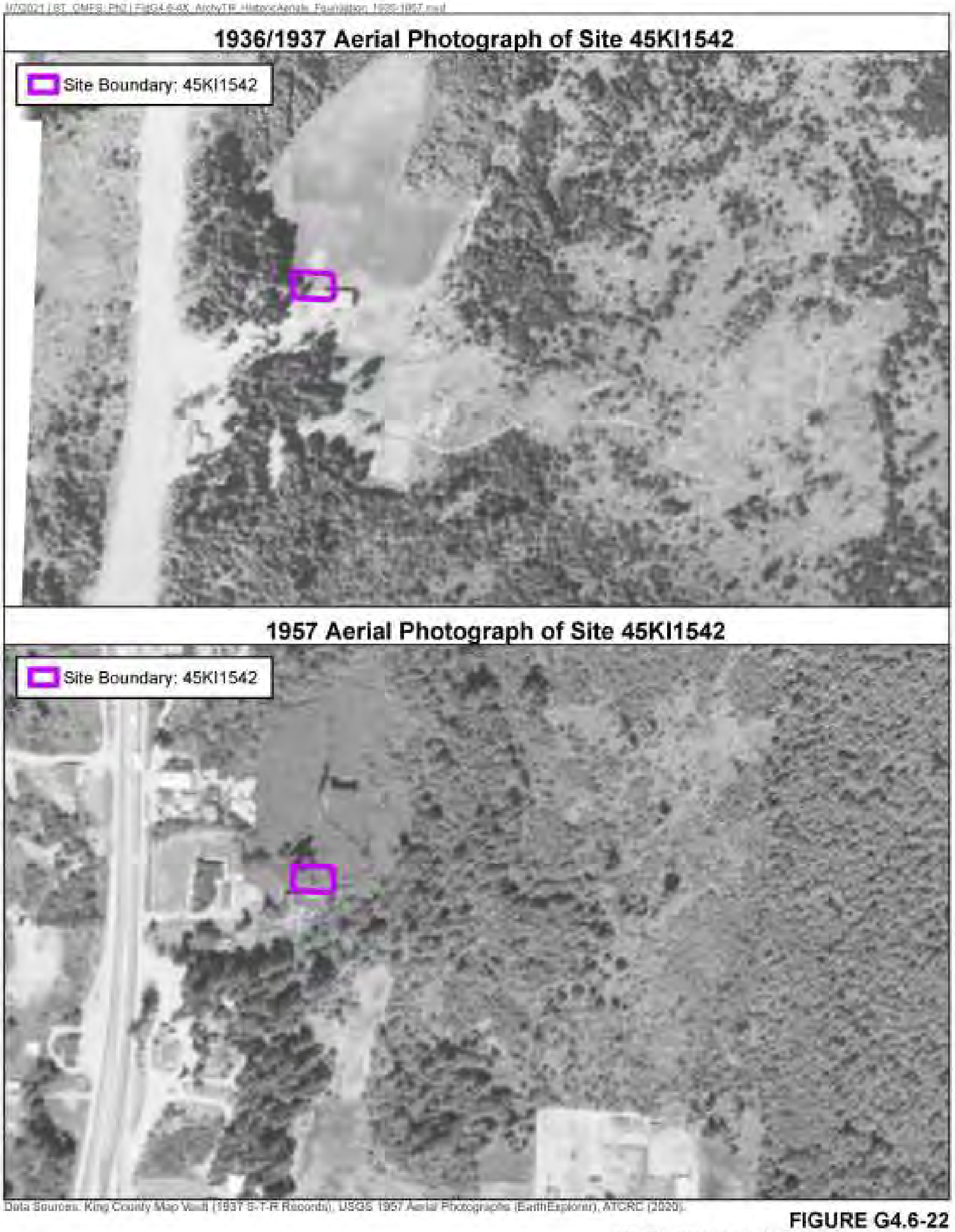
Copyright:© 2013 National Geographic Society, i-cubed

Smithsonian Number: 45KI1542

SKETCH MAPS

Source Information

1/7/2021 | ST_OMFS_Ph2 | FigG4.6-4X_ArchyTR_HistoricAerials_Foundation_1936-1957.mxd



1936/1937 Aerial Photograph of Site 45KI1542

1957 Aerial Photograph of Site 45KI1542

Data Sources: King County Map Vault (1937 S-T-R Records), USGS 1957 Aerial Photographs (EarthExplorer), ATCRC (2020).

FIGURE G4.6-22
1936/1937 and 1957 Historic Aerials
of Site 45KI1542

OMF South

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Source Information 2/27/2020 Inventory - Aqua Terra Cultural Resource Consultants

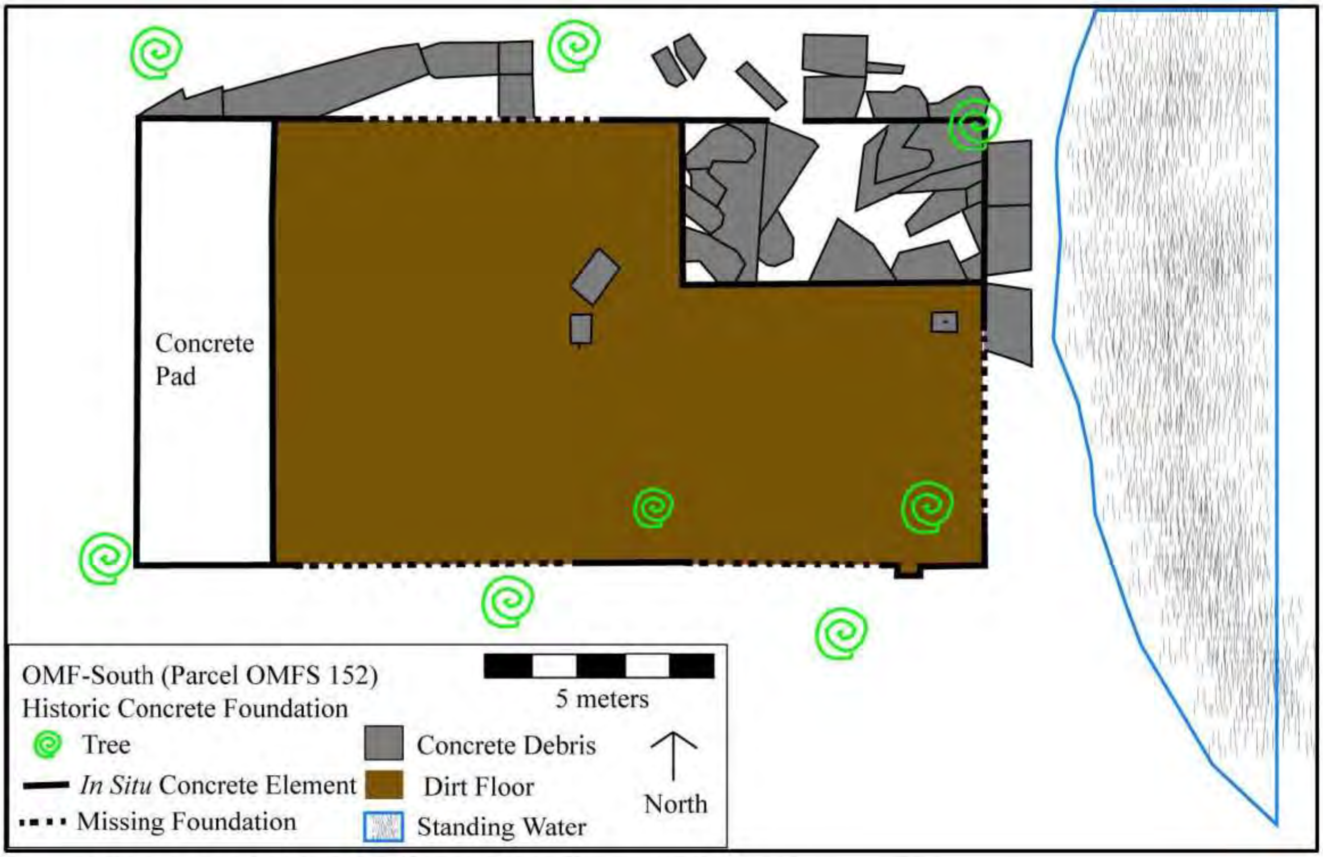

Concrete Pad
OMF-South (Parcel OMFS 152)
Historic Concrete Foundation
5 meters
Tree
In Situ Concrete Element
Missing Foundation
Concrete Debris
Dirt Floor
Standing Water
North

Figure 1. Sketch map of the Historic-Period Foundation and the immediate surroundings.

Photographs, Tables and Additional Information

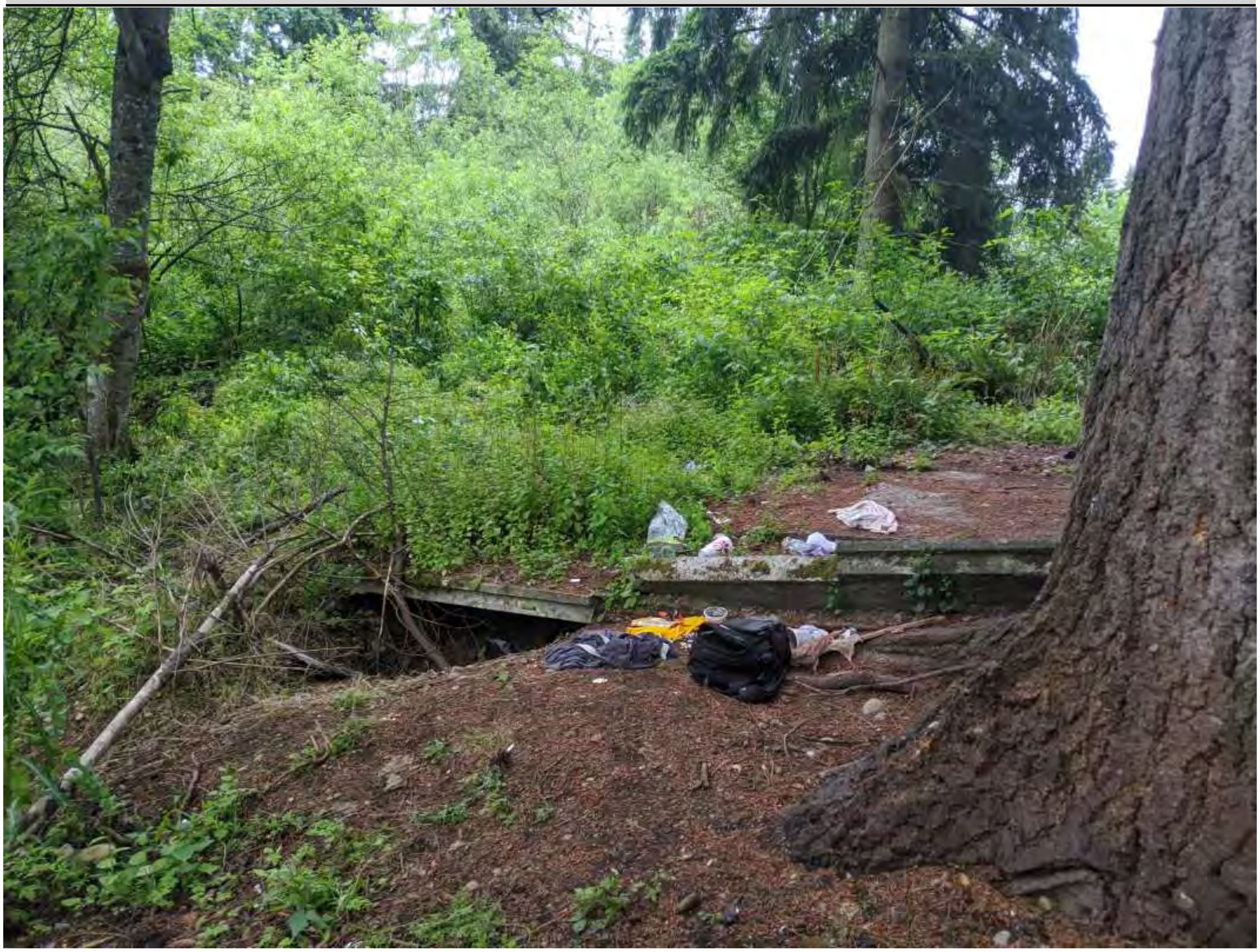
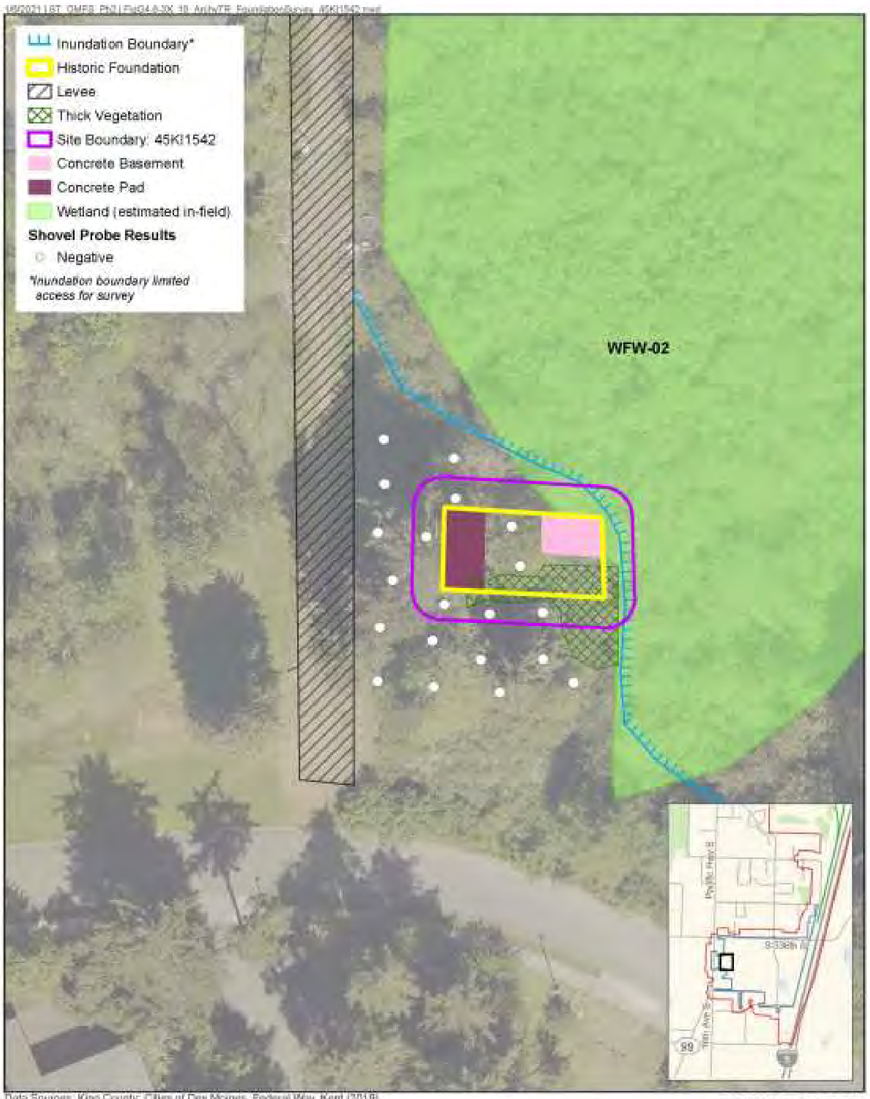


Photo ID	486188
Title	Site Overview, northwest corner, view south..jpg
Year Taken	
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	2/27/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian Number: 45KI1542


Inundation Boundary*
Historic Foundation
Levee
Thick Vegetation
Site Boundary: 45KI1542
Concrete Basement
Concrete Pad
Wetland (estimated in-field)
Shovel Probe Results
Negative
*Inundation boundary limited access for survey
WFW-02
Pacific Hwy S
S 336th St
16th Ave S
99

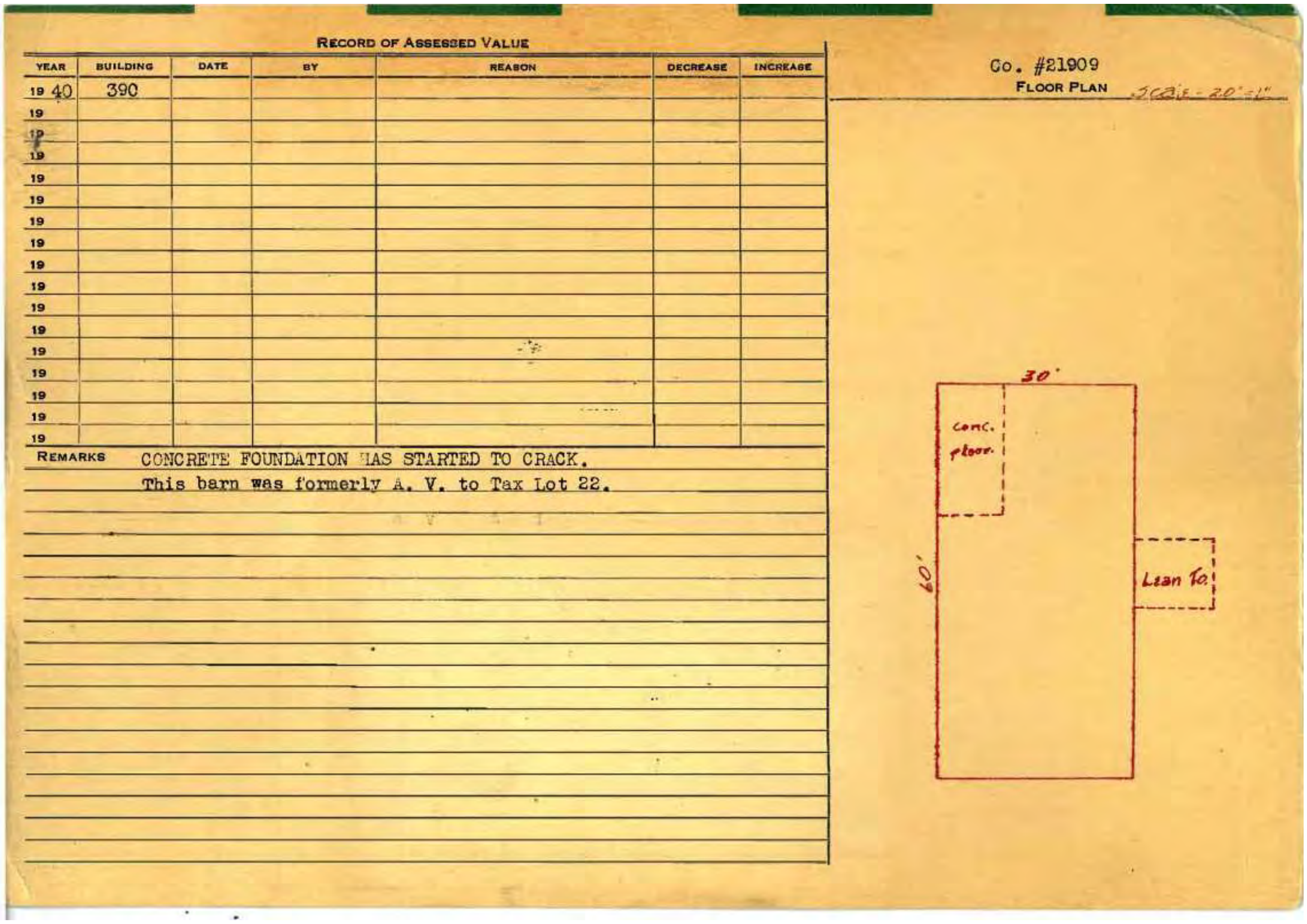
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N
0
50
100 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

FIGURE G4.6-18
Site 45KI1542
Investigation Results
South 336th Street Alternative
OMF South

Photo ID	506908
Title	FigG4.6-18_ArchyTR_Foundation Survey_45KI1542.jpg
Year Taken	
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	
Copyright	☐



RECORD OF ASSESSED VALUE

YEAR	BUILDING	DATE	BY	REASON	DECREASE	INCREASE
19 40	390					
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						
19						

REMARKS CONCRETE FOUNDATION HAS STARTED TO CRACK.
This barn was formerly A. V. to Tax Lot 22.

Co. #21909
FLOOR PLAN Scale - 20' = 1"

30'
Conc. floor.
60'
Lean To.

Photo ID 503685

Title Historic Assessor Form_Page_2.jpg

Year Taken

Is Circa? ☐

Notes

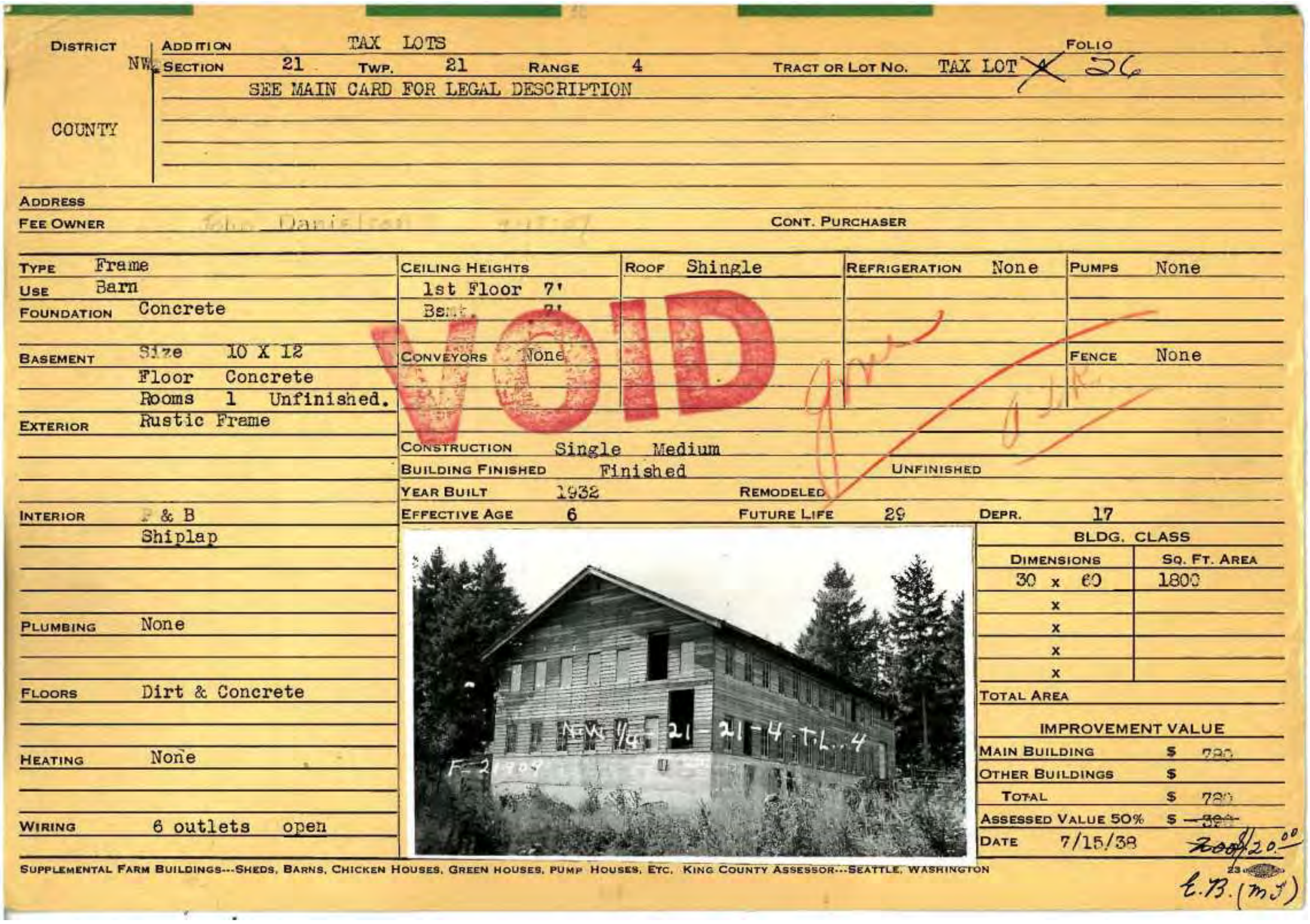
Type image/jpeg

Photo View

Source King County Assessor- WA State - Puget Sound Archives

Copyright ☐

ARCHAEOLOGICAL SITE INVENTORY FORM



DISTRICT NW¼ ADDITION TAX LOTS FOLIO
SECTION 21 TWP. 21 RANGE 4 TRACT OR LOT NO. TAX LOT ~~4~~ 26
SEE MAIN CARD FOR LEGAL DESCRIPTION
COUNTY
ADDRESS
FEE OWNER John Danielson CONT. PURCHASER

TYPE Frame
USE Barn
FOUNDATION Concrete
BASEMENT Size 10 X 12
Floor Concrete
Rooms 1 Unfinished.
EXTERIOR Rustic Frame
INTERIOR P & B
Shiplap
PLUMBING None
FLOORS Dirt & Concrete
HEATING None
WIRING 6 outlets open

CEILING HEIGHTS 1st Floor 7'
Bsmt. 7'
ROOF Shingle
REFRIGERATION None
PUMPS None
CONVEYORS None
FENCE None

VOID

Gone

O.K.

CONSTRUCTION Single Medium
BUILDING FINISHED Finished UNFINISHED
YEAR BUILT 1932 REMODELED
EFFECTIVE AGE 6 FUTURE LIFE 29 DEPR. 17

NW 1/4 21-21-4 T.L. 4
F-21904

BLDG. CLASS

DIMENSIONS	SQ. FT. AREA
30 x 60	1800
x	
x	
x	
x	

TOTAL AREA

IMPROVEMENT VALUE
MAIN BUILDING $ 780
OTHER BUILDINGS $
TOTAL $ 780
ASSESSED VALUE 50% $ ~~390~~
DATE 7/15/38 ~~200~~ 20.00

SUPPLEMENTAL FARM BUILDINGS---SHEDS, BARNS, CHICKEN HOUSES, GREEN HOUSES, PUMP HOUSES, ETC. KING COUNTY ASSESSOR---SEATTLE, WASHINGTON

E.B. (MJ)

Photo ID	503684
Title	Historic Assessor Form_Page_1.jpg
Year Taken	
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	King County Assessor- WA State - Puget Sound Archives
Copyright	☐

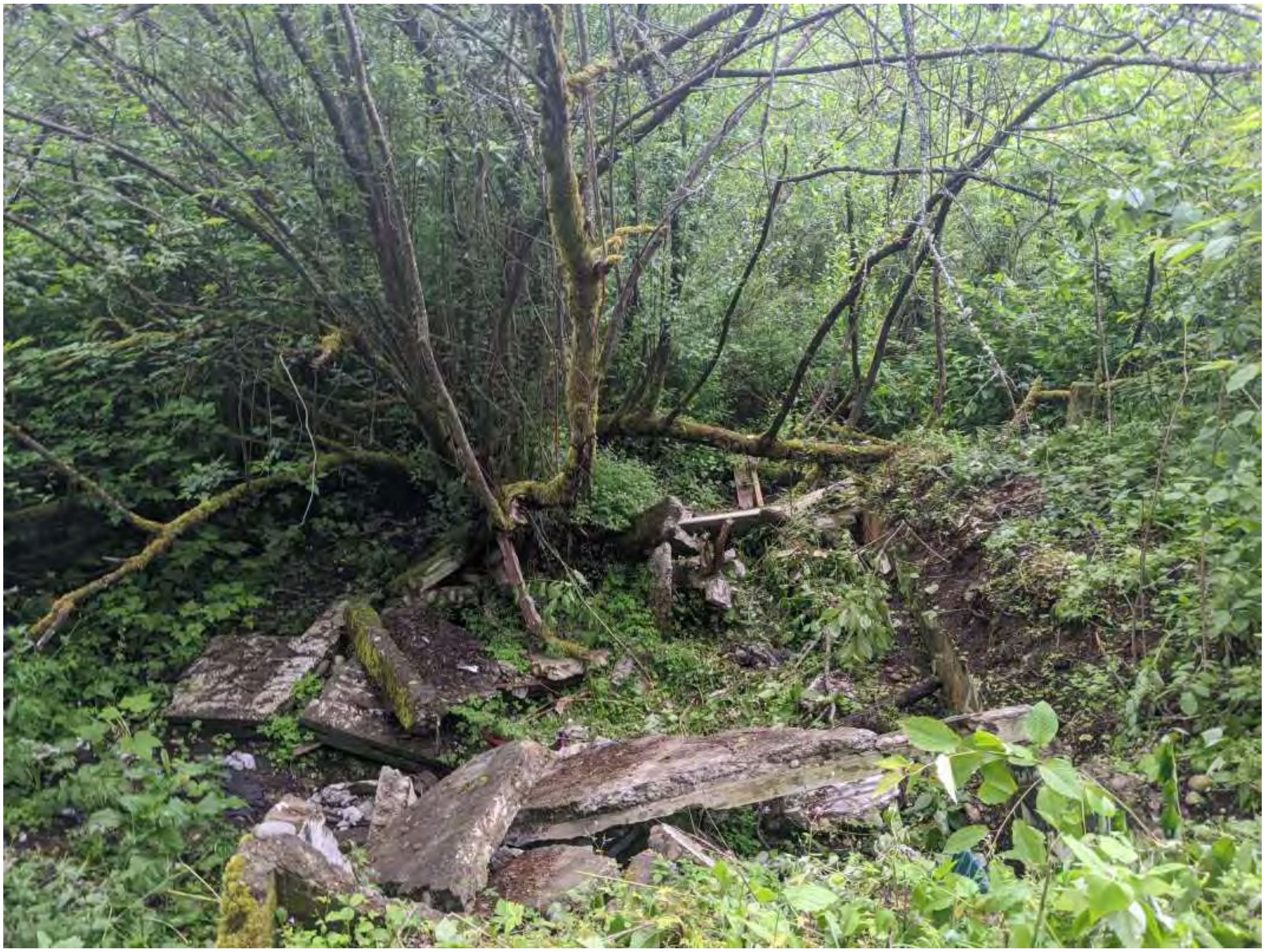


Photo ID	486190
Title	Site overview, northeast corner, view east..jpg
Year Taken	
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	2/27/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian Number: 45KI1542

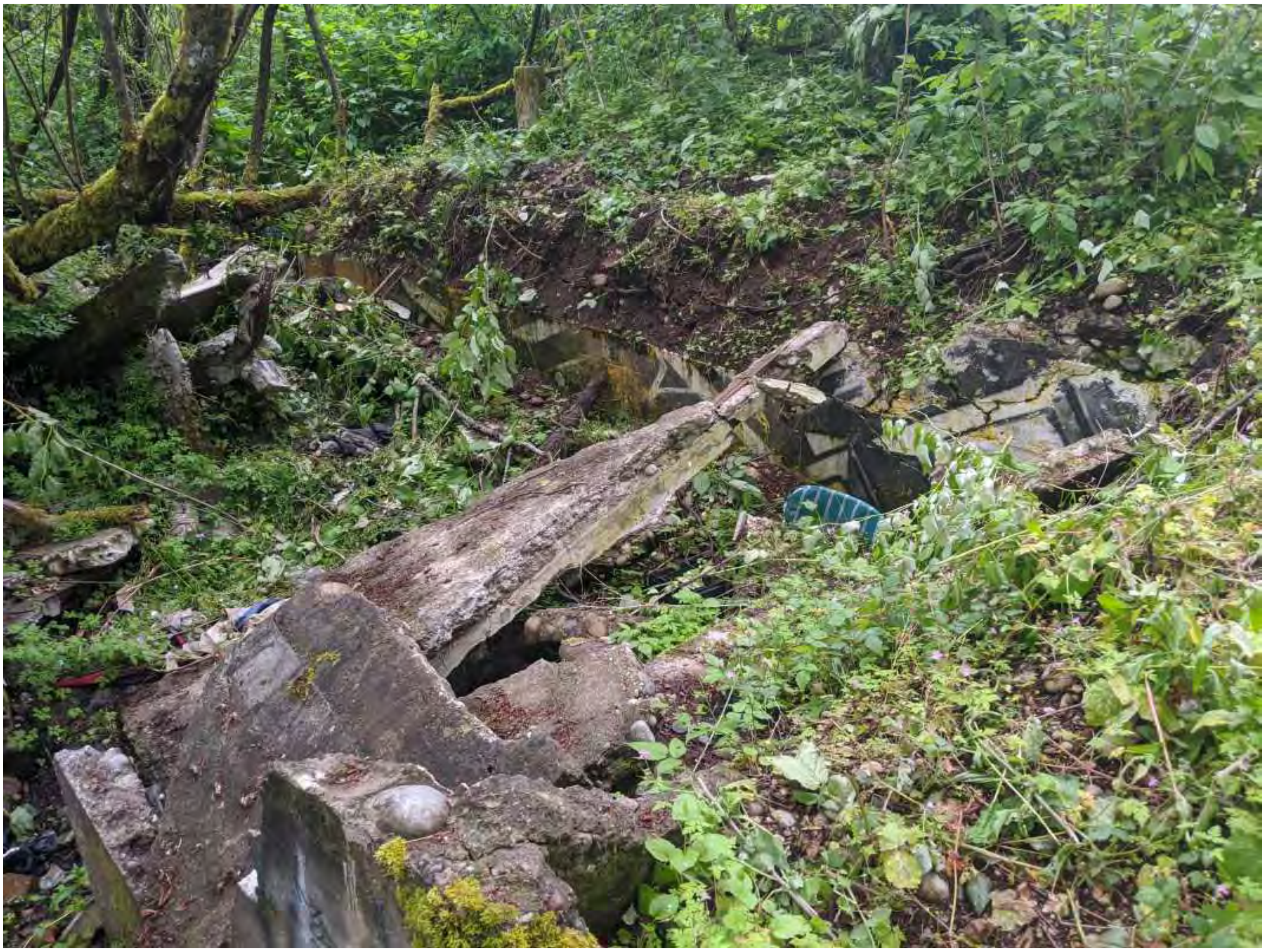


Photo ID	486189
Title	Site Overview, concrete basement and demolition pile northeast corner, view southeast..jpg
Year Taken	
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	2/27/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

STATE OF WASHINGTON
ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian Number: 45KI1543

County: King

Date: 2/21/2020 **Human Remains?** ☐ **DAHP Case No.:**

Compiled By: Edgar Huber Aqua Terra Cultural Resource Consultants

Archaeological Sites are exempt from public disclosure per RCW 42.56.300

SITE DESIGNATION

Site Name: Historic Debris Scatter

Field/Temporary ID: Historic Debris Scatter, ATCRC-2020-02

Site Type: Historic Debris Scatter/Concentration

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this request for determination of eligibility meet the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the site

☐ meets ☑ does not meet the National Register Criteria.

I recommend that this property be considered significant at the following level(s) of significance:

Criteria

Statement of Significance

The site and its historical artifacts appear to be structural remnants; however, they are in secondary depositional context and site materials deposited as fill. The site does not appear to be associated with events significant to local, state, or national history (Criterion A); nor is it associated with the lives of individuals significant in local, regional or national historic past (Criterion B); nor is it significant for its engineering or architectural qualities (Criterion C); and the site lacks the potential to contain significant scientific information (Criterion D).
In summary, site 45KI1543 lacks integrity and does not meet criteria to be considered significant under Criteria A-D of the NRHP, and does not meet criteria necessary for listing in the WHR or local registers.

Integrity

Although no definitive evidence for the origin of this deposit of historic-period artifacts was obtained, the characteristics and content of the sites artifact assemblage — predominately construction materials along with their evident fragmentation and disturbed context — indicates that the artifacts are in a secondary depositional context and incorporated in an imported fill matrix. All of the debris shows evidence of having been tumbled and worn. The lack of metals in the debris identified also suggests that a concerted effort was made to remove it before the debris was deposited in its current location. Lastly, the sharp clear boundaries between multiple soil strata is a typical indication of modern landscape modification strategies, where soils are layered and compacted with heavy machinery. The act of removing, sorting, and redepositing the historic debris from its place of origin has severed its link to a specific location and setting.

SHPO Determination

Eligibility Potentially Eligible **Determined On** 12/16/2020

Determined By

SHPO Comments

SITE LOCATION

USGS Quad Map Name(s): POVERTY BAY

T: 21 **R:** 04 **E/W:** E **Section:** 21

UTM: Zone: 10 **Easting:** 552363 **Northing:** 5238382

Latitude:	47.2968	**Longitude:**	-122.3074	**Elevation (ft/m):**	
Drainage, Major:	Puyallup	**Drainage, Minor:**	Hylebos Creek-Frontal Commencement Bay	**River Mile**	
Aspect	East	**Slope**	Varies across site		

Location Description (General to Specific):

King County, Federal Way, northwest corner of 20th Ave South and South 341st Place.

Directions (For Relocation Purposes):

From Kitts Corner at SR99 and 16th Ave South, proceed south for 100ft. Turn left onto South 341st Place, proceed east for 1,550ft. The landform on which the site is present is on the left.

SITE DESCRIPTION

Narrative Description (Overall Site Observations)**:**

Site 45KI1543 is a historic-period debris scatter in the southern portion of parcel OMF 151, on a highly modified landform situated on the northwest corner of 20th Ave South and South 341st Place intersection. The debris scatter was initially identified in two locations in the northwest and southeast corners of the landform (Figure G4.6-24). The site is located in both the South 336th Street and South 344th Street alternatives.

Before an additional subsurface survey was conducted on the landform, historic aerial photographs were reviewed in detail for this area. The earliest aerial imagery of this location dated to 1936/1937 and illustrates a landscape with partial forest regrowth with winding paths following a clear-cut event. The closest structure at this time was located approximately 200 meters southwest as part of a small farmstead off South 344th Street (Figure G4.6-25) (King County Map Vault 1936/1937). In the next available imagery from 1957, the site location is completely forested and the closest structures at that time are approximately 200 meters directly south (Figure G4.6-25) (EarthExplorer 1957). There does not seem to be any access to this site from the developed areas of South 344th Street. There is no visible change in the landscape immediately surrounding the site until the development of the eastern half of South 341st Place in the 1980s. These developments slowly progressed eastward along the roadway, beginning with the clearcutting of parcels adjacent to the road between 1985 to 1987, followed by progressive grading and construction that occurred from 1987 to the early 1990s. Aerial imagery from 1990 shows the landform completely graded, with few clusters of vegetation. The landscape seems to have been completely graded to glacial soils during this time (Figure G4.6-25) (Earth Explorer 1990).

By 2002, the site had largely become overgrown, with evidence of dumping in aerial imagery. The evidence of dumping becomes more widespread between 2002 and 2005 (Google Earth 2020). In 2005, the site was once again mostly cleared during the preparation for the construction of 20th Ave South and the Christian Faith Center. It is at this time that the roadway shown on the surveyed landform is constructed, and a large pile of boulders appeared in the center of the landform (Google Earth 2020).

The boulders were spread across the landform by 2007, as shown in satellite imagery (Google Earth 2020), likely in conjunction with vegetation clearance. The final visible landscape alteration occurred in the summer of 2016 when a vegetation-removal effort occurred across the western half of the landform (Google Earth 2020).

A very sparse scatter of historical and recent artifacts was observed on the surface during the pedestrian survey of the landform between the two concentrations identified during the subsurface investigations (Figure G4.6-24). However, surface visibility was approximately 2 percent, with vegetation across the landform consisting of thick grasses, a thicket of Himalayan blackberry, Douglas-fir, Western hemlock, and several non-native decorative species. The landform also has three steep slopes, boulder piles, extensive utility corridors, and a prepared gravel road, which limited excavation locations.

Twenty-eight shovel probes were excavated across the landform. Of these,24 were excavated across the northwestern quarter of the landform, and the remaining four were excavated in the southeastern corner. A total of17 shovel probes contained modern or temporally non-diagnostic demolition debris (Figure G4.6-24). The soils across the site were identified as layers of fill over intact glacially deposited patent material. Glacial till was typically identified at depths between 20 to 30 centimeters below the surface.

The origin of this debris scatter is unknown. There is no evidence of historic structures near the site from the 1930s through the 1980s that could have been the source. This implies that the debris may have been imported as fill, or the site was used for dumping, following the modern clearance of the site for development. No diagnostic marks were identified on any of the artifacts encountered during the survey of this site. All of the brick fragments identified are hard, evenly fired, and of very fine industrial standard clay. All of them have edges that range from sub-round to very angular, and most are less than five centimeters in size. The cut stone fragments are finished on one face. Some have a finished edge. None have perforations, and the unfinished edges are subangular to angular. All of the glass fragments are less than2 square centimeters in size and have subangular to angular edges.

Site Dimensions (Overall Site Dimensions)**:**

Length:	260 feet (80 meters)	**Direction:**	north-south	**Width:**	50 ft (15) meters)	**Direction:**	east-west

Method of Horizontal Measurement: GPS

Depth: 0-28 inches (0 - 70 centimeters) **Method of Vertical Measurement:** measuring tape

Vegetation (On Site)**:**

Local:	The vegetation across the site consisted of thick grasses, a thicket of Himalayan blackberry, Douglas-fir, Western hemlock, and several non-native decorative species.	**Regional:**	Puget Sound area, of the Western Hemlock Zone.

Landforms (On Site)**:**

Local:

Regional:

Water Resources (Type)**:** West Hylebos Creek **Distance:** 170 meters **Permanence:** Year round

CULTURAL MATERIALS AND FEATURES

Narrative Description (Specific Inventory Details)**:**

The artifacts identified include nondiagnostic clear, green, and brown glass fragments; leather scraps, plastics (both hard fragments and films), numerous, machine-made brick fragments, a ceramic tile fragment, culinary ware, ceramic fragments, and cut stone block fragments. Only two metal artifacts were identified: a wire nail and an unidentified metal. None of the artifacts were distinctive or bore any markings that might have provided temporally significant information. All of these artifact types are mixed in the same general soil strata (brown sandy loam with pebbles and cobbles). In most cases (14 of 17), the artifact-bearing layer was present immediately on top of intact, undisturbed glacially deposited parent material with sharp, clearly defined boundaries. The other three positive shovel probes had multiple strata of modern fill with various artifact concentrations. All identified strata had sharply defined boundaries and contained moderate to high levels of pebbles and cobbles.

Method of Collection:

No artifacts were collected.

Location of Artifacts (Temporary/Permanent)**:**

All artifacts were returned to the individual shovel probe locations.

SITE AGE

Component Type	Historic
Dates	1950-1990
Dating Method	Relative, artifacts
Phase	
Basis for Phase Designation	

ARCHAEOLOGICAL SITE INVENTORY FORM

SITE RECORDERS

Observed By	Address
Edgar Huber	8525 Stoney Creek Lane SW, Olympia, WA 98512
Jessica Morris	8525 Stoney Creek Lane SW, Olympia, WA 98512

Date Recorded: 8/20/2020

Recorded by (Professional Archaeologist)**:** Jessica Morris

Organization:	Aqua Terra Cultural Resource Consultants	**Phone Number:**	(530) 307-1332
Address:	8525 Stoney Creek Lane SW, Olympia, WA 98512	**Email:**	jessica.morris@cwu.edu

Recorded by (Professional Archaeologist)**:** Edgar Huber

Organization:	Aqua Terra Cultural Resource Consultants	**Phone Number:**	520-904-5247
Address:	8525 Stoney Creek Lane SW, Olympia, WA 98512	**Email:**	edgar@aquaterracrc.com

SITE HISTORY

Previous Archaeological Work:

None

LAND OWNERSHIP

Owner	Address	Parcel
CHRISTIAN FAITH CENTER	33645 20TH AVE S , 98003	2121049004

RESEARCH REFERENCES

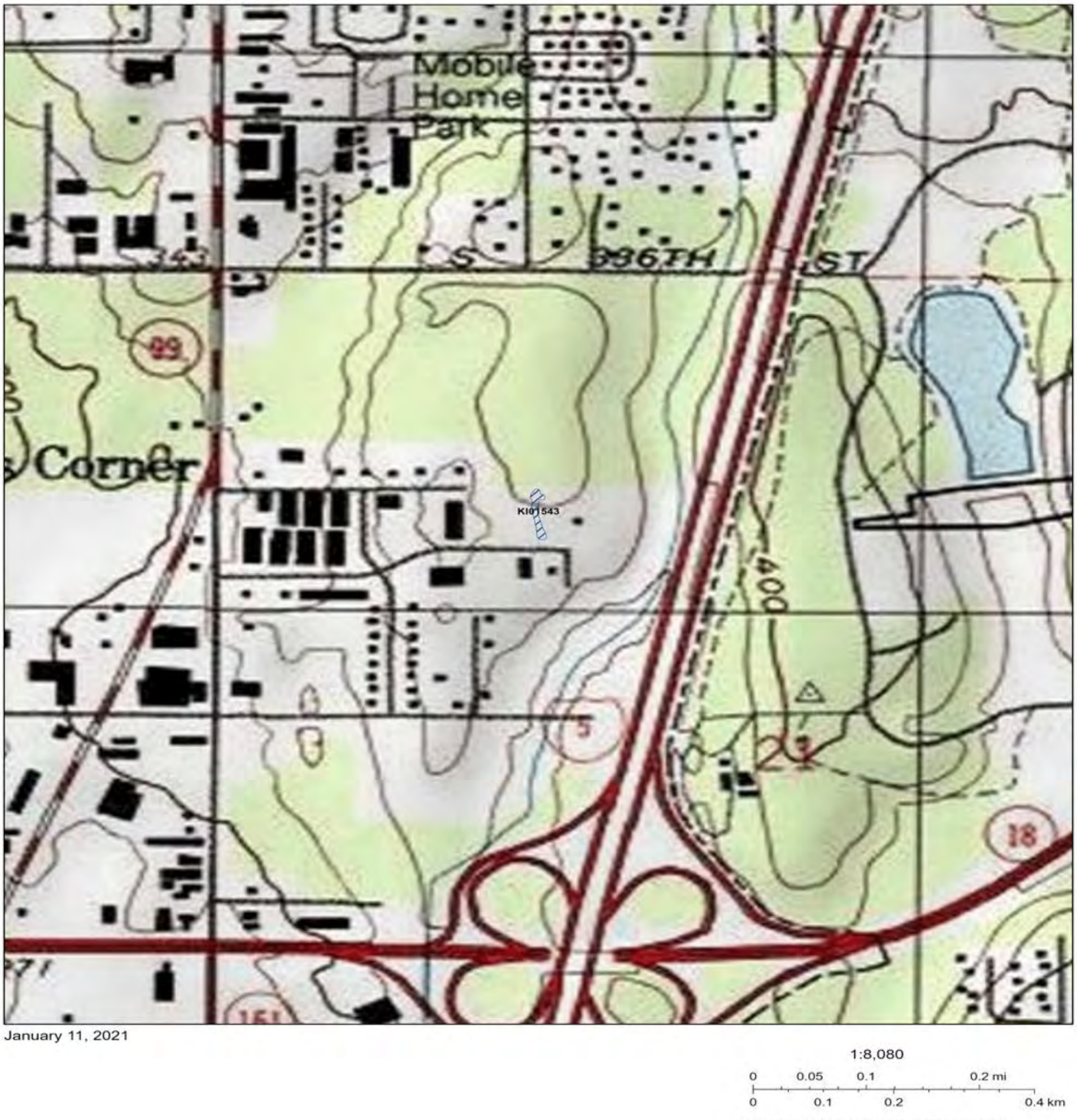
Items/Documents Used in Research:

Earth Explorer. Digital Database: https://earthexplorer.usgs.gov/. Accessed January2020.
1957 Aerial Photograph, A550460020182
1972 Aerial Photograph AR6212002900137
1991 Aerial Photograph, AR1VFOAC0020185

Google Earth. 2020. January 2020, South 336th Street and South 344th Street Areas of Impact, https://earth.google.com/web/

King County (Map Vault). Digital database:
https://info.kingcounty.gov/transportation/kcdot/roads/mapandrecordscenter/mapvault/. Accessed January2020.
1936/1937 Aerial Photograph- Section 21, Township 21 N Range 4 E.
1965 Aerial Photograph- Section 16, Township 21 N Range 4 E

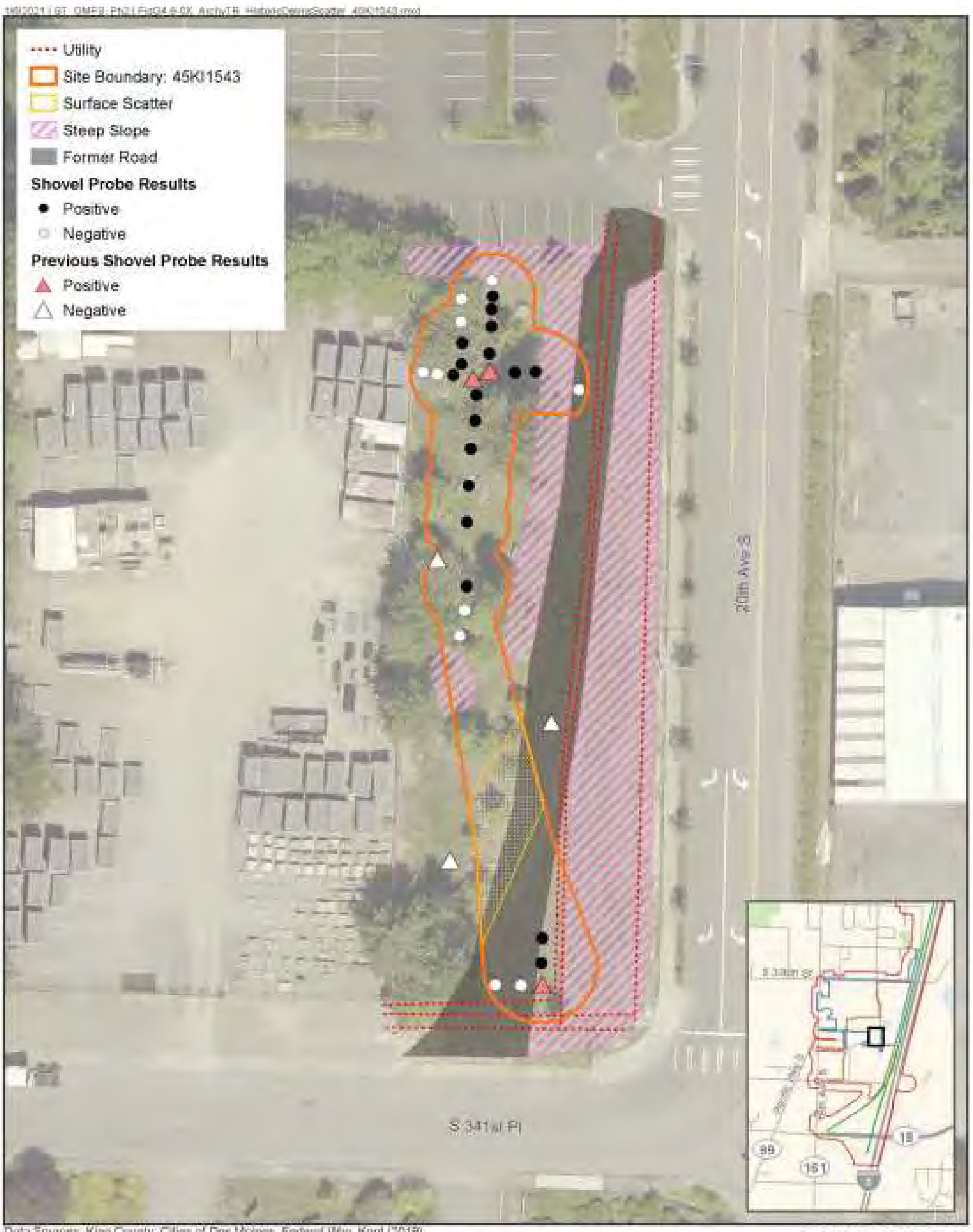
USGS MAP


Mobile Home Park
S 336TH ST
99
Corner
KI01543
400
5
18
161
January 11, 2021
1:8,080
0 0.05 0.1 0.2 mi
0 0.1 0.2 0.4 km
Copyright:© 2013 National Geographic Society, i-cubed

ARCHAEOLOGICAL SITE INVENTORY FORM

SKETCH MAPS

Source Information ATCRC/HDR


Utility
Site Boundary: 45KI1543
Surface Scatter
Steep Slope
Former Road
Shovel Probe Results
Positive
Negative
Previous Shovel Probe Results
Positive
Negative
20th Ave S
S 341st Pl
S 336th St
99
161
18

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N 0 50 100 Feet

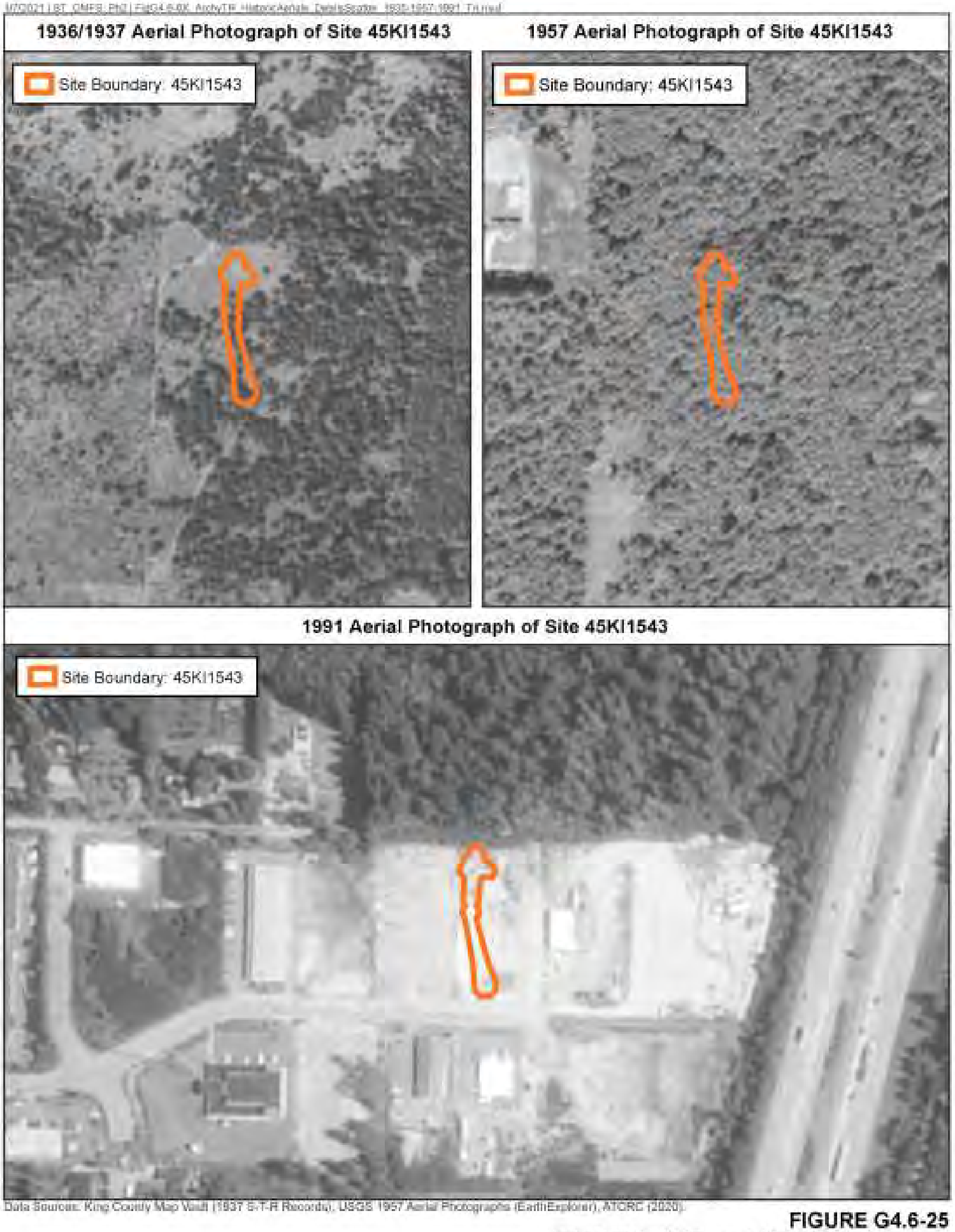
DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

FIGURE G4.6-24
Site 45KI1543
Investigation Results
South 336th Street and South 344th Street Alternatives
OMF South

ARCHAEOLOGICAL SITE INVENTORY FORM

Source Information ATCRC/HDR

1/7/2021 | ST_OMFS_Ph2 | FigG4.6-XX_ArchyTR_HistoricAerials_DetailsScale_1936-1957-1991_Tri.mxd


1936/1937 Aerial Photograph of Site 45KI1543
Site Boundary: 45KI1543
1957 Aerial Photograph of Site 45KI1543
Site Boundary: 45KI1543
1991 Aerial Photograph of Site 45KI1543
Site Boundary: 45KI1543

Data Sources: King County Map Vault (1937 S-T-R Records), USGS 1957 Aerial Photographs (EarthExplorer), ATCRC (2020).

N
0 200 400 Feet

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

FIGURE G4.6-25
1936/1937, 1957, and 1991 Historic Aerials
of Site 45KI1543

OMF South

Photographs, Tables and Additional Information

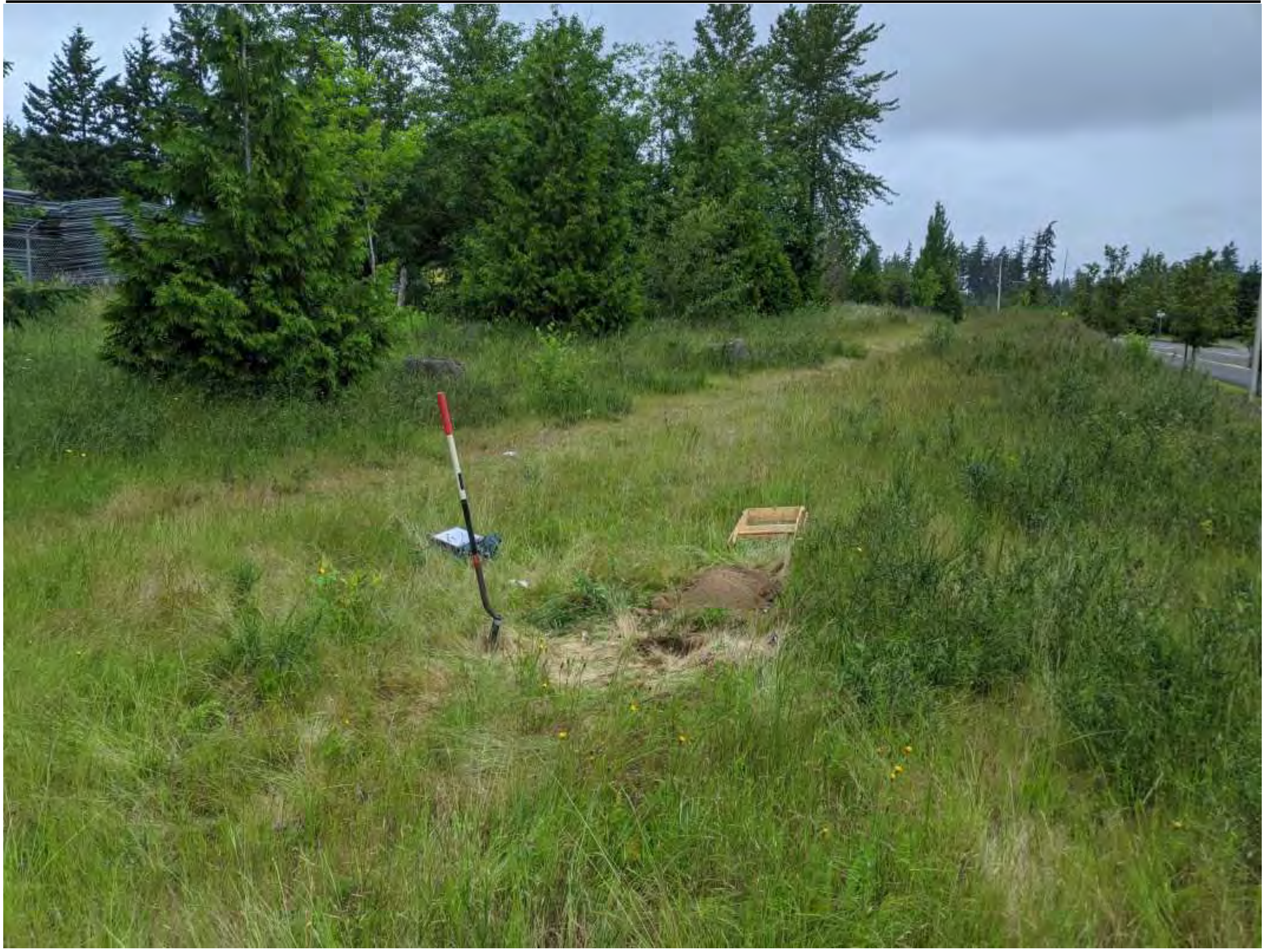


Photo ID	486336
Title	Site Overview from southeast corner before slope.
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

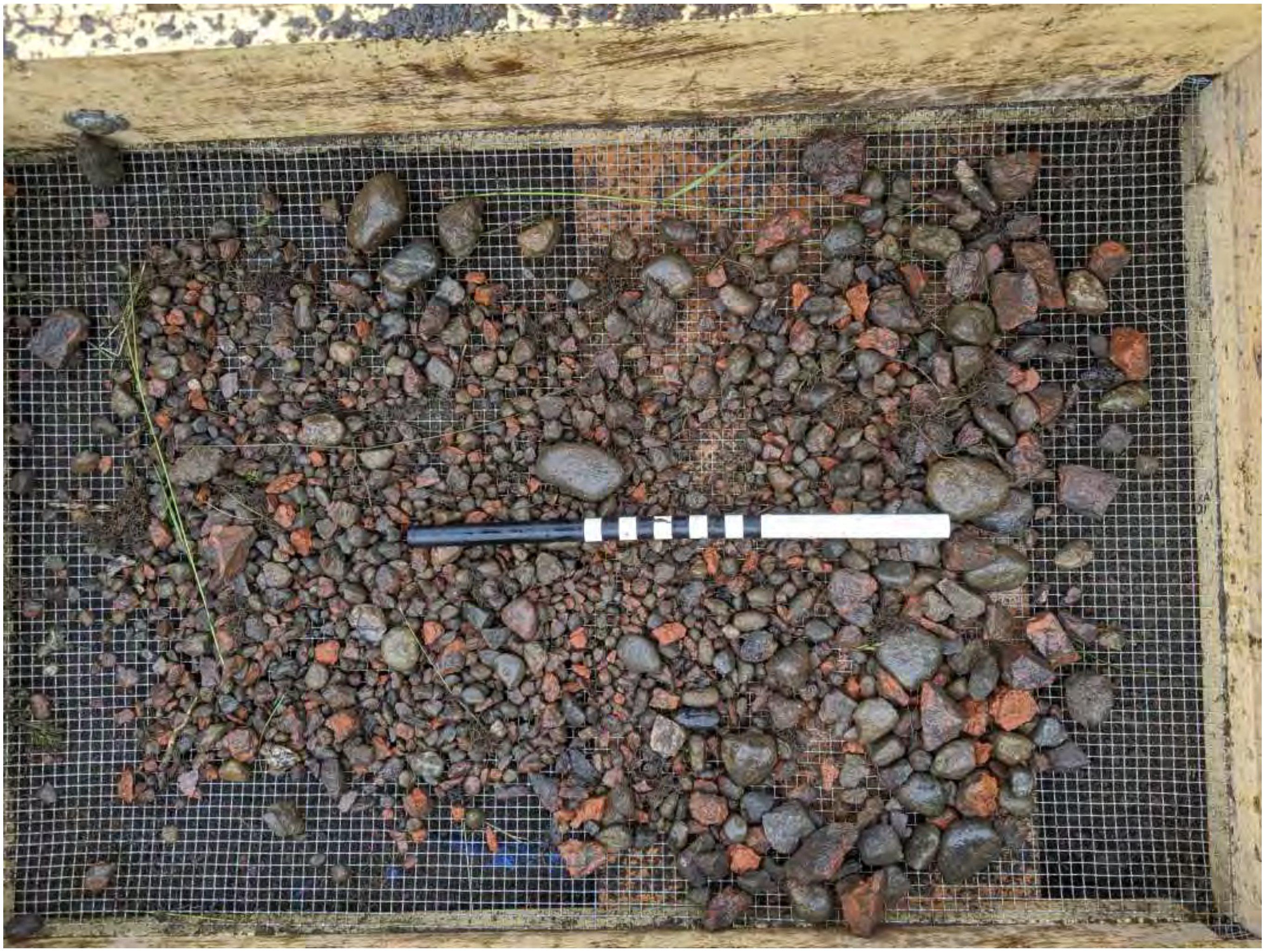


Photo ID	486339
Title	Mixed gravel and brick fragments, Strata 1, SP02-28.jpg
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

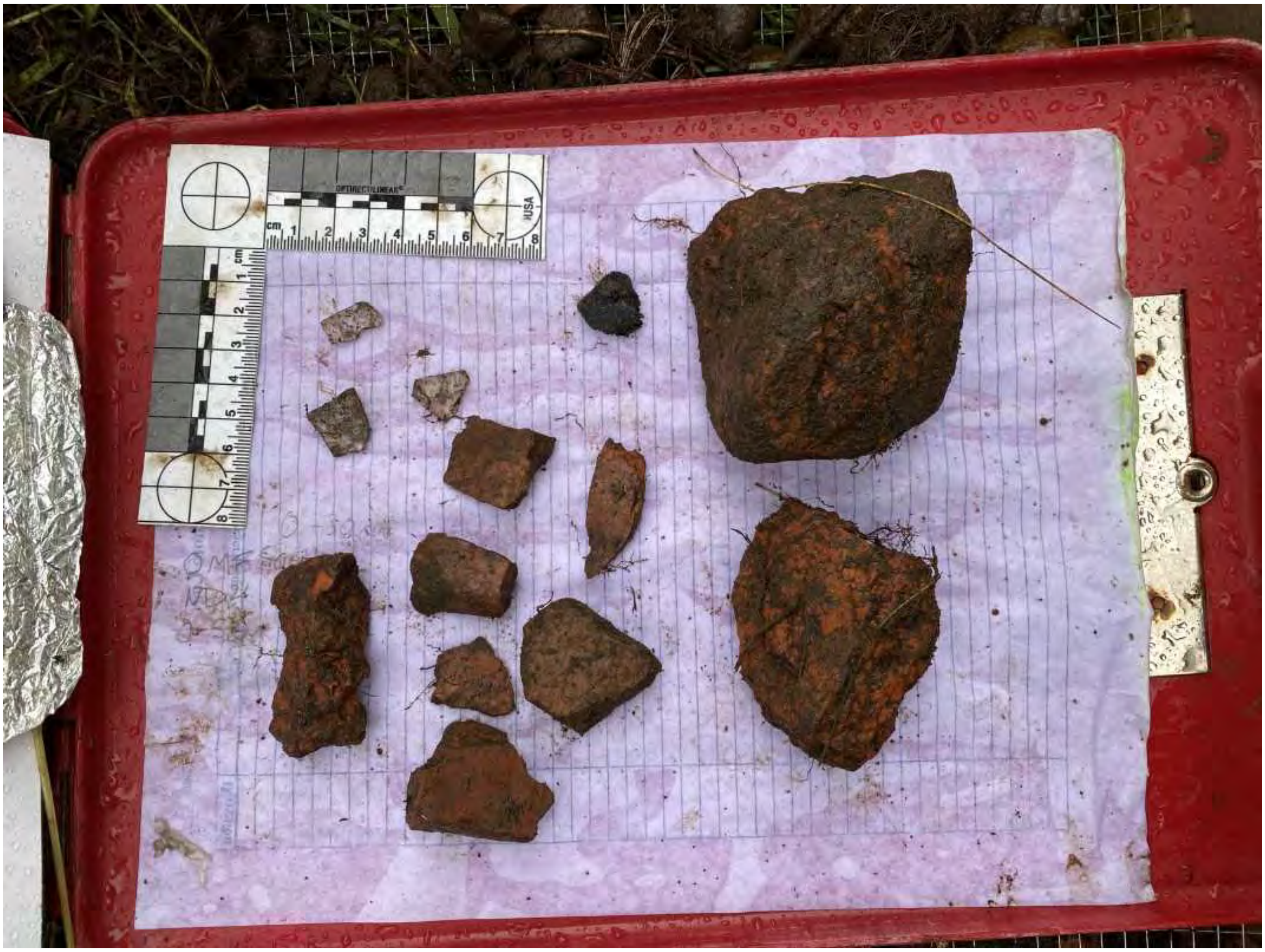


Photo ID	486338
Title	Glass and Brick fragments, Strata 2, SP02-01.JPG
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

ARCHAEOLOGICAL SITE INVENTORY FORM

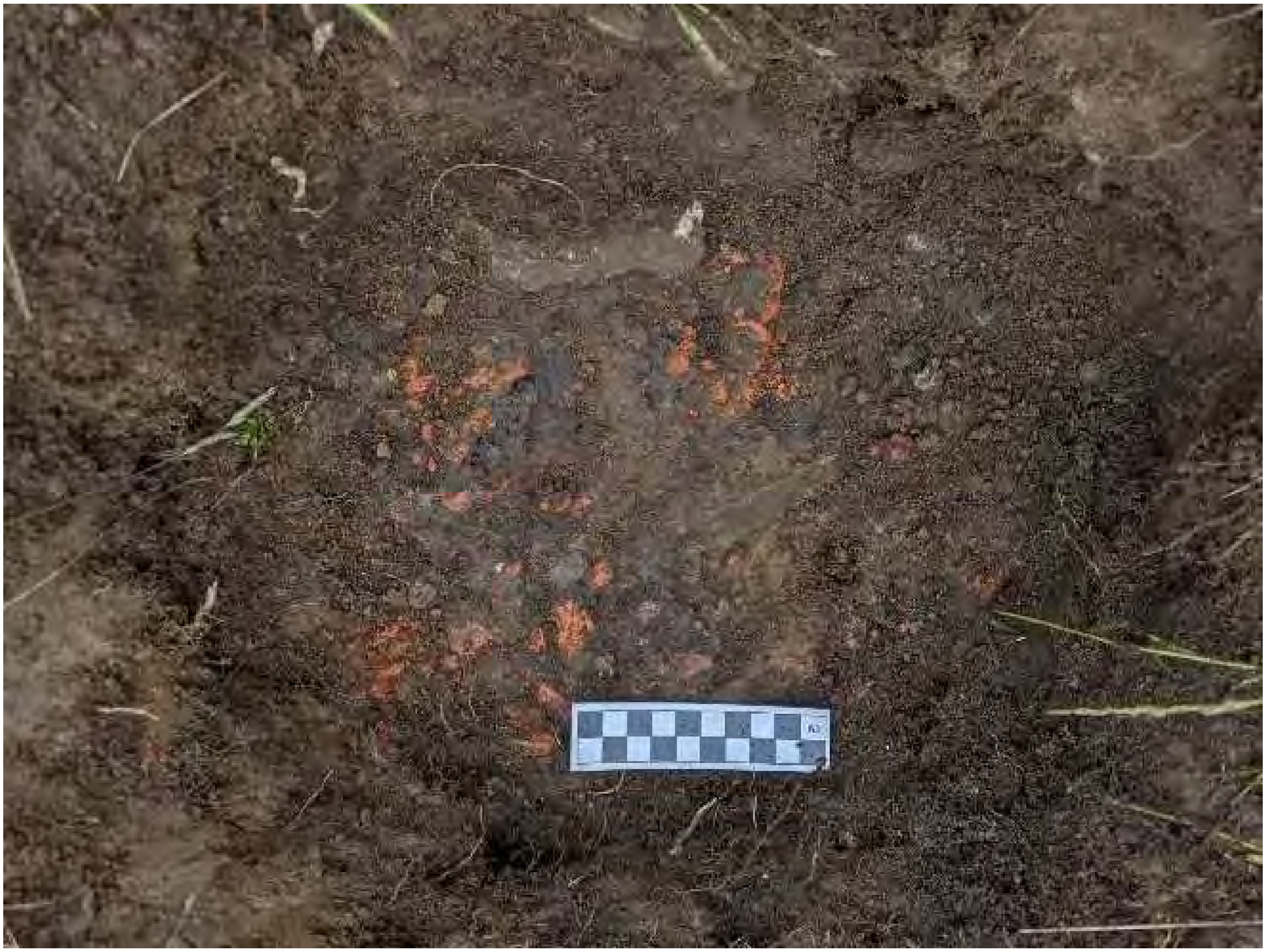


Photo ID	486337
Title	Typical debris concentration, SP02-28.jpg
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

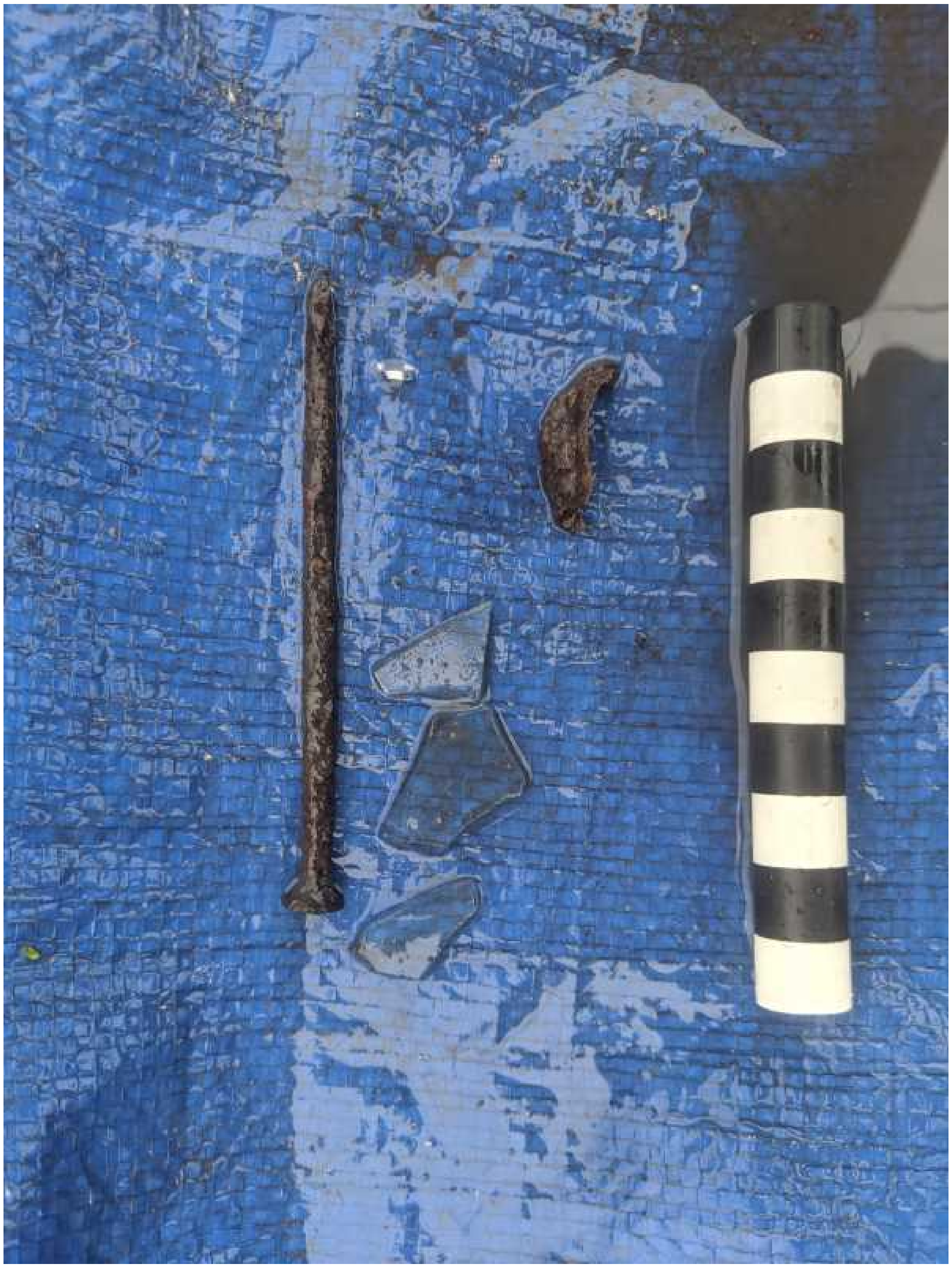


Photo ID	486335
Title	Metal and Glass Debris, Strata 1, SP02-28.jpg
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

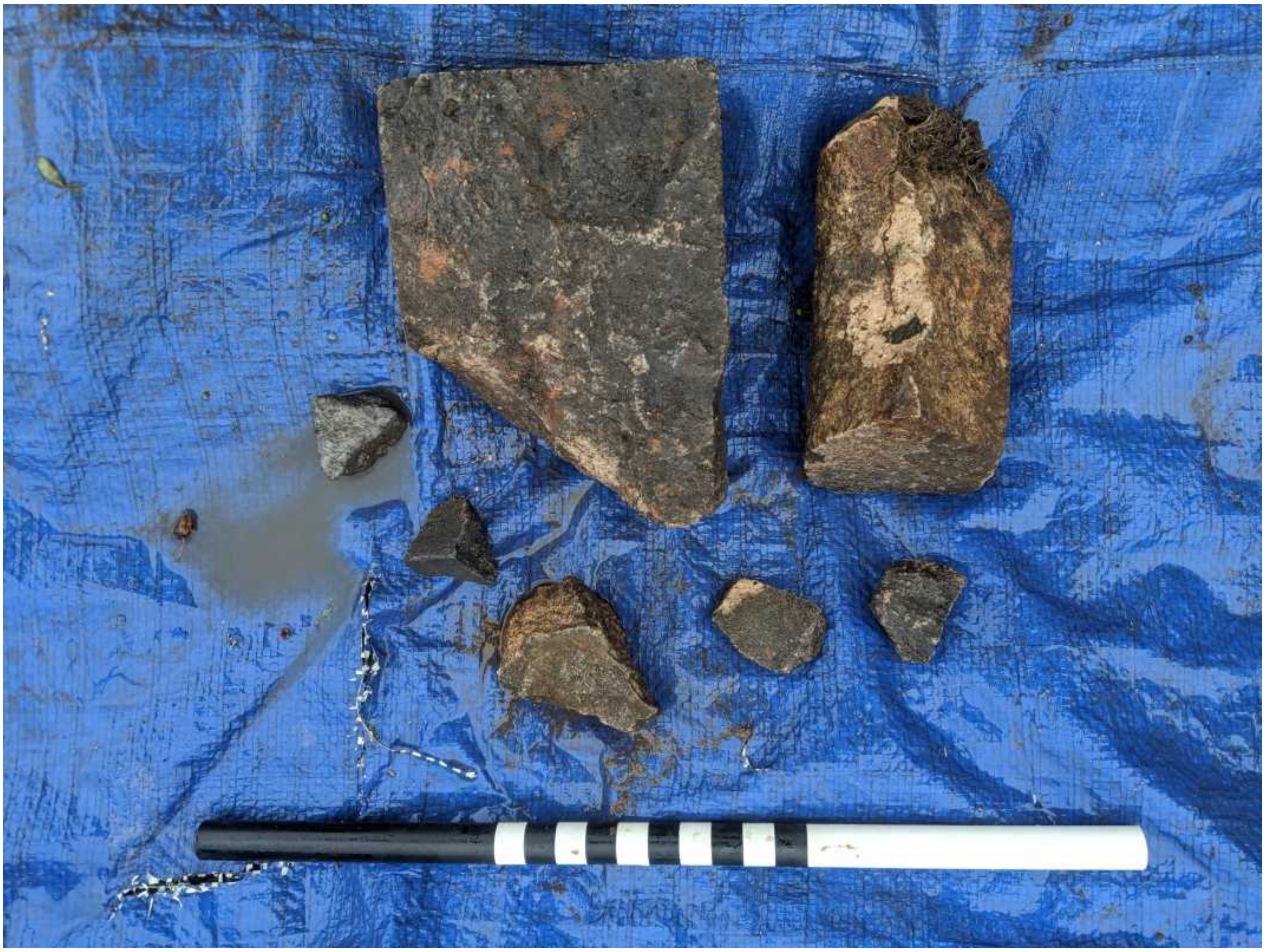


Photo ID	486334
Title	Cut stone fragments, Strata 1, SP02-28.jpg
Year Taken	2020
Is Circa?	☐
Notes	
Type	image/jpeg
Photo View	
Source	8/20/2020 Inventory - Aqua Terra Cultural Resource Consultants
Copyright	☐

STATE OF WASHINGTON
ARCHAEOLOGICAL SITE INVENTORY FORM

Smithsonian Number: 45KI01583

County: King

Date: 4/2/2021 **Human Remains?** ☐ **DAHP Case No.:**

Compiled By: Ron Adams Historical Research Associates, Inc.

Archaeological Sites are exempt from public disclosure per RCW 42.56.300

SITE DESIGNATION

Site Name:

Field/Temporary ID: HRA-2902.02-1

Site Type: Historic Isolate

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this request for determination of eligibility meet the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the site ☐ meets ☑ does not meet the National Register Criteria.

I recommend that this property be considered significant at the following level(s) of significance:

Criteria

Statement of Significance

This isolated beer bottle has no demonstrable connection to a pattern of events to be considered significant under Criterion A nor is it associated with a prominent person that would make it significant under Criterion B. The isolate also lacks any features that would make it significant under Criterion C. This artifact, by itself, contributes no new information about local, regional or national history and is therefore not significant under Criterion D.
Sound Transit recommends that Isolate HRA-2902.02-1 is not eligible for listing in the NRHP or the WHR. Sufficient information has been gathered from the site to evaluate it under National Register Criteria A, B, C, and D.

Integrity

Isolate HRA-2902.02-1 appears to retain integrity of location and potentially retains integrity of setting, feeling, and association, given that the immediate surroundings of the isolate (WSDOT right-of-way adjacent to I-5) have likely changed little since the artifact was deposited. As the isolate is not associated with built structures or other features, integrity aspects of design, materials, and workmanship do not pertain to the evaluation of the site.

SHPO Determination

Eligibility Potentially Eligible **Determined On** 8/27/2021

Determined By

SHPO Comments

SITE LOCATION

USGS Quad Map Name(s): POVERTY BAY

T: 21 **R:** 04 **E/W:** E **Section:** 16

UTM: Zone: 10 **Easting:** 552665 **Northing:** 5238865

Latitude: 47.3012 **Longitude:** -122.3033 **Elevation (ft/m):** 115

River Mile N/A

Drainage, Major:	Puget Sound	**Drainage, Minor:**	Hylebos Creek- Frontal Commencement Bay
Aspect	West	**Slope**	5%

Location Description (General to Specific):

The isolate is located in the eastern part of the city of Federal Way, Washington near the western base of an fill embankment slope that extends towards I-5 located approximately eight meters to the east of the isolate.

Directions (For Relocation Purposes):

From the intersection of S 336th St and 24th Ave S in Federal Way, Washington proceed to the east into the Washington State Department of Transportation (WSDOT) Right-of-Way (ROW) . Walk along the embankment west of I-5 within the WSDOT ROW for approximately 215 meters to the south/southwest to the isolate location.

SITE DESCRIPTION

Narrative Description (Overall Site Observations)**:**

This isolate consists of a beer bottle identified on the surface with embossing indicating that it was manufactured by the Northwestern Glass Company in 1966 (Lockhart et al. 2017). The bottle was identified near the base of an embankment that extends upward to the east to Interstate 5, located approximately 20 m to the east of the bottle. Other modern cans and debris dating from between the mid-1970s to 1990s was found within approximately 10 m to the south of the bottle on and near the base of the same embankment. Six shovel probes and shovel probe/auger cores (SP-71, SP-74, SP-75, SP-76, SP-77, and SP-78), excavated in the immediate vicinity of the 1966 bottle, including four radial shovel probes excavated within five m of the bottle, and in the immediate vicinity of the other, nearby surface items contained no historically diagnostic or pre-contact artifacts. Because none of the other items found in the vicinity of the 1966 bottle were historically diagnostic, the bottle is being recorded as an archaeological isolate.

Site Dimensions (Overall Site Dimensions)**:**

Length:	1 m	**Direction:**	N-S	**Width:**	1 m	**Direction:**	E-W

Method of Horizontal Measurement: Tape Measure

Depth: Surface **Method of Vertical Measurement:** N/A

Vegetation (On Site)**:**

Local:	Western redcedar, vine maple, sword fern, Himalayan blackberry	**Regional:**	Tsuga Heterophylla vegetation zone.

Landforms (On Site)**:**

Local:	Fill embankment	**Regional:**	Puget Trough

Water Resources (Type)**:**	Hybelos Creek	**Distance:**	10 m	**Permanence:**	Perennial

CULTURAL MATERIALS AND FEATURES

Narrative Description (Specific Inventory Details)**:**

This isolate consists of an amber glass beer bottle identified on the surface with embossing indicating that it was manufactured by the Northwestern Glass Company in 1966 (Lockhart et al. 2017).

Method of Collection:

The artifact was not collected.

Location of Artifacts (Temporary/Permanent)**:**

N/A

SITE AGE

Component Type	Historic
Dates	1966
Dating Method	Documentary research of historic artifact
Phase	N/A
Basis for Phase Designation	N/A

SITE RECORDERS

Observed By	**Address**
Ron Adams	1825 SE 7th Avenue, Portland, OR 97214

Date Recorded: 12/22/2020

Recorded by (Professional Archaeologist): Ron Adams

Organization:	Historical Research Associates, Inc.	**Phone Number:**	(206) 343-0226
Address:	1825 SE 7th Avenue, Portland, OR 97214	**Email:**	radams@hrassoc.com

SITE HISTORY

Previous Archaeological Work:

No previous archaeological work has been done at the isolate location.

LAND OWNERSHIP

Owner	**Address**	**Parcel**
Washington State Department of Transportation	310 Maple Park Avenue SE, PO Box 47300, Olympia, WA, 98504-7300	N/A

RESEARCH REFERENCES

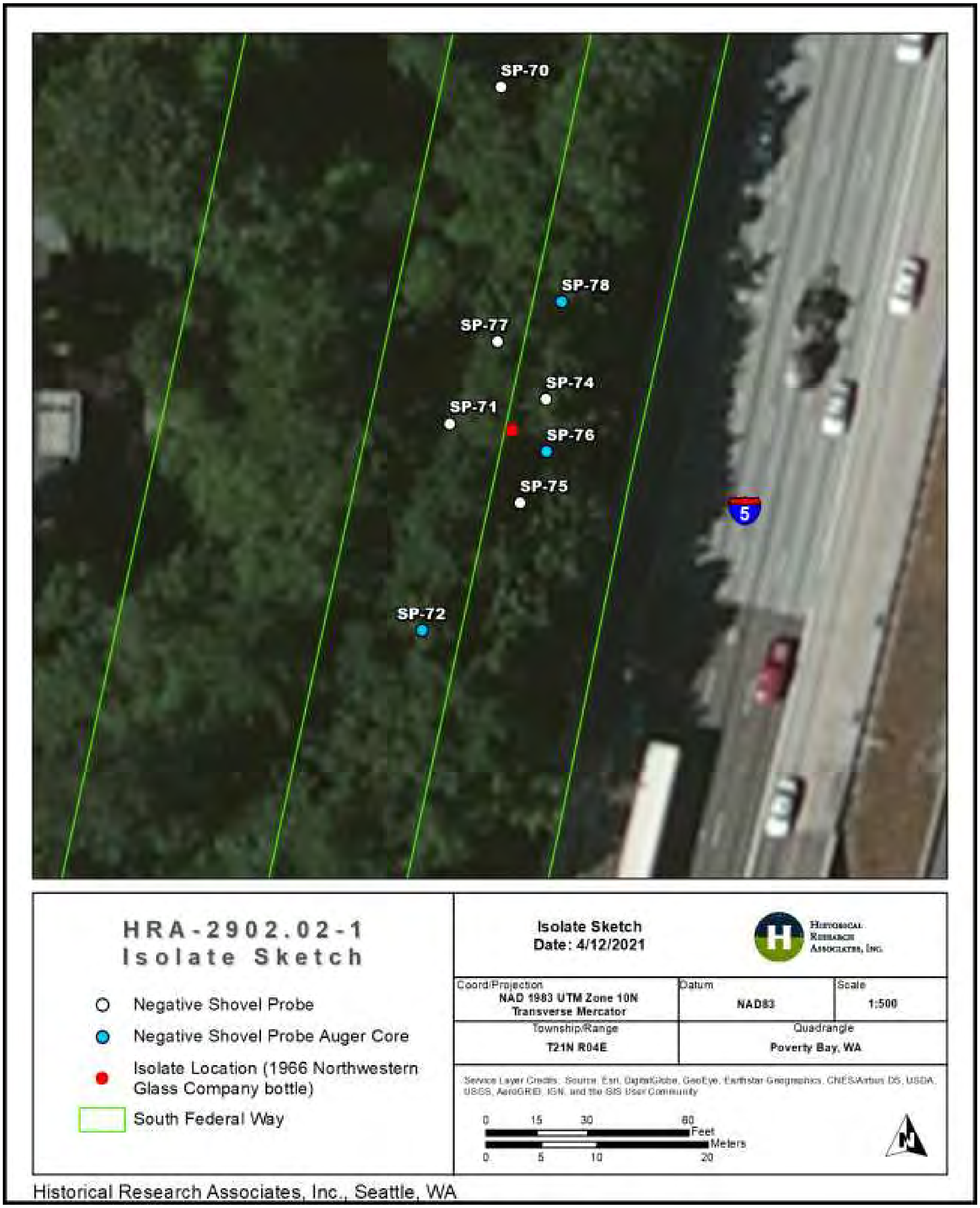
Items/Documents Used in Research:

Lockhart, Bill, Beau Schriever, Bill Lindsey, and Carol Serr
2017 Northwestern Glass Co. In Encyclopedia of Manufacturers Marks on Glass Containers, Volume N-O, edited by Bill Lockhart, Bill Lindsey, Carl Serr, Pete Schultz, and Beau Schriever, pp.35–42. Electronic document, https://sha.org/bottle/pdffiles/NorthwesternGlass.pdf, accessed March 19, 2021.

USGS MAP

SKETCH MAPS

Source Information	Map created by HRA, Inc., and owned by Sound Transit.


SP-70
SP-78
SP-77
SP-74
SP-71
SP-76
SP-75
5
SP-72
HRA-2902.02-1
Isolate Sketch
○ Negative Shovel Probe
● Negative Shovel Probe Auger Core
● Isolate Location (1966 Northwestern Glass Company bottle)
🟩 South Federal Way
Isolate Sketch
Date: 4/12/2021
Historical Research Associates, Inc.
Coord/Projection
NAD 1983 UTM Zone 10N Transverse Mercator
Datum
NAD83
Scale
1:500
Township/Range
T21N R04E
Quadrangle
Poverty Bay, WA
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
0 15 30 60 Feet
0 5 10 20 Meters
N
Historical Research Associates, Inc., Seattle, WA

Photographs, Tables and Additional Information

Photo ID	519078
Title	HRA-2902.02-1 Photo 1
Year Taken	2020
Is Circa?	☐
Notes	Isolate HRA-2902.02-1 location.
Type	image/jpeg
Photo View	North/Northeast
Source	Photo taken by HRA, inc., and owned by Sound Transit.
Copyright	☐

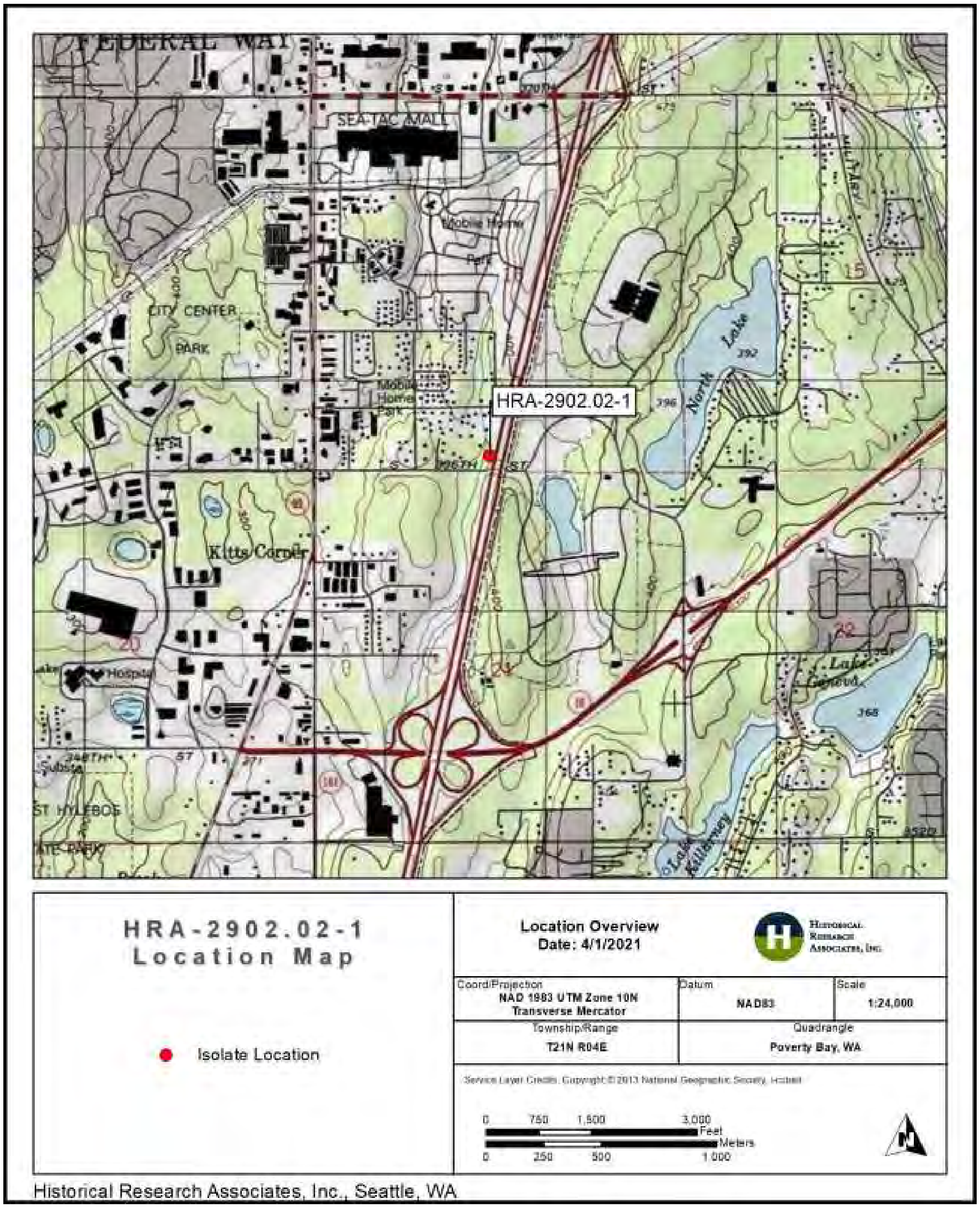

FEDERAL WAY
SEA-TAC MALL
Mobile Home Park
CITY CENTER PARK
Mobile Home Park
HRA-2902.02-1
S 296TH ST
North Lake
392
396
Kitts Corner
Hospital
348TH
ST HYLEBOS STATE PARK
Lake Geneva
368
Lake Killarney
MILITARY
HRA-2902.02-1 Location Map
Isolate Location
Location Overview
Date: 4/1/2021
Historical Research Associates, Inc.
Coord/Projection
NAD 1983 UTM Zone 10N Transverse Mercator
Datum
NAD83
Scale
1:24,000
Township/Range
T21N R04E
Quadrangle
Poverty Bay, WA
Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
0 750 1,500 3,000 Feet
0 250 500 1,000 Meters
N
Historical Research Associates, Inc., Seattle, WA

Photo ID	519083
Title	HRA-2902.02-1 Location Map
Year Taken	
Is Circa?	☐
Notes	Site HRA-2902.02-1 Location Map.
Type	image/png
Photo View	
Source	Map created by HRA, Inc., owned by Sound Transit.
Copyright	☐

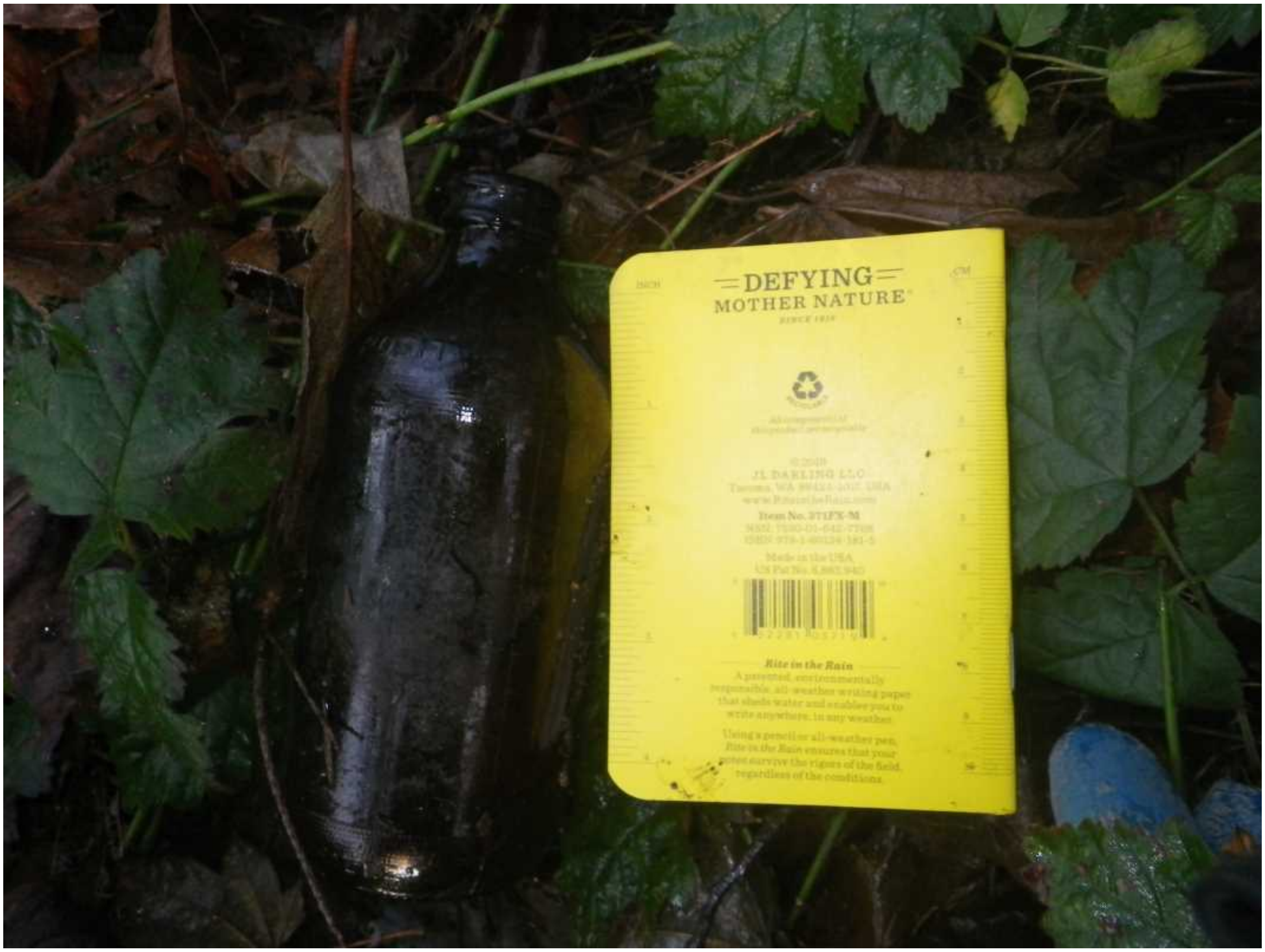


Photo ID	519081
Title	HRA-2902.02-1 Photo 2
Year Taken	2020
Is Circa?	☐
Notes	1966 Northwestern Glass Company beer bottle (isolate HRA-2902.02-1).
Type	image/jpeg
Photo View	Plan
Source	Photo taken by HRA, inc., and owned by Sound Transit.
Copyright	☐

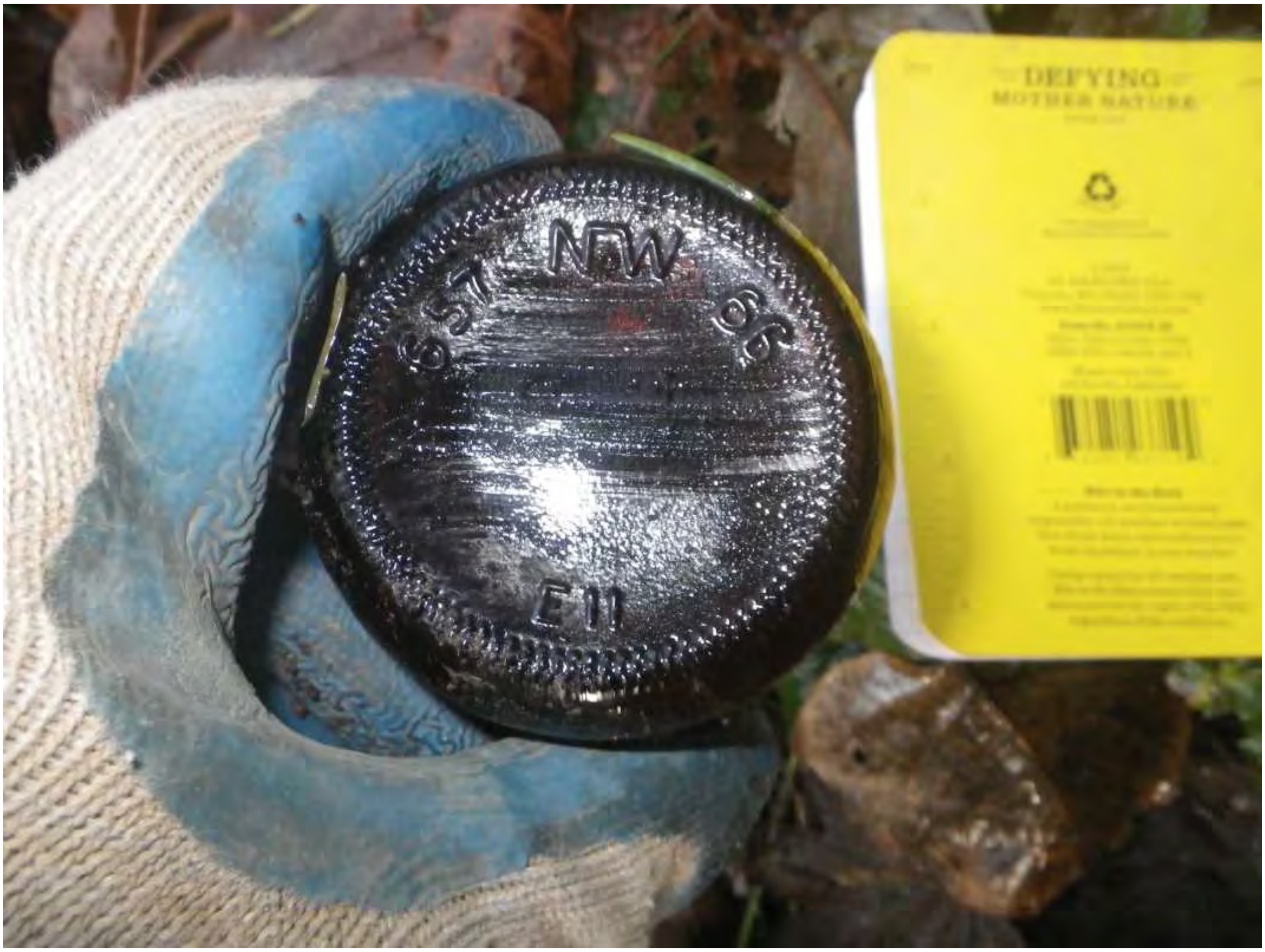


Photo ID	519079
Title	HRA-2902.02-1 Photo 3
Year Taken	2020
Is Circa?	☐
Notes	Base of 1966 Northwestern Glass Company beer bottle (Isolate HRA-2902.02-1).
Type	image/jpeg
Photo View	Plan
Source	Photo taken by HRA, inc., and owned by Sound Transit.
Copyright	☐

]

Operations and Maintenance Facility South

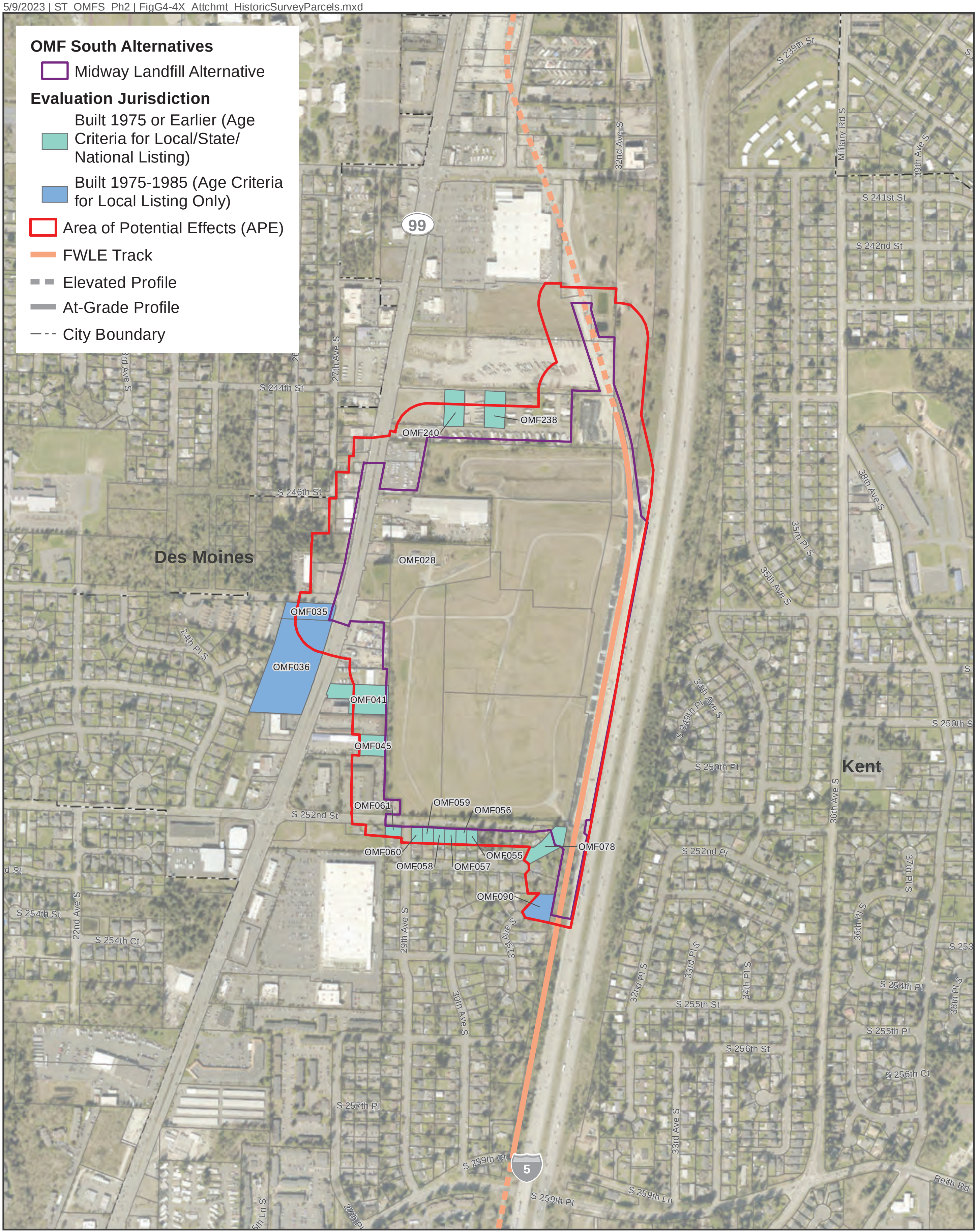
ATTACHMENT G4-4

Surveyed Architectural Resources

Federal Transit Administration

SOUNDTRANSIT

5/9/2023 | ST_OMFS_Ph2 | FigG4-4X_Attchmt_HistoricSurveyParcels.mxd

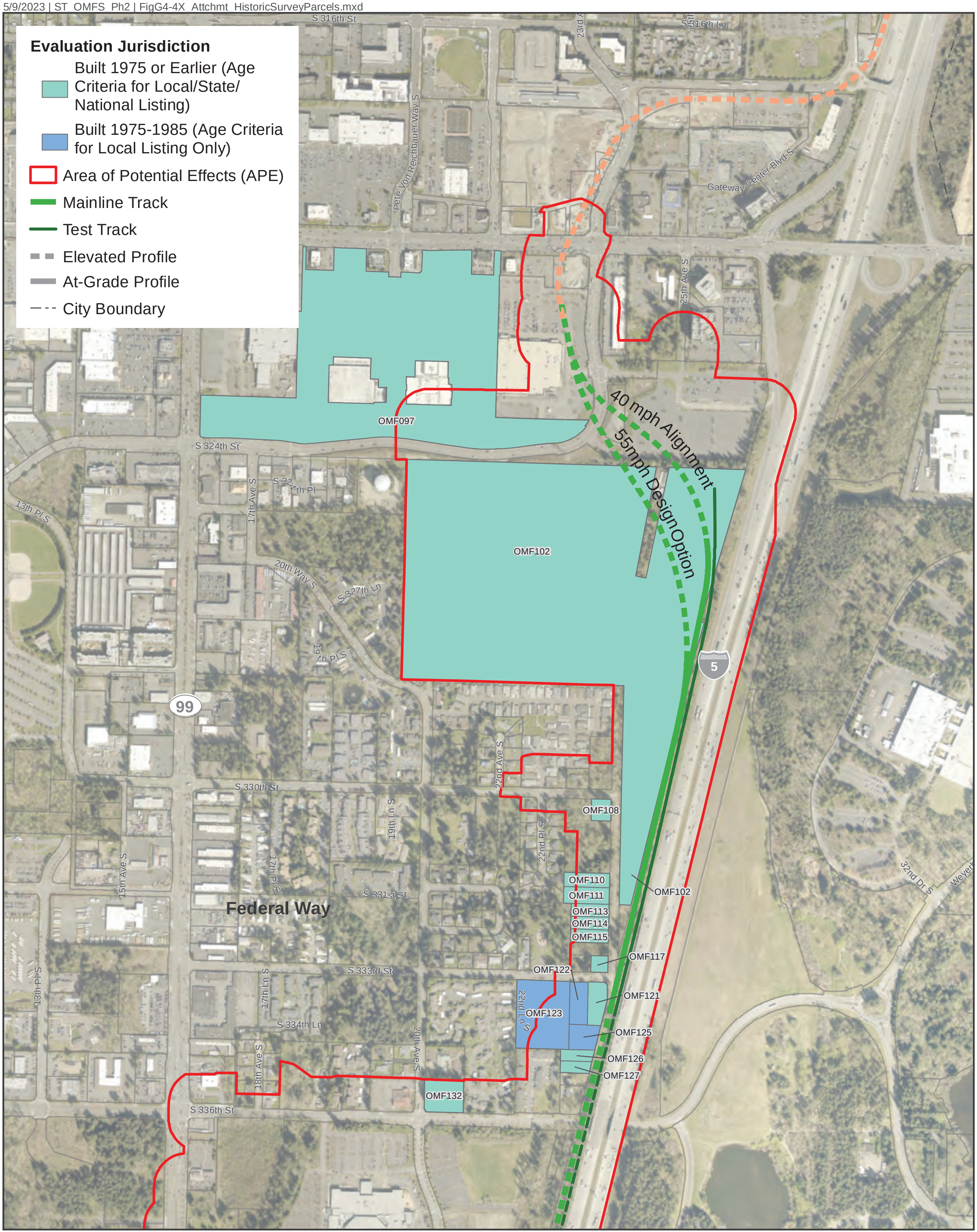

OMF South Alternatives
Midway Landfill Alternative
Evaluation Jurisdiction
Built 1975 or Earlier (Age Criteria for Local/State/ National Listing)
Built 1975-1985 (Age Criteria for Local Listing Only)
Area of Potential Effects (APE)
FWLE Track
Elevated Profile
At-Grade Profile
City Boundary
99
5
Des Moines
Kent
OMF238
OMF240
OMF028
OMF035
OMF036
OMF041
OMF045
OMF061
OMF059
OMF056
OMF060
OMF058
OMF057
OMF055
OMF078
OMF090
S 239th St
Military Rd S
39th Ave S
32nd Ave S
S 241st St
S 242nd St
27th Ave S
S 244th St
S 246th St
38th Ave S
35th Pl S
35th Ave S
24th Pl S
34th Ave S
S 249th Pl
S 250th St
S 250th Pl
36th Ave S
S 252nd St
S 252nd Pl
37th Pl S
S 254th St
22nd Ave S
S 254th Ct
29th Ave S
31st Ave S
30th Ave S
32nd Pl S
33rd Pl S
34th Pl S
36th Pl S
S 253
S 254th Pl
38th Pl S
S 255th St
S 255th Pl
S 256th St
S 256th Ct
S 257th Pl
33rd Ave S
S 259th Ct
S 259th Pl
S 259th Ln
Reith Rd
27th Pl
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4-4.1
Architectural Inventory
Midway Landfill Alternative

OMF South

5/9/2023 | ST_OMFS_Ph2 | FigG4-4X_Attchmt_HistoricSurveyParcels.mxd


Evaluation Jurisdiction
🟩 Built 1975 or Earlier (Age Criteria for Local/State/ National Listing)
🟦 Built 1975-1985 (Age Criteria for Local Listing Only)
🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
City Boundary
S 316th St
23rd Av
S 316th Ln
Pete Von Reichbauer Way S
Gateway Center Blvd S
25th Ave S
40 mph Alignment
55mph Design Option
OMF097
S 324th St
17th Ave S
S 324th Pl
13th Pl S
OMF102
20th Way S
S 327th Ln
19th Pl S
5
99
22nd Ave S
S 330th St
19th Ln S
OMF108
22nd Pl S
17th Pl S
15th Ave S
S 331st St
Federal Way
OMF110
OMF111
OMF113
OMF114
OMF115
OMF102
OMF117
13th Pl S
17th Ln S
S 333rd St
OMF122
OMF121
22nd Ln S
OMF123
S 334th Ln
OMF125
20th Ave S
18th Ave S
OMF126
OMF127
OMF132
S 336th St
32nd Dr S
Weyerh

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

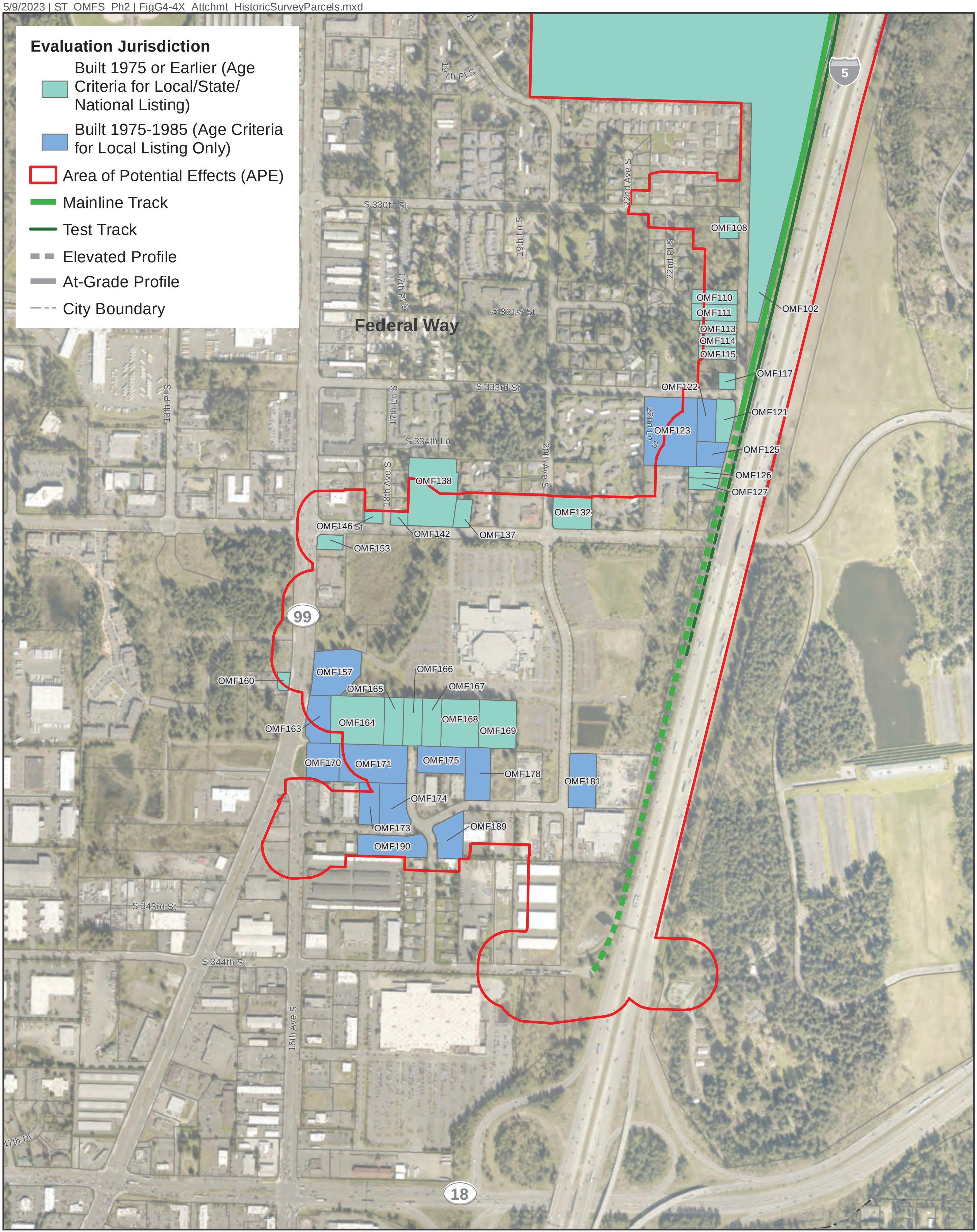
N

0 500 1,000 Feet

FIGURE G4-4.2
Architectural Inventory
Mainline Track Options

OMF South

5/9/2023 | ST OMFS Ph2 | FigG4-4X Attchmt HistoricSurveyParcels.mxd


Evaluation Jurisdiction
🟩 Built 1975 or Earlier (Age Criteria for Local/State/ National Listing)
🟦 Built 1975-1985 (Age Criteria for Local Listing Only)
🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
City Boundary
Federal Way
5
99
18
S 330th St
S 331st St
S 333rd St
S 334th Ln
S 343rd St
S 344th St
19th Pl S
17th Pl S
19th Ln S
22nd Ave S
22nd Pl S
13th Pl S
17th Ln S
18th Ave S
20th Ave S
22nd Ln S
16th Ave S
47th Pl
OMF102
OMF108
OMF110
OMF111
OMF113
OMF114
OMF115
OMF117
OMF121
OMF122
OMF123
OMF125
OMF126
OMF127
OMF132
OMF137
OMF138
OMF142
OMF146
OMF153
OMF157
OMF160
OMF163
OMF164
OMF165
OMF166
OMF167
OMF168
OMF169
OMF170
OMF171
OMF173
OMF174
OMF175
OMF178
OMF181
OMF189
OMF190

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

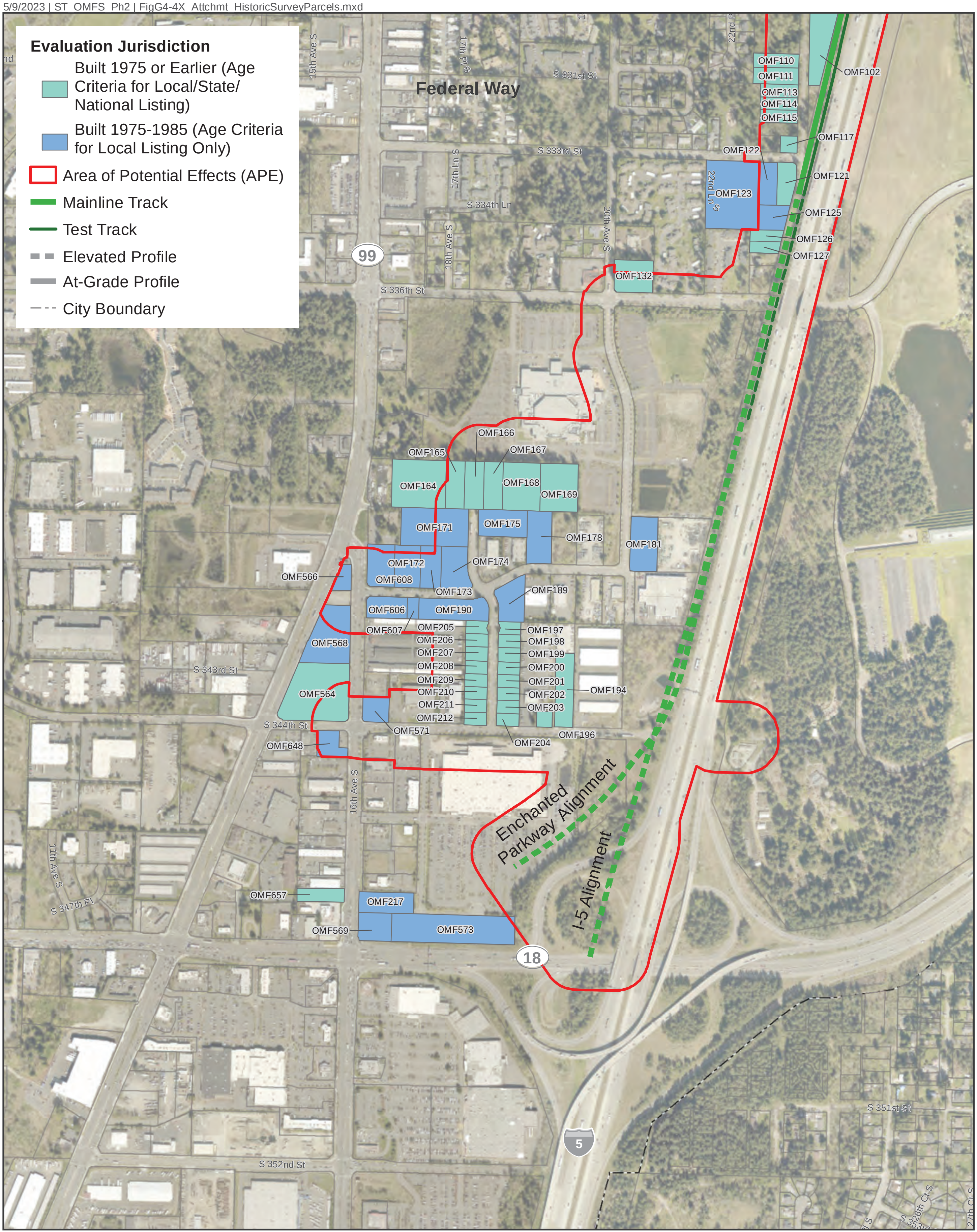
N

0 500 1,000 Feet

FIGURE G4-4.3
Architectural Inventory
Preferred Alternative

OMF South

5/9/2023 | ST_OMFS_Ph2 | FigG4-4X_Attchmt_HistoricSurveyParcels.mxd


Evaluation Jurisdiction
🟩 Built 1975 or Earlier (Age Criteria for Local/State/ National Listing)
🟦 Built 1975-1985 (Age Criteria for Local Listing Only)
🟥 Area of Potential Effects (APE)
Mainline Track
Test Track
Elevated Profile
At-Grade Profile
City Boundary
Federal Way
15th Ave S
17th Pl S
S 331st St
22nd Pl S
S 333rd St
17th Ln S
S 334th Ln
18th Ave S
20th Ave S
22nd Ln S
99
S 336th St
S 343rd St
S 344th St
16th Ave S
11th Ave S
S 347th Pl
18
5
S 351st St
S 352nd St
OMF102
OMF110
OMF111
OMF113
OMF114
OMF115
OMF117
OMF121
OMF122
OMF123
OMF125
OMF126
OMF127
OMF132
OMF164
OMF165
OMF166
OMF167
OMF168
OMF169
OMF171
OMF172
OMF173
OMF174
OMF175
OMF178
OMF181
OMF189
OMF190
OMF194
OMF196
OMF197
OMF198
OMF199
OMF200
OMF201
OMF202
OMF203
OMF204
OMF205
OMF206
OMF207
OMF208
OMF209
OMF210
OMF211
OMF212
OMF217
OMF564
OMF566
OMF568
OMF569
OMF571
OMF573
OMF606
OMF607
OMF608
OMF648
OMF657
Enchanted Parkway Alignment
I-5 Alignment
N
0
500
1,000 Feet

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

FIGURE G4-4.4
Architectural Inventory
South 344th Street Alternative

OMF South

Operations and Maintenance Facility South

ATTACHMENT G4-5

Historic Property Inventory Forms

Federal Transit Administration

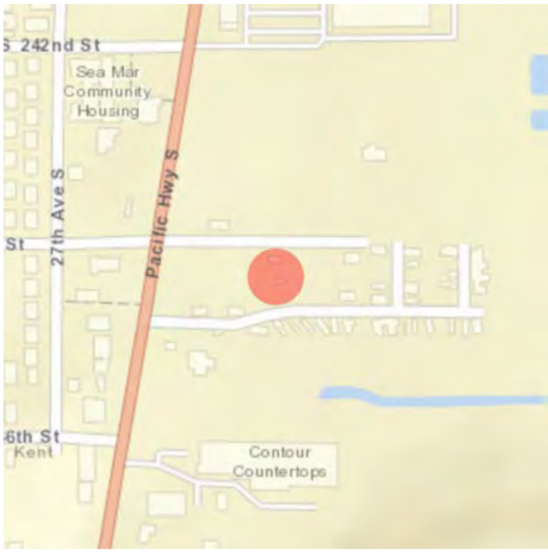
SOUNDTRANSIT

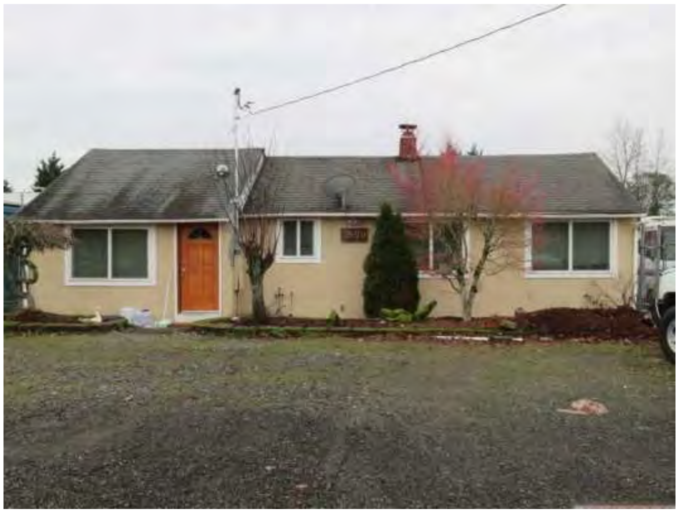
Historic Property Report

Resource Name: Residence

Property ID: 395452

Location


S 242nd St
Sea Mar Community Housing
27th Ave S
Pacific Hwy S
St
6th St
Kent
Contour Countertops



Address:	2859 S 244TH ST, KENT, WA
Tax No/Parcel No:	2122049069
Plat/Block/Lot:	BEG ON N LN OF SE 1/4 OF NE 1/4 AT A PT 279.34 FT
Geographic Areas:	King County, DES MOINES Quadrangle, T22R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1948	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

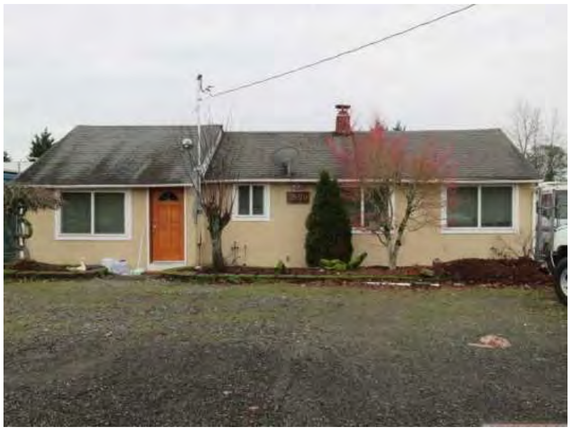
Local Registers and Districts

Name	Date Listed	Notes

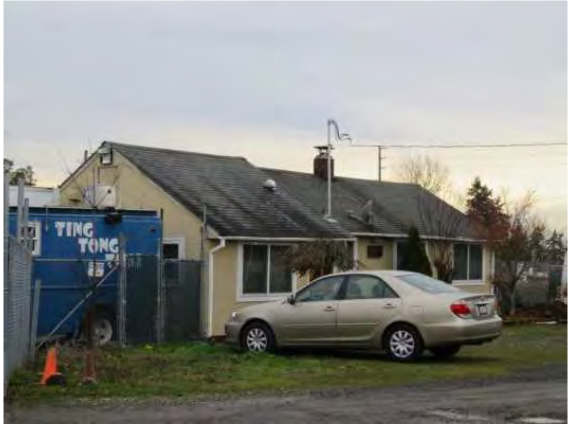
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00115, , Assessors Data Project: King County H	7/5/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2859 S 244th Street, view south.JPG



2859 S 244th Street, view southwest.JPG

Inventory Details - 7/5/2011

Common name:	
Date recorded:	7/5/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2122049069
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2859 S 244th Street, Kent, is located in King County. According to the county assessor, the structure was built in 1948 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Stucco
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1948), 2859 S 244th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location. Evaluation The building at 2859 S 244th Street was constructed in 1948 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 2859 S 244th Street does not retain integrity from its period of construction (1948) and is not eligible any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1948, the residential building at 2859 S 244th Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in stucco, and is topped by a telescoping side-gabled roof clad in asphalt roofing. Windows throughout were vinyl framed in altered fenestration. The building is surrounded by heavy commercial development.
Bibliography:	Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020. Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019. King County Tax Assessor 2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020. Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy. NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020. Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

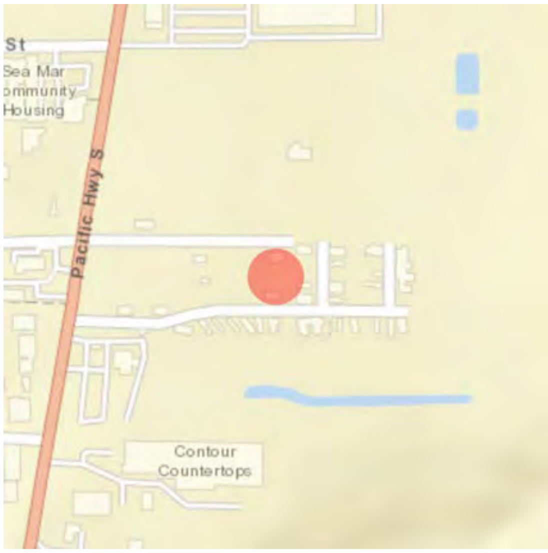
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

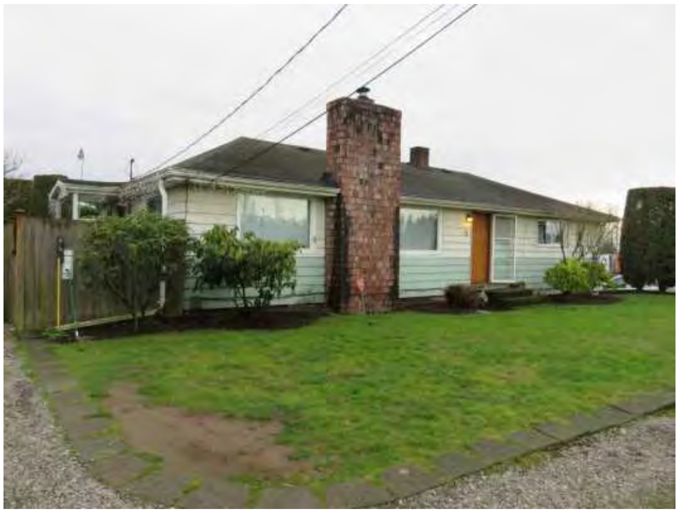
Historic Property Report

Resource Name: Residence

Property ID: 391007

Location





Address:	2907 S 244TH ST, KENT, WA
Tax No/Parcel No:	2122049111
Plat/Block/Lot:	E 1/2 OF FOLG POR OF N 1/2 OF N 1/2 OF SE 1/4 OF N
Geographic Areas:	King County, DES MOINES Quadrangle, T22R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1952	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

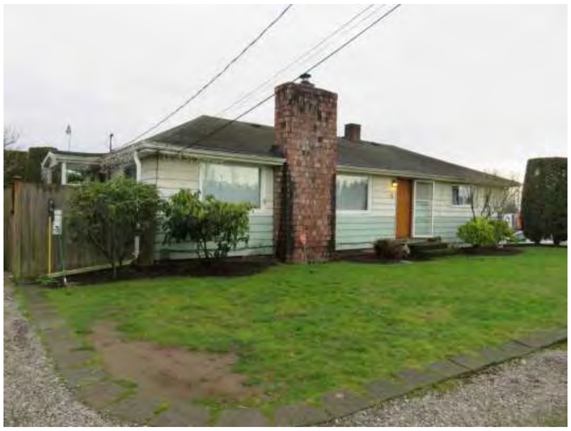
Local Registers and Districts

Name	Date Listed	Notes

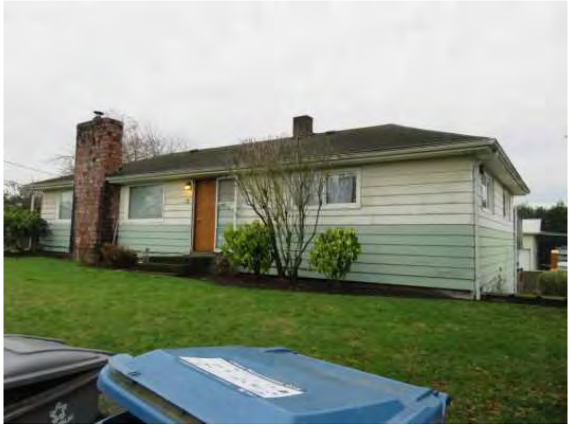
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00115, , Assessors Data Project: King County H	7/5/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Determined Not Eligible	Holly Borth, 1/20/2021

Photos



2907 S 244th Street, view southwest



2907 S 244th Street, view southeast

Historic Property Report

Resource Name: Residence

Property ID: 391007

Inventory Details - 7/5/2011

Common name:	
Date recorded:	7/5/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2122049111
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2907 S 244th Street, Kent, is located in King County. According to the county assessor, the structure was built in 1952 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Vinyl Siding
Roof Type	Hip
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Bungalow
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1952), 2907 S 244th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 2907 S 244th Street was constructed in 1952 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, as initially constructed, may have embodied the distinctive characteristics of the Ranch style; however, alterations to windows, siding, and other materials have rendered the building unable to convey significance as a representative example of its type (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 2907 S 244th Street does not retain integrity from its period of construction (1952) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1952, the residential building at 2907 S 244th Street fronts north (King County Assessor 2020). The one-story, rectangular building on daylight basement sits on a poured-concrete foundation, is clad in vinyl siding, and is topped by a hipped roof clad in asphalt roofing. Visible windows were vinyl framed in altered fenestration. The slightly off-center wood entry door is accessed via a two-step concrete stoop. An exterior brick chimney is located on the north facade toward the east, flanked by two picture windows. A second, smaller chimney is located on the ridgeline toward to the west.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

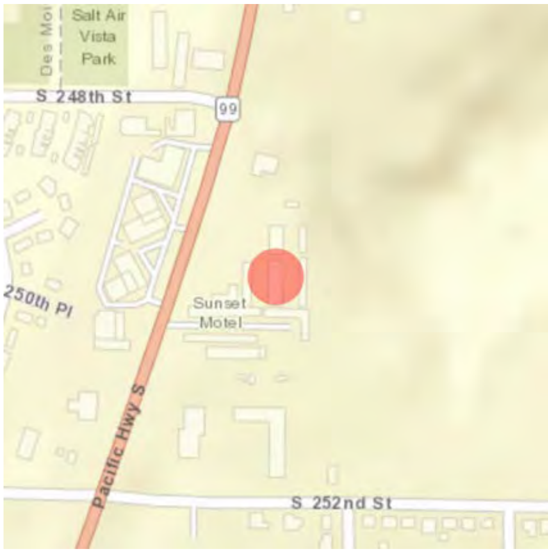
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

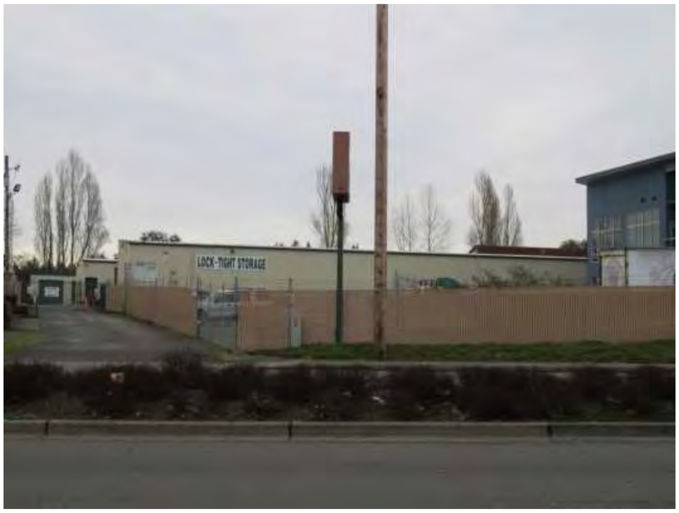
Historic Property Report

Resource Name: Lock-Tight Storage

Property ID: 721224

Location


Salt Air
Vista
Park
Des Moi
S 248th St
99
250th Pl
Sunset
Motel
Pacific Hwy S
S 252nd St


LOCK-TIGHT STORAGE

Address: 24852 Pacific Hwy S, Kent, Washington, 98032

Geographic Areas: T22R04E21, King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1974	☑

Historic Use:

Category	Subcategory
Commerce/Trade	Commerce/Trade - Warehouse
Commerce/Trade	Commerce/Trade - Warehouse

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

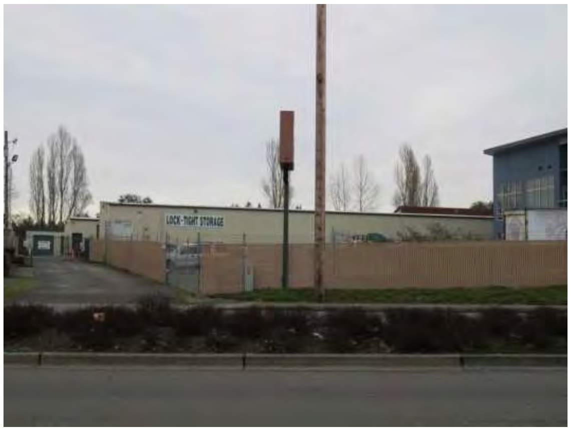
Local Registers and Districts

Name	Date Listed	Notes

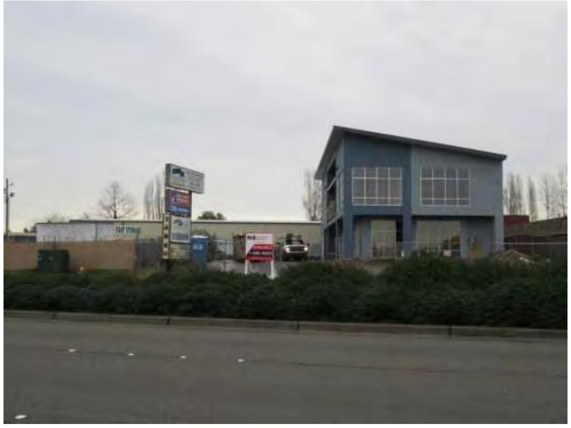
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

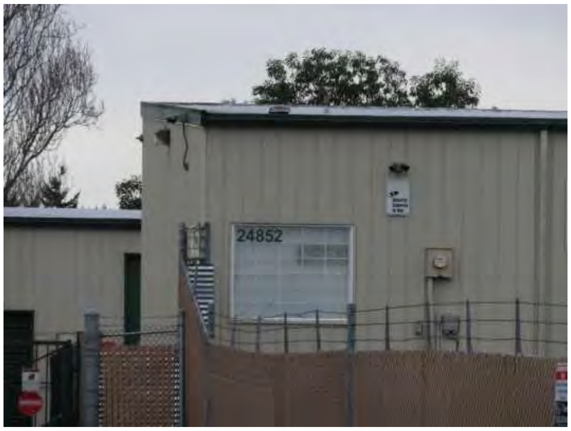
Photos



24852 Pacific Highway S, view southeast.JPG



24852 Pacific Highway S, view east



24852 Pacific Highway S, view east.JPG

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Metal
Roof Type	Shed
Roof Material	Metal
Structural System	Wood - Platform Frame
Form Type	Commercial
Foundation	Concrete - Poured

Styles:

Period	Style Details
Late 19th and Early 20th Century American Movements	Commercial

Surveyor Opinion

Significance narrative:	Integrity From their period of construction (1974), the buildings at 24852 Pacific Highway S appear to retain poor integrity of materials, design, and workmanship, due to a loss of at least some historic-period windows. The buildings retain integrity of location, setting, feeling, and association. Evaluation Three similar buildings are located at 24852 Pacific Highway S and were known as Lock-Tight Storage at the time of survey. The buildings were constructed in 1974 and do not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resources with the lives of significant persons (Criterion B). The buildings do not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the buildings were built of common construction methods and well-known materials and are unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 24852 Pacific Highway S does not retain integrity from its period of construction (1974) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1974, the three commercial buildings at 24852 Pacific Highway S are located to the rear of a newer building facing south toward Pacific Highway. They are only partially visible from the ROW (King County Assessor 2020). The one-story, rectangular buildings sit on unknown foundations, are clad in vertical metal siding, and are topped by shed and shallow gable roofs clad in metal roofing. While fenestration is mostly screened from view, except for some garage bays, the most visible building includes at least one faux-grid vinyl-framed window.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

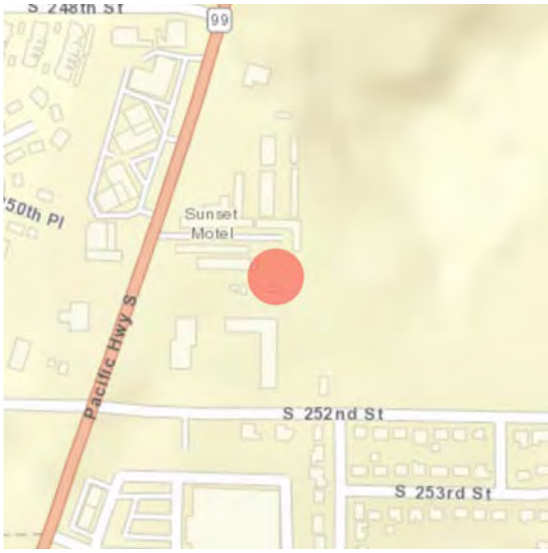
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

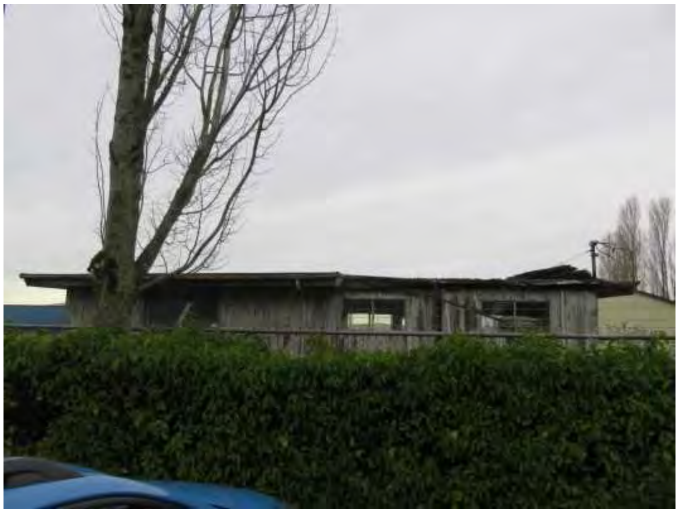
Historic Property Report

Resource Name: Commercial Building

Property ID: 339504

Location





Address:	25036 PACIFIC HWY S, KENT, WA
Tax No/Parcel No:	2122049154
Plat/Block/Lot:	LOT 1 KENT SPC 75-14 REC AF # 7512030325 SD PLAT D
Geographic Areas:	King County, DES MOINES Quadrangle, T22R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1966	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Multiple Family House
Domestic	Domestic - Multiple Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

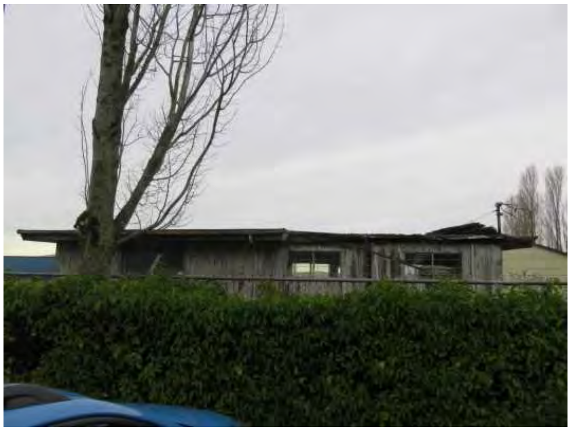
Local Registers and Districts

Name	Date Listed	Notes

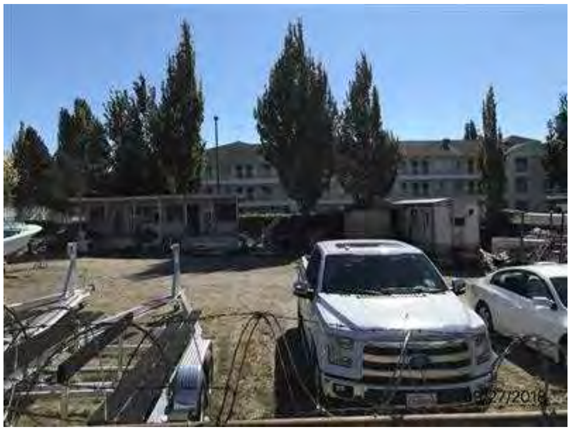
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00111, , Assessors Data Project: King County E	7/2/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

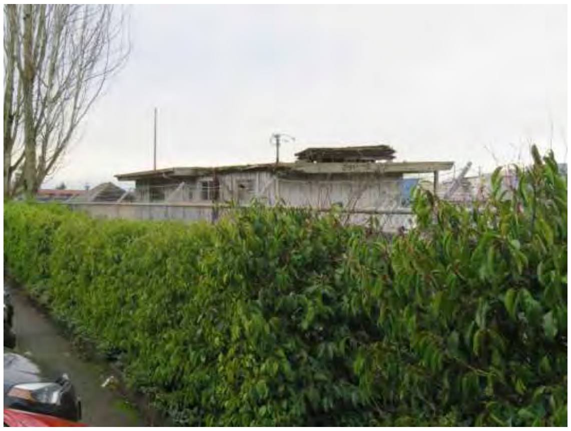
Photos



25036 Pacific Highway S, view north.JPG



25036 Pacific Hwy, courtesy of King County Assessor, 2018



25036 Pacific Highway S, view northwest.JPG

Historic Property Report

Resource Name: Commercial Building

Property ID: 339504

Inventory Details - 7/2/2011

Common name:	
Date recorded:	7/2/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2122049154
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Commercial
Structural System	Wood - Platform Frame

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The building at 25036 Pacific Highway S, Kent, is located in King County. According to the county assessor, the structure was built in 1966 and is a professional building. Also according to the county assessor, the structure was remodeled in 1976. The 1-story building has a commercial form.

Historic Property Report

Resource Name: Commercial Building

Property ID: 339504

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Wood - T 1-11
Roof Type	Shed
Foundation	Concrete - Poured
Form Type	Commercial
Roof Material	Asphalt/Composition - Rolled
Structural System	Wood - Post and Beam

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1966), 25036 Pacific Highway S appears to retain poor integrity of materials, design, workmanship, setting, location, feeling, and association.
Evaluation
The building at 25036 Pacific Highway S was constructed in 1966 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 25036 Pacific Highway S does not retain integrity from its period of construction (1966) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1966, the vacant building at 25036 Pacific Highway S fronts north (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation, is clad in T1-11 siding, and is topped by a shed roof. The building was minimally visible from the ROW and included at least some aluminum-framed windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

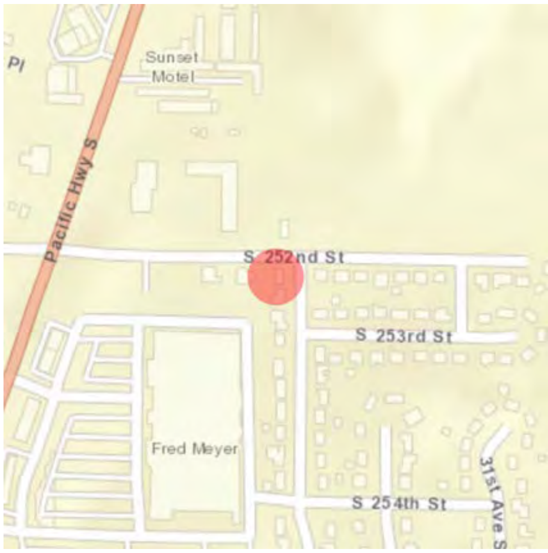
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

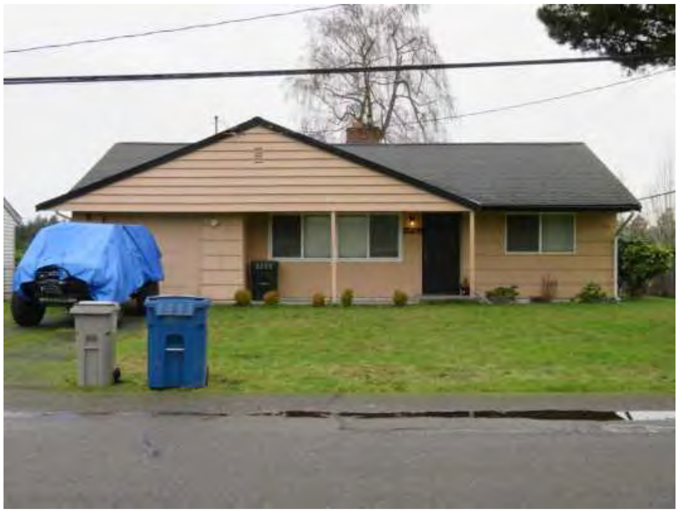
Historic Property Report

Resource Name: Residence

Property ID: 318482

Location


Sunset Motel
Pacific Hwy S
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address:	25205 29TH AVE S, KENT, WA
Tax No/Parcel No:	1950900005
Plat/Block/Lot:	DEL MAR ADD # 8
Geographic Areas:	King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1958	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

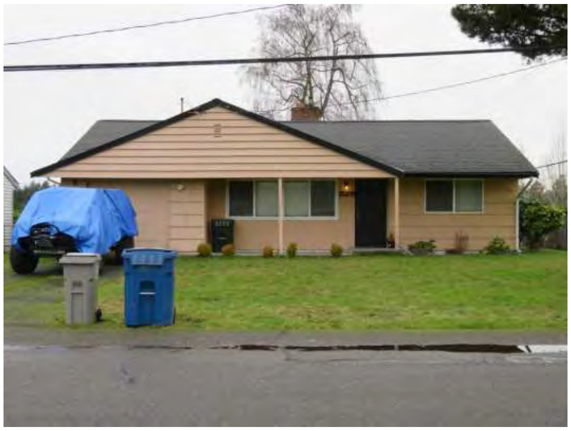
Local Registers and Districts

Name	Date Listed	Notes

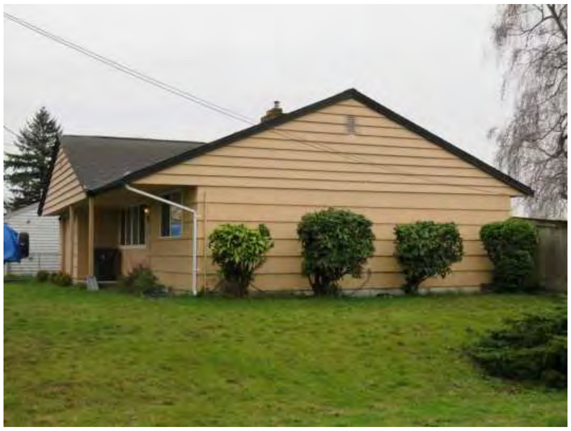
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



25205 29th Avenue S, view west.JPG



25205 29th Avenue S, view south.JPG

Historic Property Report

Resource Name: Residence

Property ID: 318482

Inventory Details - 7/10/2011

Common name:	
Date recorded:	7/10/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1950900005
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 25205 29th Avenue S, Kent, is located in King County. According to the county assessor, the structure was built in 1958 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - Vertical Boards
Cladding	Wood - Shingle
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1958), 25205 29th Avenue S retains poor integrity of materials, design, and workmanship, due to a loss of all historic-period windows and some cladding, which have been either altered or covered. The building retains integrity of location, setting, feeling, and association.

Evaluation

The building at 25205 29th Avenue S was constructed in 1958 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 25205 29th Avenue S does not retain integrity from its period of construction (1958) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description: Built in 1958, the residential building at 25205 29th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of vertical bead-board, shingles, and horizontal-board siding. The building is topped by a side-gabled roof with a projecting front-gabled porch, clad in asphalt roofing. All visible windows are vinyl-framed in altered fenestration. An attached garage is located on the south side of the residence.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

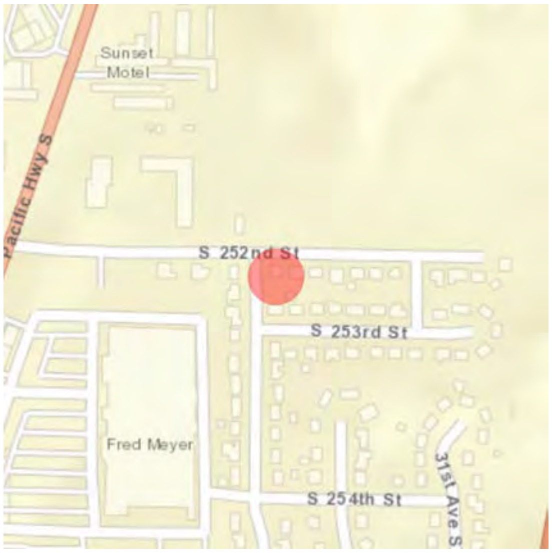
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

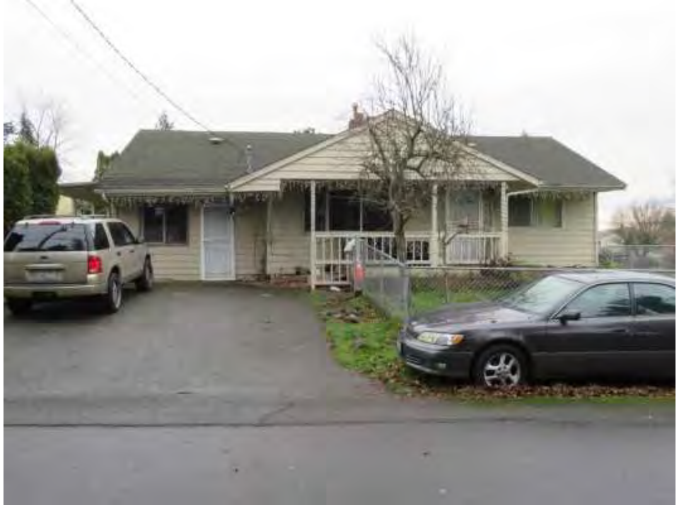
Historic Property Report

Resource Name: Residence

Property ID: 396965

Location


Sunset Motel
Pacific Hwy S
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address:	2905 S 252ND ST, KENT, WA
Tax No/Parcel No:	1950900055
Plat/Block/Lot:	DEL MAR ADD # 8
Geographic Areas:	King County, DES MOINES Quadrangle, T22R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

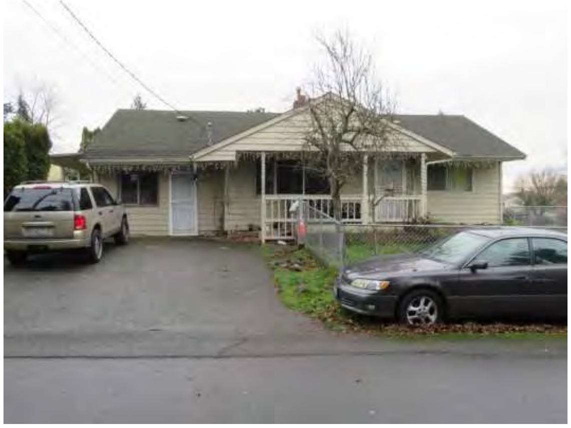
Local Registers and Districts

Name	Date Listed	Notes

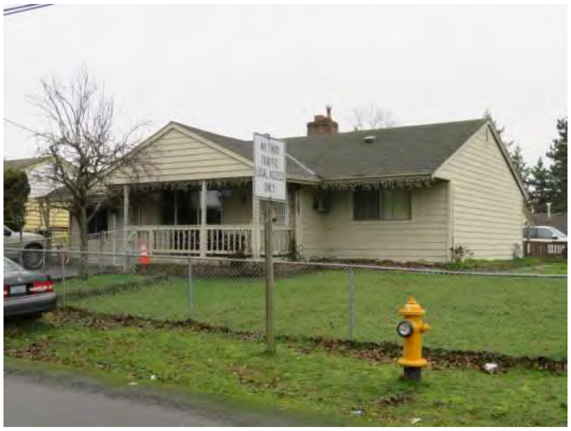
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2905 S 252nd Street, view south.JPG



2905 S 252nd Street, view southeast.JPG

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1950900055
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2905 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 396965

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1957), 2905 S 252nd Street retains poor integrity of materials, design, workmanship, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the conversion of the garage to living space. The building retains integrity of location, setting, and feeling. Evaluation The commercial building at 2905 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 2905 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1957, the residential building at 2905 S 252nd Street fronts north (King County Assessor 2020). The roughly rectangular one-story building sits on a poured-concrete foundation and is clad in horizontal board siding. The building is topped by a side-gabled roof with a projecting front-gabled porch clad in asphalt roofing. Windows throughout appear to be a combination of wood-, aluminum-, and vinyl-framed, some with storm windows. The original garage, located on the east side of the building, has been converted to living space and includes a pedestrian door.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 396965

Inventory Details - 3/12/2020

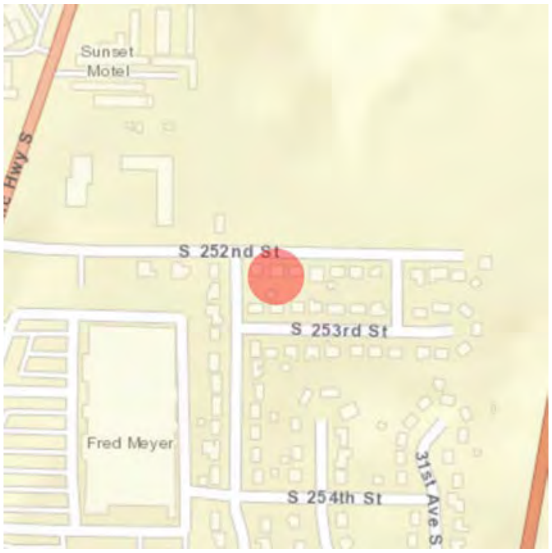
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

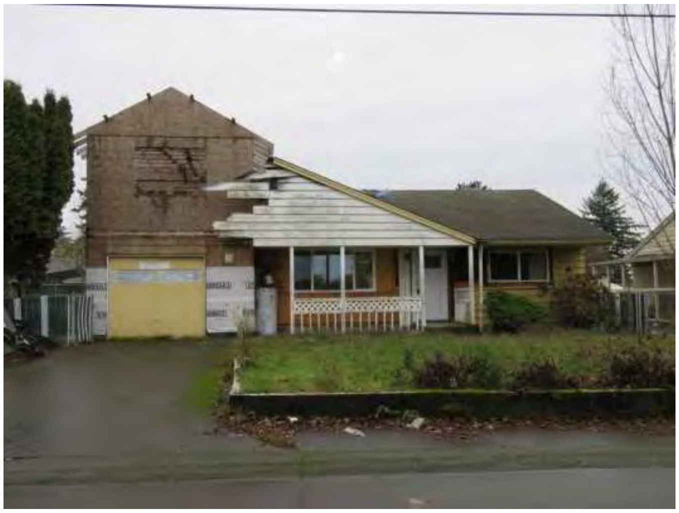
Historic Property Report

Resource Name: Residence

Property ID: 314120

Location


Sunset Motel
Hwy S
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address: 2911 S 252ND ST, KENT, WA

Tax No/Parcel No: 1950900060

Plat/Block/Lot: DEL MAR ADD # 8

Geographic Areas: King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑
Addition	2020	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

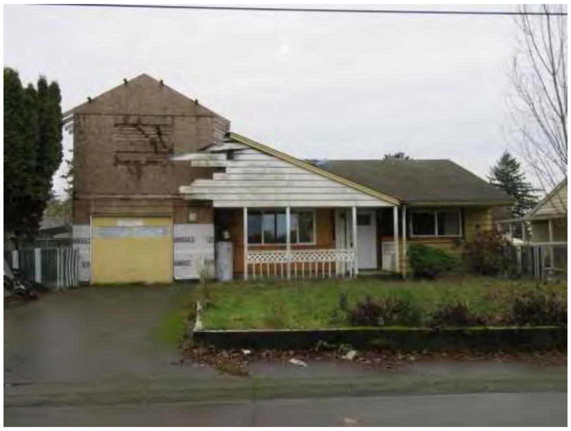
Local Registers and Districts

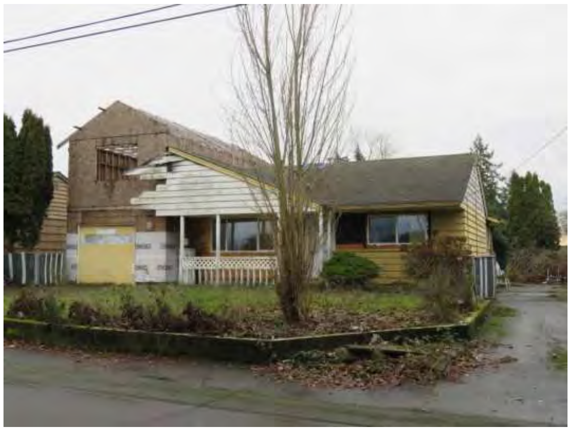
Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos


2911 S 252nd Street, view southwest.JPG


2911 S 252nd Street, view southeast.JPG

Inventory Details - 7/9/2011

Common name:

Date recorded: 7/9/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 1950900060

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2911 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1957), 2911 S 252nd Street retains poor integrity of materials, design, workmanship, feeling, and association, due to a loss of all historic-period windows and the addition of a two-story massing to the east. The building retains integrity of location and setting. Evaluation The building at 2911 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 2911 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1957, the residential building at 2911 S 252nd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in horizontal board siding, and has a side-gable roof. At the time of survey, the building was in a state of construction, with a two-story massing under construction on the east side of the building, which cut through the projecting front-gabled porch. All visible windows were vinyl framed in altered fenestration.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 314120

Inventory Details - 3/12/2020

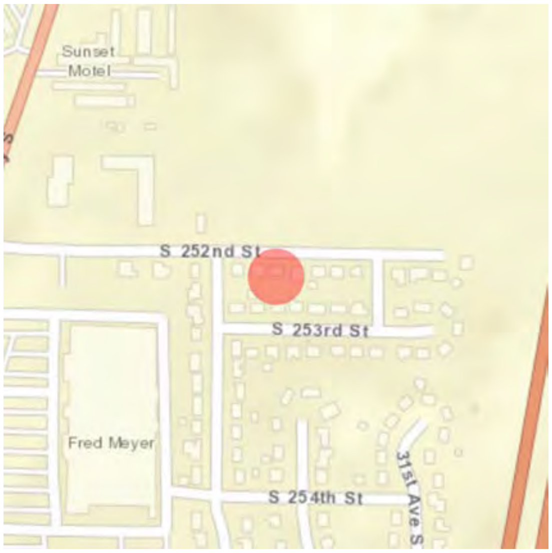
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

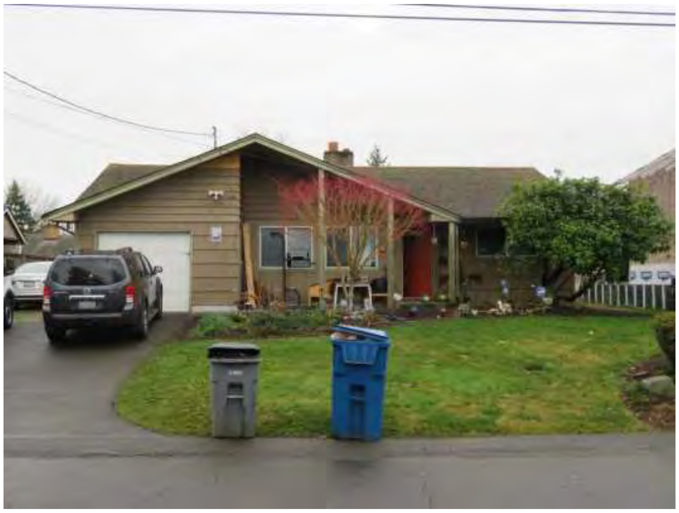
Historic Property Report

Resource Name: Residence

Property ID: 307746

Location


Sunset Motel
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address:	2919 S 252ND ST, KENT, WA
Tax No/Parcel No:	1950900065
Plat/Block/Lot:	DEL MAR ADD # 8
Geographic Areas:	King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

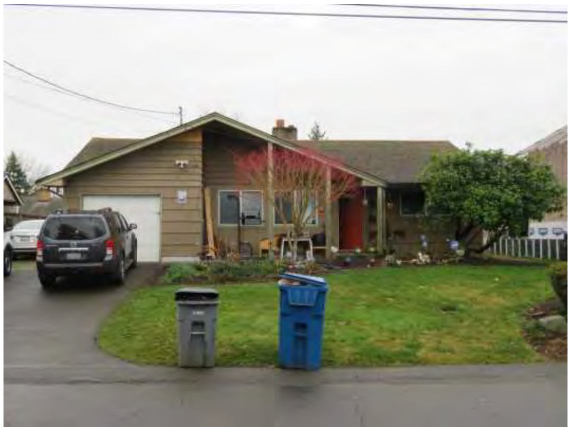
Local Registers and Districts

Name	Date Listed	Notes

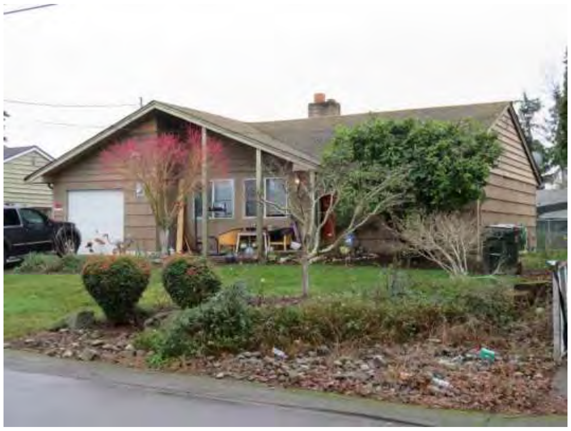
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2919 S 252nd Street, view south.JPG



2919 S 252nd Street, view southeast.JPG

Historic Property Report

Resource Name: Residence

Property ID: 307746

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1950900065
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2919 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - T 1-11
Cladding	Wood - Shingle
Cladding	Wood
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1957), 2919 S 252nd Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and some cladding, which have been either altered or covered. The building retains integrity of location and setting.

Evaluation

The residential building at 2919 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 2919 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1957, the residential building at 2919 S 252nd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of shingles, horizontal boards, and T1-11 siding. The building is topped by a cross-gabled roof clad in asphalt/composition roofing; on the facade, the north-facing gable is supported by three square posts. Windows throughout appear to be vinyl framed in altered fenestration.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

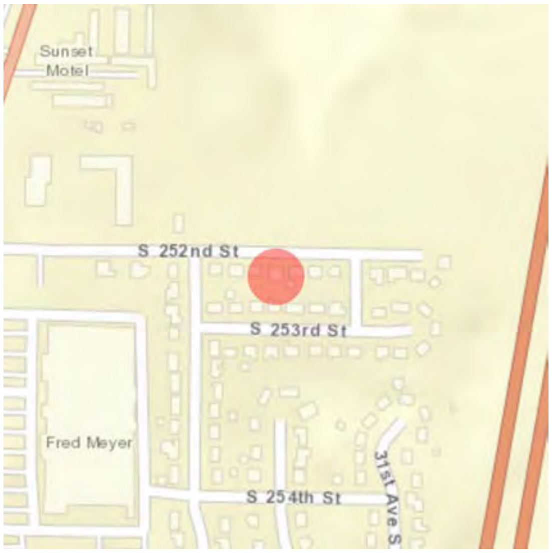
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

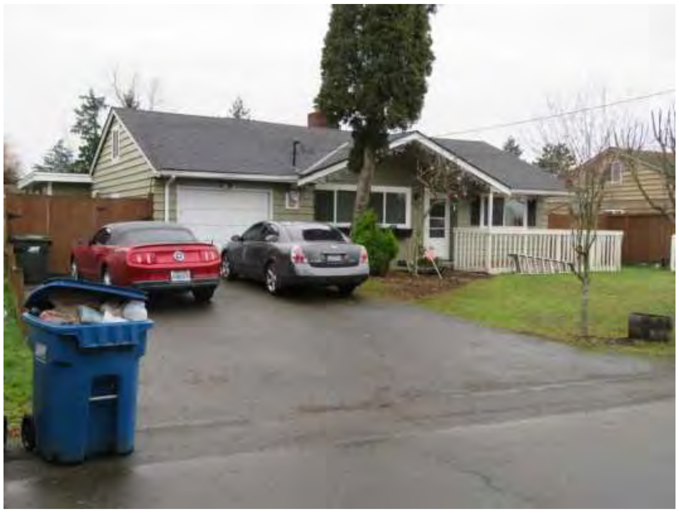
Historic Property Report

Resource Name: Residence

Property ID: 323139

Location


Sunset Motel
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address:	2925 S 252ND ST, KENT, WA
Tax No/Parcel No:	1950900070
Plat/Block/Lot:	DEL MAR ADD # 8
Geographic Areas:	King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

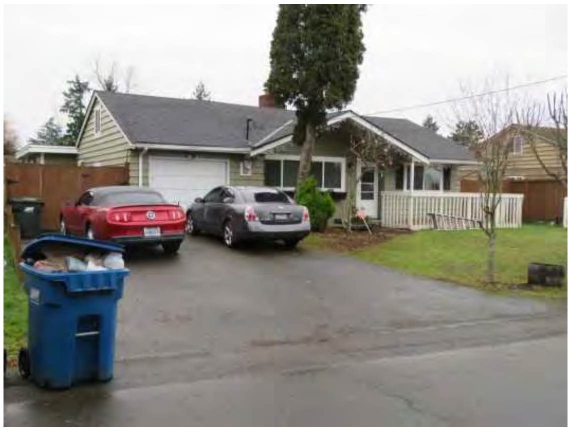
Local Registers and Districts

Name	Date Listed	Notes

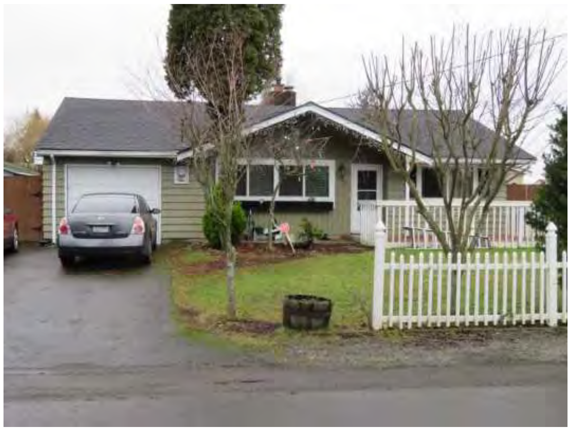
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2925 S 252nd Street, view southwest.JPG



2925 S 252nd Street, view south.JPG

Historic Property Report

Resource Name: Residence

Property ID: 323139

Inventory Details - 7/10/2011

Common name:	
Date recorded:	7/10/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1950900070
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2925 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. Also according to the county assessor, the structure was remodeled in 2000. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - Clapboard
Cladding	Wood - T 1-11
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Structural System	Wood - Platform Frame
Form Type	Single Dwelling - Ranch

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1957), 2925 S 252nd Street retains poor integrity of materials, design, and workmanship, due to a loss of all historic-period windows and some cladding, which have been either altered or covered. The building retains integrity of location, setting, feeling, and association.

Evaluation

The building at 2925 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 2925 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description: Built in 1957, the domestic building at 2925 S 252nd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in a combination of wood clapboard and T1-11 siding, and is topped by a side-gabled roof with a projecting front-gabled porch. Visible windows are vinyl framed in altered fenestration. An attached garage is located on the building's east end.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

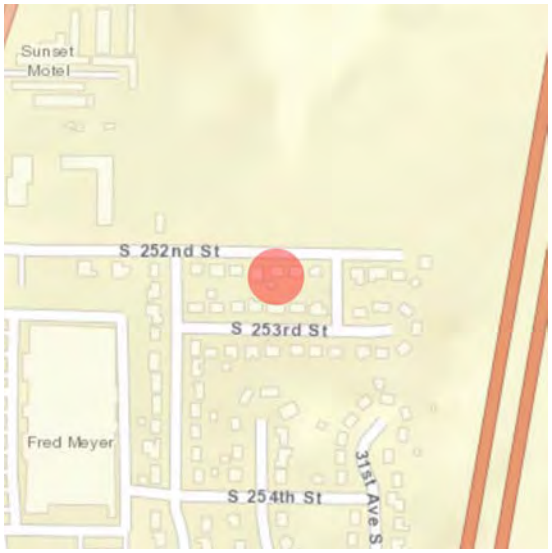
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

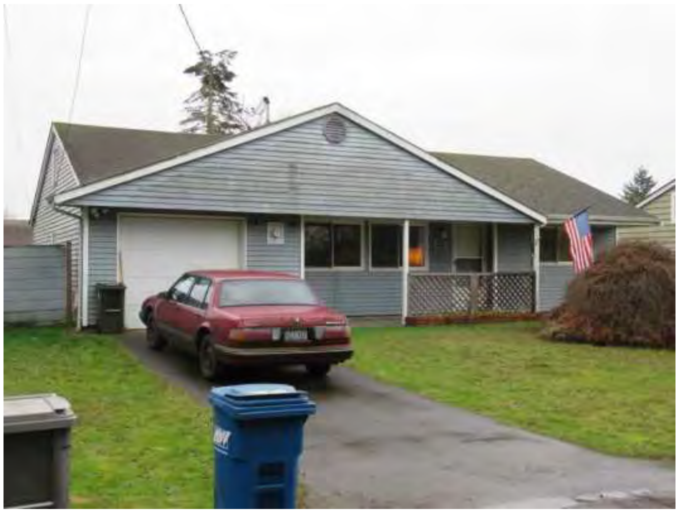
Historic Property Report

Resource Name: Residence

Property ID: 309649

Location


Sunset Motel
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address:	2933 S 252ND ST, KENT, WA
Tax No/Parcel No:	1950900075
Plat/Block/Lot:	DEL MAR ADD # 8
Geographic Areas:	King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

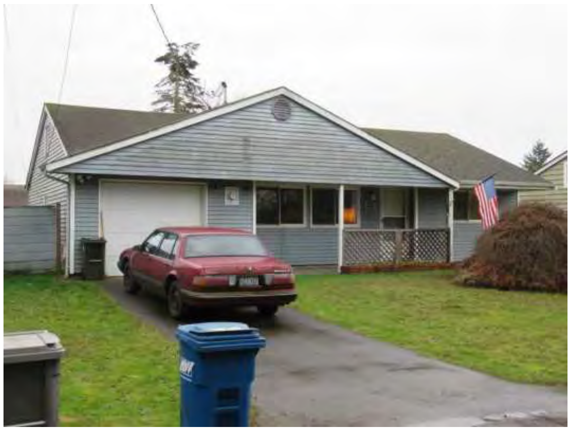
Local Registers and Districts

Name	Date Listed	Notes

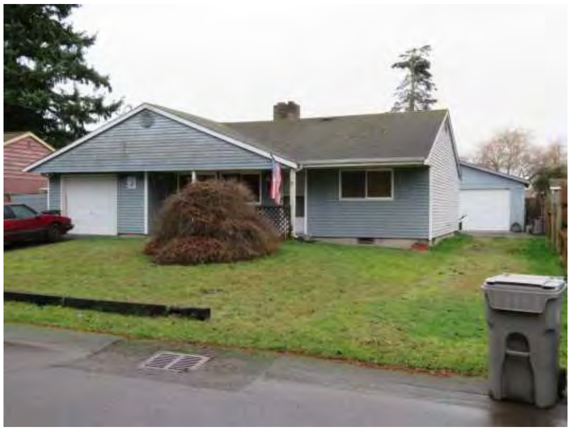
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/8/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2933 S 252nd Street, view southwest.JPG



2933 S 252nd Street, view southeast.JPG

Inventory Details - 7/8/2011

Common name:	
Date recorded:	7/8/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1950900075
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2933 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:

Date recorded: 2/14/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Vinyl Siding
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1957), 2933 S 252nd Street retains poor integrity of materials, design, and workmanship, due to a loss of all historic-period windows and cladding, which have been either altered or covered. The building retains integrity of location, setting, feeling, and association.

Evaluation

The building at 2933 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 2933 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1957, the residential building at 2933 S 252nd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in vinyl siding, and is topped by a side-gabled roof with a projecting front-gabled porch clad in asphalt/composition roofing. Windows throughout are vinyl framed in altered fenestration. An attached garage is located on the building's east end.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

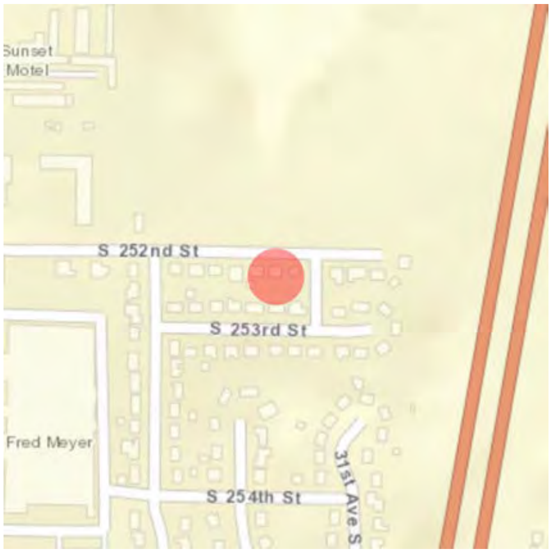
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

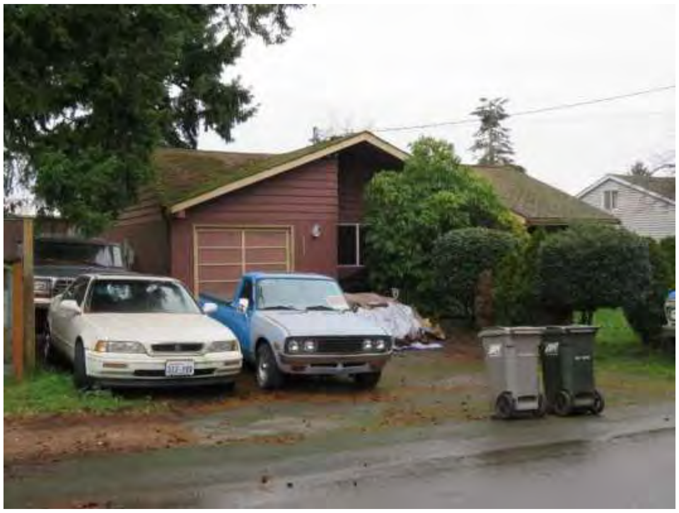
Historic Property Report

Resource Name: Residence

Property ID: 317877

Location


Sunset Motel
S 252nd St
S 253rd St
Fred Meyer
S 254th St
31st Ave S



Address: 2939 S 252ND ST, KENT, WA

Tax No/Parcel No: 1950900080

Plat/Block/Lot: DEL MAR ADD # 8

Geographic Areas: King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

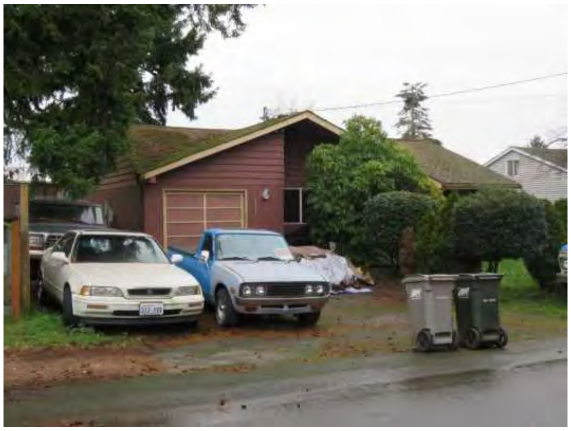
Local Registers and Districts

Name	Date Listed	Notes

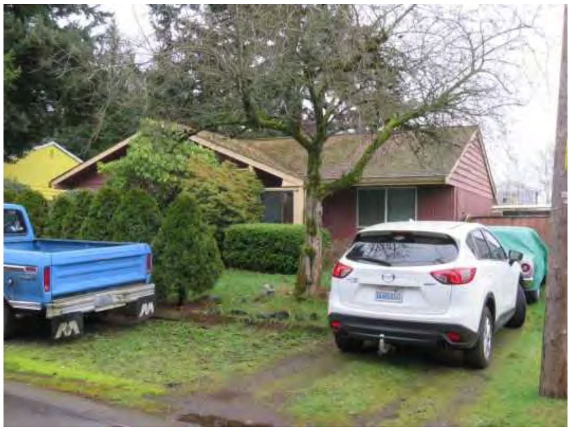
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



2939 S 252nd Street, view southwest.JPG



2939 S 252nd Street, view southeast.JPG

Inventory Details - 7/9/2011

Common name:

Date recorded: 7/9/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 1950900080

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2939 S 252nd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - Vertical Boards
Cladding	Wood
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1957), 2939 S 252nd Street retains poor integrity of materials, design, and workmanship, due to a loss of all historic-period windows and some cladding, which have been either altered or covered. The building retains integrity of location, setting, feeling, and association. Evaluation The building at 2939 S 252nd Street was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 2939 S 252nd Street does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1957, the domestic building at 2939 S 252nd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of vertical bead-board and horizontal board siding. The building is topped by a side-gabled roof with a projecting front gable over the attached garage and porch on the east end. The porch is clad in asphalt roofing. Windows were a combination of vinyl and aluminum framed in altered fenestration.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 317877

Inventory Details - 3/12/2020

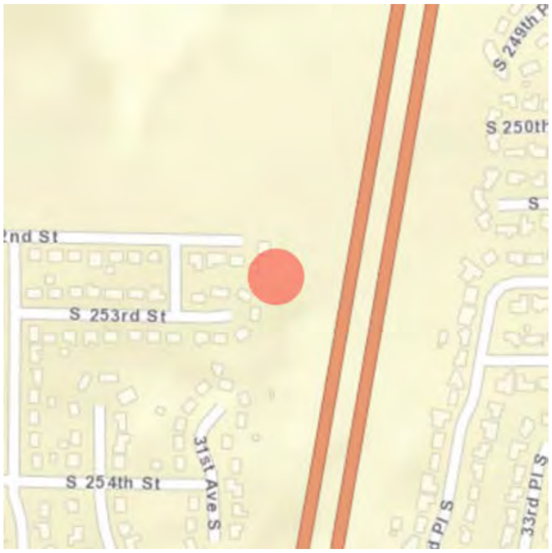
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

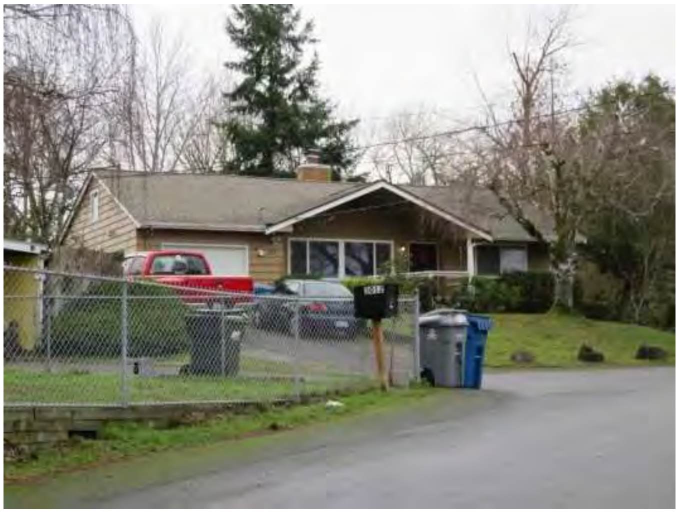
Historic Property Report

Resource Name: Residence

Property ID: 323891

Location


S 249th P
S 250th
S
2nd St
S 253rd St
S 254th St
31st Ave S
d Pl S
33rd Pl S



Address:	3018 S 253RD ST, KENT, WA
Tax No/Parcel No:	1951500015
Plat/Block/Lot:	DEL MAR ADD # 12 ALL 3 & POR OF 2 BEG ON ELY LNAT
Geographic Areas:	King County, DES MOINES Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1959	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

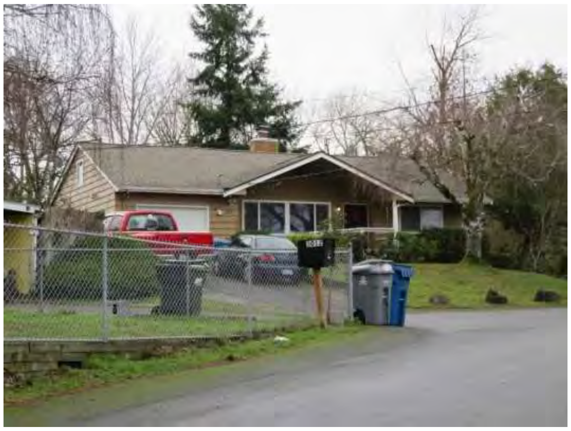
Local Registers and Districts

Name	Date Listed	Notes

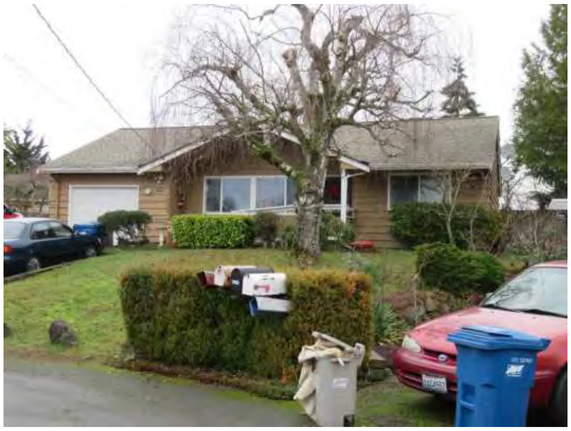
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



3018 S 253rd Street, view northeast.JPG



3018 S 253rd Street, view northwest.JPG

Historic Property Report

Resource Name: Residence

Property ID: 323891

Inventory Details - 7/11/2011

Common name:	
Date recorded:	7/11/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1951500015
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 3018 S 253rd Street, Kent, is located in King County. According to the county assessor, the structure was built in 1959 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/14/2020

Common name:

Date recorded: 2/14/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - Clapboard
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1959), 3018 S 253rd Street retains poor integrity of materials, design, and workmanship, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The building retains integrity of location, setting, feeling, and association. Evaluation The building at 3018 S 253rd Street was constructed in 1959 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 3018 S 253rd Street does not retain integrity from its period of construction (1959) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1959, the residential building at 3018 S 253rd Street fronts southwest (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in horizontal clapboard siding, and is topped by a side-gabled roof clad in asphalt roofing. An attached garage is located on the northwest side, and a central projecting gable porch covers the entry door. All windows are vinyl framed in altered fenestration.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

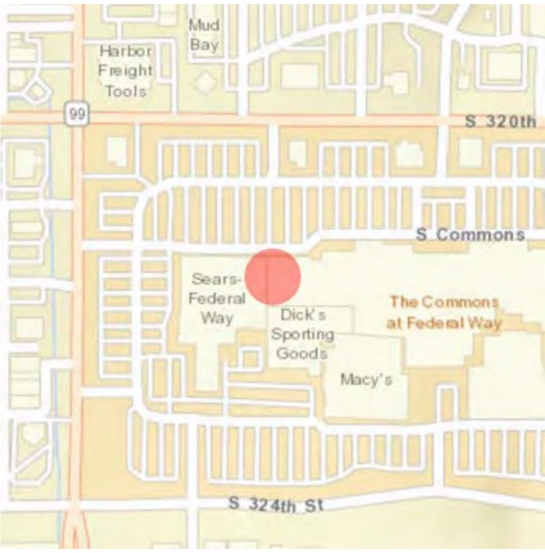
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

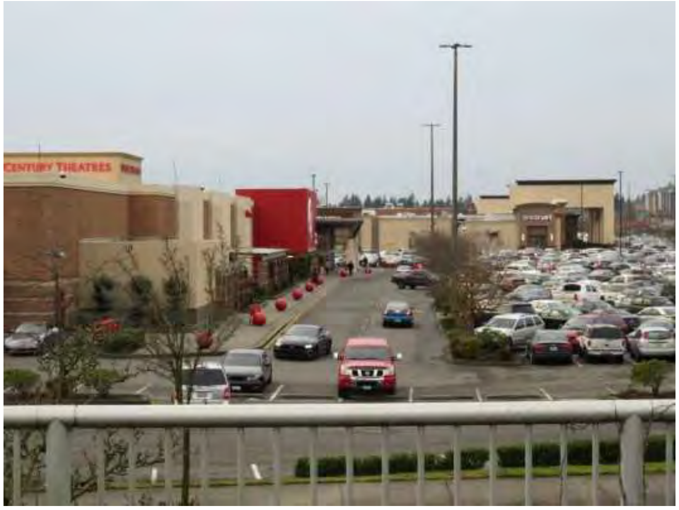
Historic Property Report

Resource Name: Sea Tac Mall

Property ID: 721219

Location


Mud Bay
Harbor Freight Tools
99
S 320th
S Commons
Sears-Federal Way
Dick's Sporting Goods
The Commons at Federal Way
Macy's
S 324th St


CENTURY THEATRES

Address:	1706 S Commons, Federal Way, Washington, 98003
Geographic Areas:	T21R04E16, King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1975	☑

Historic Use:

Category	Subcategory
Commerce/Trade	Commerce/Trade - Department Store
Commerce/Trade	Commerce/Trade - Warehouse
Commerce/Trade	Commerce/Trade - Department Store
Commerce/Trade	Commerce/Trade - Warehouse

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company
Architect	Nelson, Wall & Dolle
Architect	Mullvanny, Douglas

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	3/11/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos

CENTURY THEATRES

1706 S Commons, view north.JPG

1706 S Commons, view with retention pond, view northwest.JPG

SeaTacMall_FederalWay_The_Seattle_Times___April_30_1973__p17.pdf

Inventory Details - 2/14/2020

Common name:

Date recorded: 2/14/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Plan	Irregular
Cladding	Brick
Cladding	Stucco
Roof Type	Flat with Parapet
Form Type	Commercial - Mall
Roof Material	Asphalt/Composition - Built Up
Structural System	Masonry - Precast Concrete

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1975), 1706 S Commons retains moderate integrity of materials, design, and workmanship. It is assumed that the mall has housed numerous commercial retailers, many of which have standardized storefronts utilized nationwide. When such retailers come and go, minor changes to cladding, massing, and window and doors are expected. They lead to moderate changes in integrity. The building retains integrity of location, setting, feeling, and association.

Evaluation

The commercial building at 1706 S Commons, originally known as SeaTac Mall, was constructed in 1975 kitty-corner from Federal Way's first mall, which was built in 1955 (Stein 2003). Though the building attracted 20,000 enthusiastic visitors to its grand opening, the subject commercial strip mall does not appear, based on a review of historic maps and local histories, to have any specific or direct association with events that made a significant contribution to the broad patterns of local, state, or national history, aside from continued commercial growth along Federal Way. Were it the first mall in the region, it may be significant for its associations with commerce. However, the mall appears to be more appropriately understood as an addition to an existing shopping center at its time of construction (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 1706 S Commons is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description:

Built in 1975, the commercial building at 1706 S Commons fronts north (King County Assessor 2020). The irregular one-story building sits on a poured-concrete foundation, is clad in a combination of stucco siding and brick veneer, and is topped by a flat roof with parapet. At the time of survey the strip mall housed numerous big-box retailers, including a Target, Century Theatres, Kohl’s, and Macy’s. An associated retention pond is located south of the parking area with visible culverts.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/11/2020

Common name: The Commons at Federal Way

Date recorded: 3/11/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Surveyor Opinion

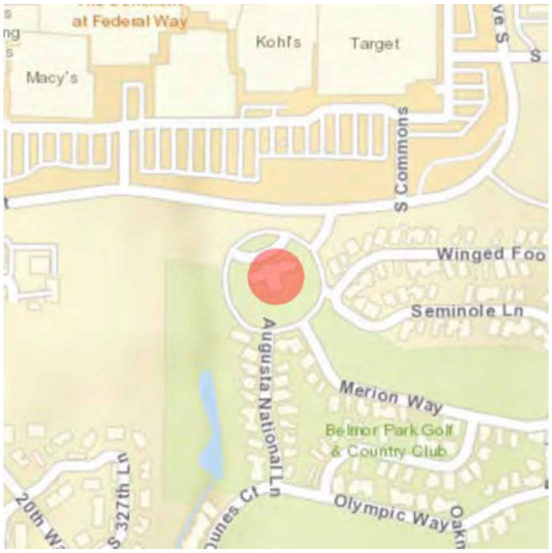
Significance narrative: The Commons at Federal Way (formerly SeaTac Mall) is a regional shopping mall located in Federal Way and is the only indoor shopping center in the city. The previous owners, Steadfast Commercial Properties, changed the name to The Commons at Federal Way. The original developer was Harry Newman of Newman Properties. SeaTac Mall opened in 1975 on a forested, swampy pasture that was the homestead of Mabel Webb Alexander, who arrived in Washington in 1879 and died at age 96. For many years the original SeaTac Mall used a thunderbird in the logo and had a mascot, Thudius T. Thunderbird.

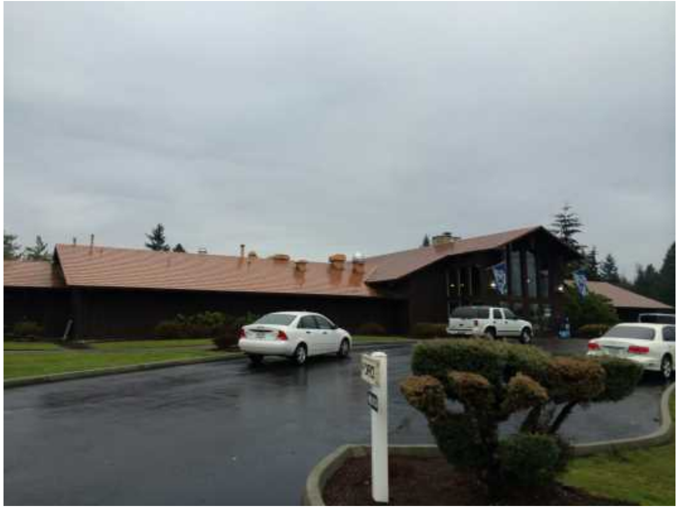
Historic Property Report

Resource Name: Belmor Park Mobile Home Park

Property ID: 674318

Location


at Federal Way
Kohl's
Target
Macy's
S Commons
Winged Foo
Seminole Ln
Augusta National Ln
Merion Way
Belmor Park Golf & Country Club
Olympic Way
Dunes Ct
S 327th Ln
20th W



Address:	2101 S 324th St, Federal Way, WA 98003
Tax No/Parcel No:	1621049037
Geographic Areas:	POVERTY BAY Quadrangle, T21R04E16, King County

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1966	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Multiple Family House
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Social	Social - Clubhouse
Domestic	Domestic - Multiple Family House
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Social	Social - Clubhouse

Historic Context:

Category
Architecture
Community Planning and Development

Architect/Engineer:

Category	Name or Company
Architect	Woodman, Jack, and Associates
Builder	Brown, Gavin
Builder	Mallory Company of Woodinville
Engineer	Hugh Goldsmith Associates
Engineer	Turf and Toro
Landscape Architect	Coleman, Raymond

Thematics:

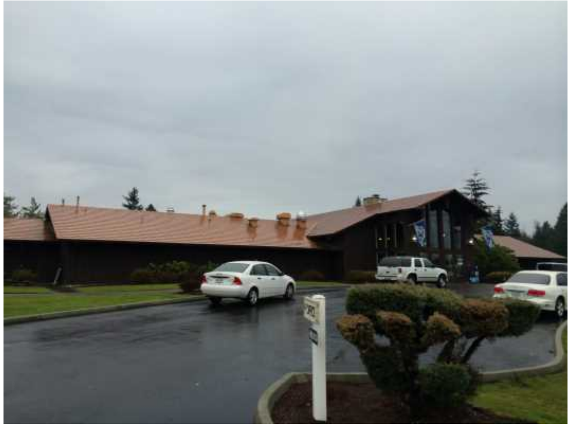
Local Registers and Districts

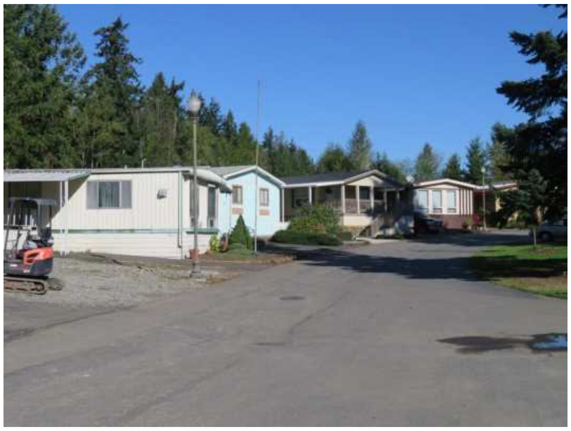
Name	Date Listed	Notes

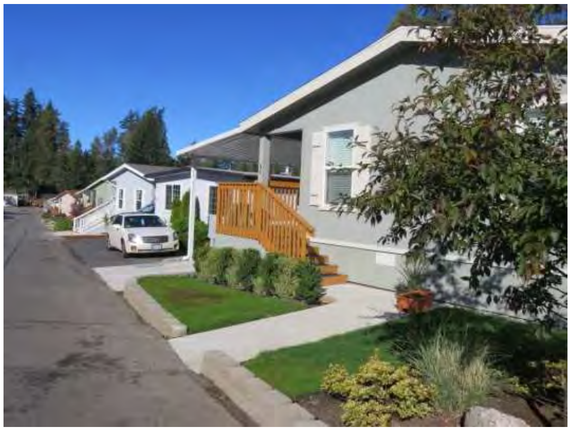
Project History

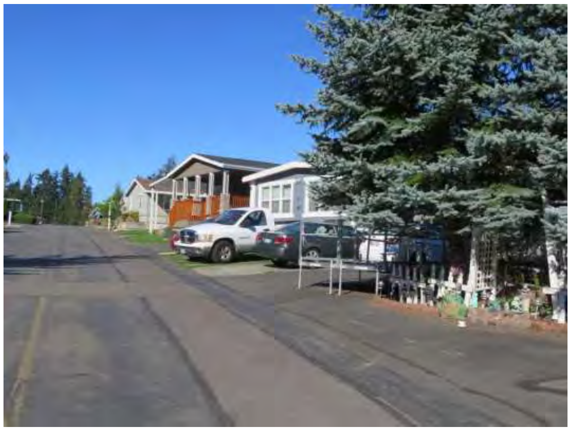
Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
102912-18-FTA, FTA, Federal Way Link Transit Extension	3/17/2014	Determined Not Eligible	, 10/2/2014
2011-07-00111, , Assessors Data Project: King County E	7/2/2011	Not Determined	
2014-09-00131, , Sound Transit Federal Way (2)			
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	6/26/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	10/5/2020	Survey/Inventory	

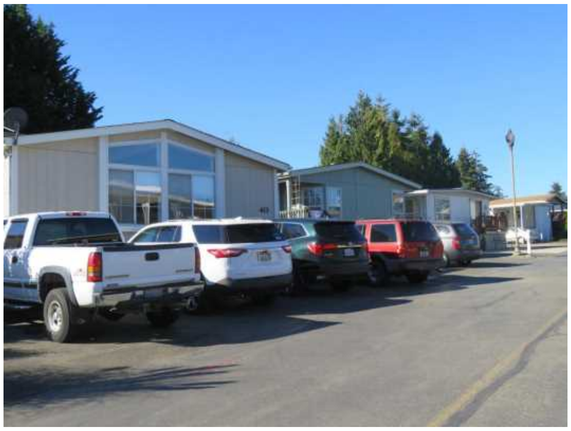
Photos

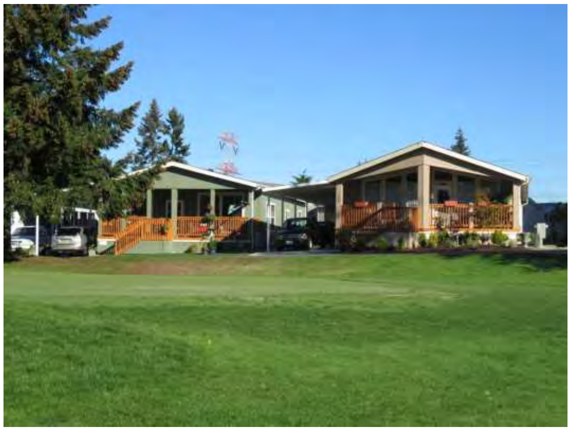

Northeast corner

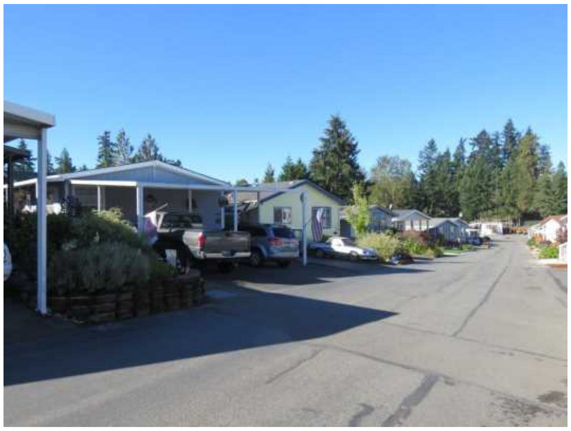

Belmor Mobile Home Park, homes

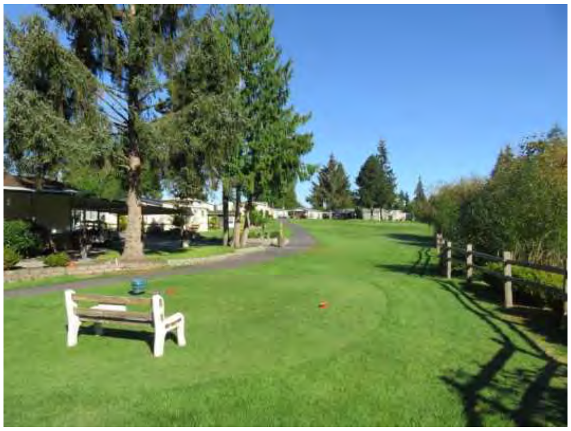

Belmor Mobile Home Park, homes

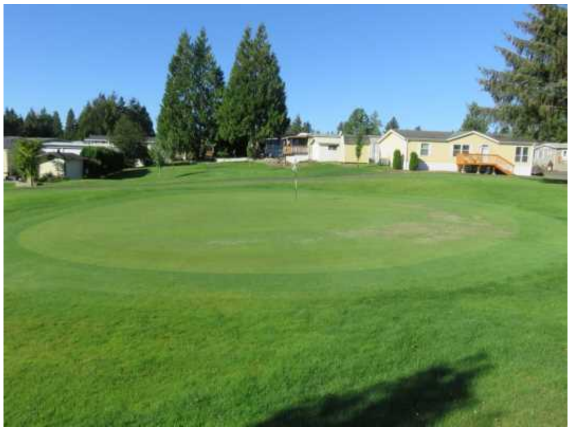

Belmor Mobile Home Park, homes

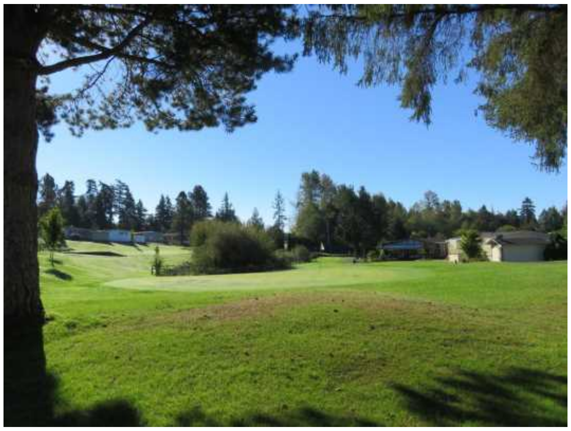

Belmor Mobile Home Park, homes

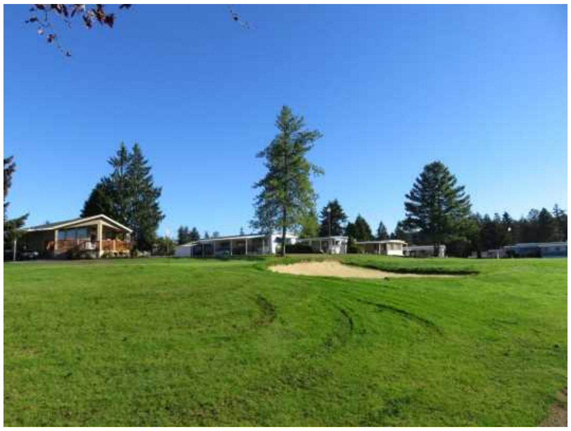

Belmor Mobile Home Park, homes

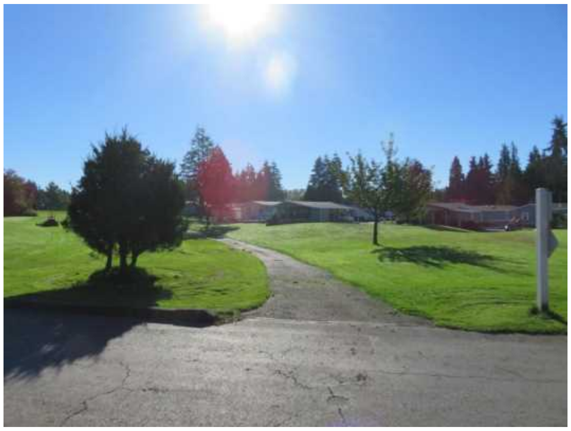

Belmor Mobile Home Park homes

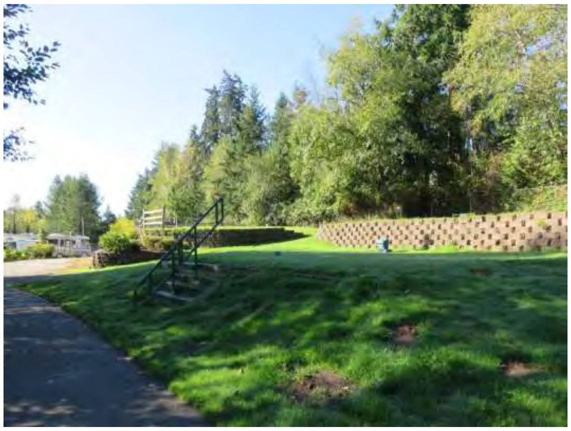

Belmor Mobile Home Park, green and developed catchment

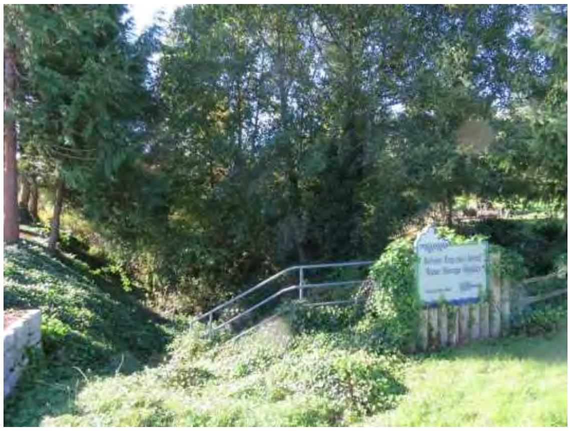

Belmor Mobile Home Park, golf course

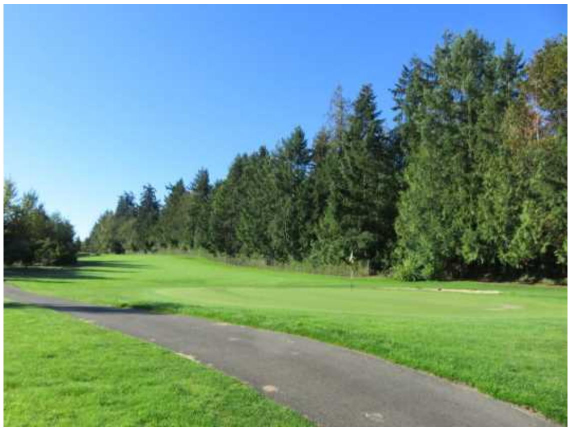

Belmor Mobile Home Park, green and catchment

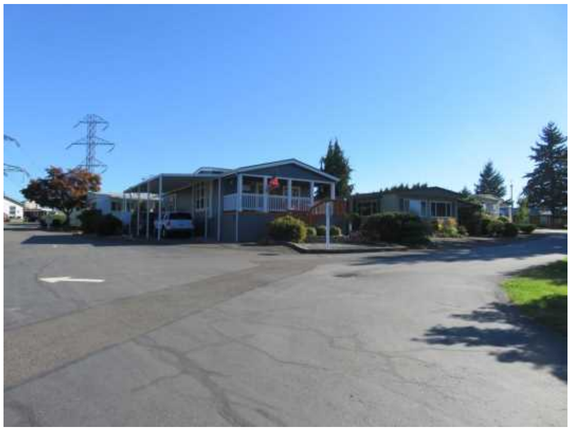

Belmor Mobile Home Park, homes and green

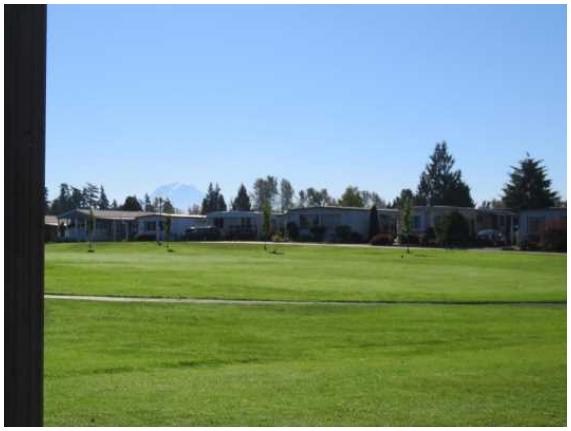

Belmor Mobile Home Park, homes and green

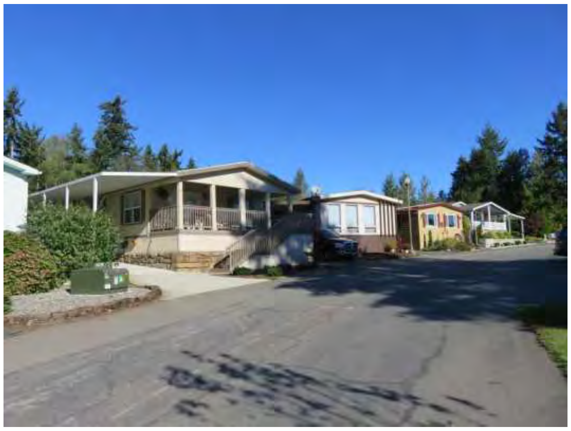

Belmor Mobile Home Park, terrace and bench on green

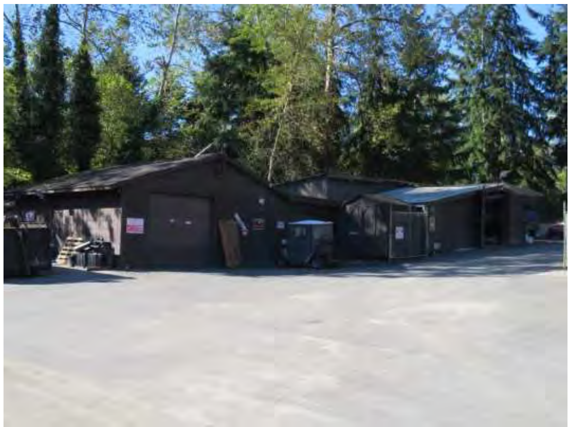

Belmor Mobile Home Park, added stormwater facility


Belmor Mobile Home Park, golf course

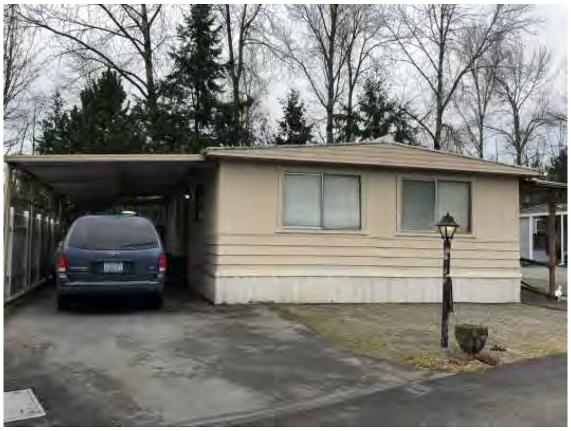

Belmor Mobile Home Park, homes and interior roadway


Belmor Mobile Home Park, golf course

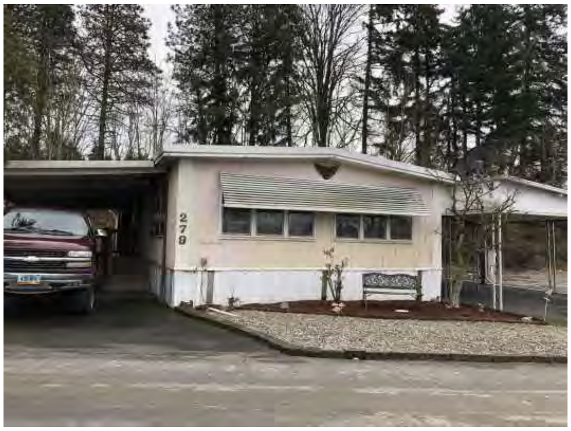

Belmor Mobile Home Park, homes



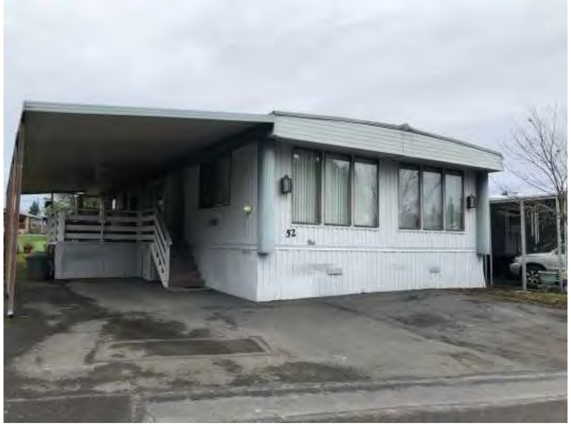
Belmor Mobile Home Park, garage and maintenance



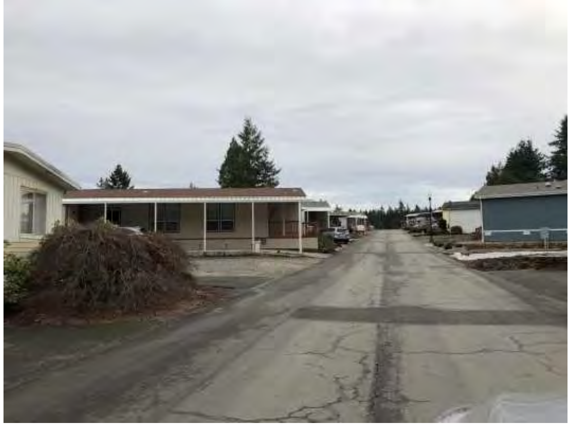
BelmorPark_MobileHome_FederalWay (8).JPG



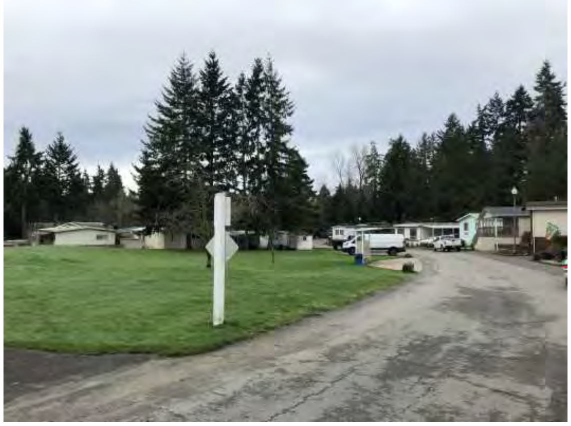
BelmorPark_MobileHome_FederalWay (7)_FourSeasons.JPG



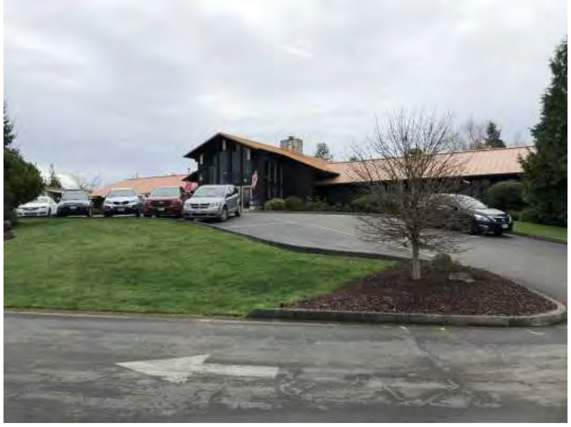
BelmorPark_MobileHome_FederalWay (6).JPG



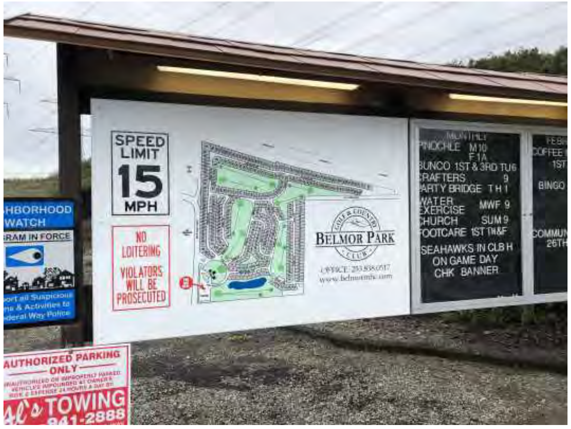
BelmorPark_MobileHome_FederalWay (5).JPG



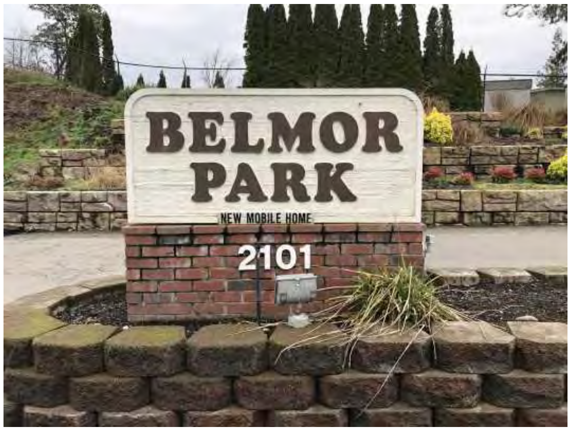
BelmorPark_MobileHome_FederalWay (4).JPG



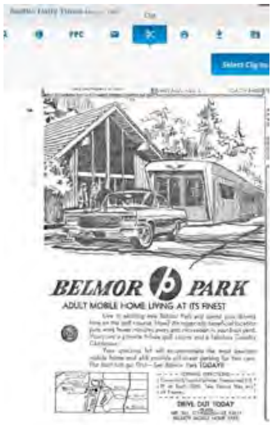
BelmorPark_MobileHome_FederalWay (3).JPG


SPEED LIMIT
15
MPH
NO LOITERING
VIOLATORS WILL BE PROSECUTED
BELMOR PARK
AUTHORIZED PARKING ONLY
Al's TOWING
PINOCHLE
BUNCO
CRAFTERS
PARTY BRIDGE
WATER EXERCISE
CHURCH
FOOTCARE
SEAHAWKS IN CLBH ON GAME DAY
BINGO

BelmorPark_MobileHome_FederalWay (2).JPG


BELMOR
PARK
NEW MOBILE HOME
2101

BelmorPark_MobileHome_FederalWay (1).JPG

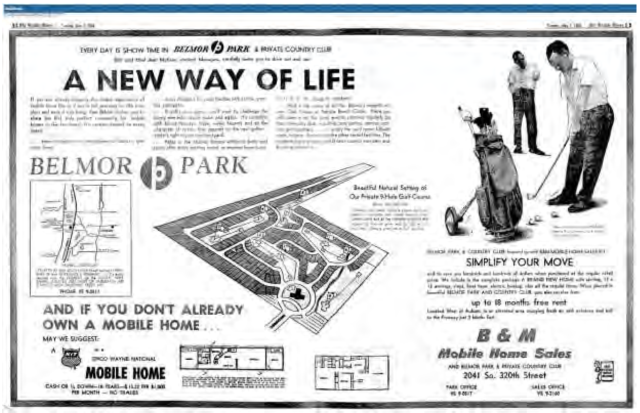

Select Clip

BELMOR PARK

ADULT MOBILE HOME LIVING AT ITS FINEST

DRIVE OUT TODAY

BelmorPark_MobileHome_The_Seattle_Times___May_9_1967.jpg



EVERY DAY IS SHOW TIME IN BELMOR PARK & PRIVATE COUNTRY CLUB

A NEW WAY OF LIFE

BELMOR PARK

Beautiful Natural Setting of Our Private 9-Hole Golf Course

AND IF YOU DON'T ALREADY OWN A MOBILE HOME . . .

MAY WE SUGGEST:

MOBILE HOME

SIMPLIFY YOUR MOVE

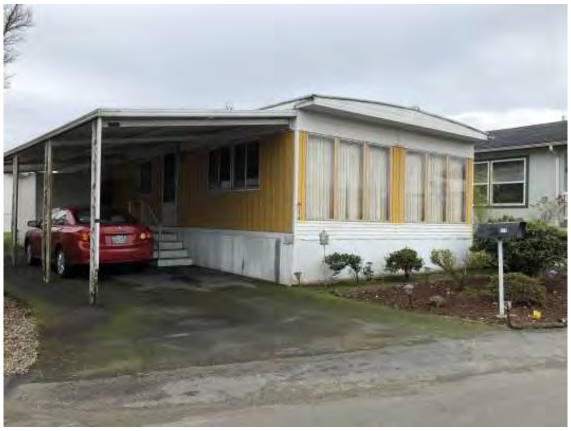
up to 18 months free rent

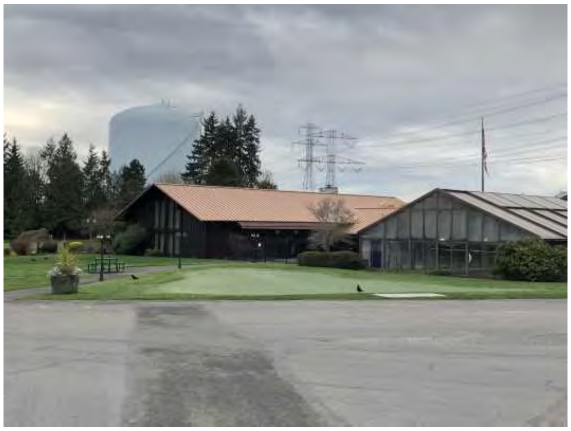
B & M
Mobile Home Sales
AND BELMOR PARK & PRIVATE COUNTRY CLUB
2041 So. 320th Street
PARK OFFICE
SALES OFFICE

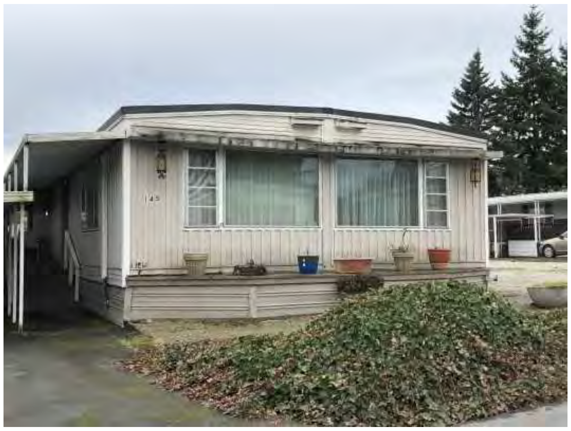
BelmorPark_MobileHome_The_Seattle_Times___May_7_1968__p72.JPG

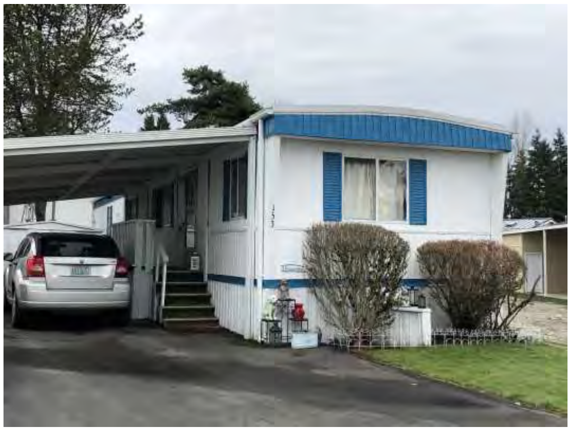
WASHINGTON
MOBILE HOME
25445 L

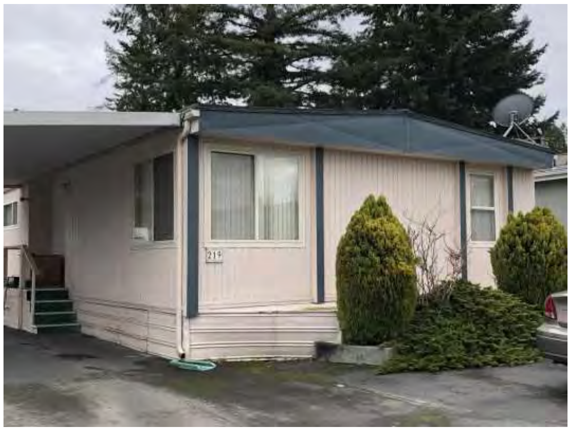
BelmorPark_MobileHome_FederalWay (19).JPG

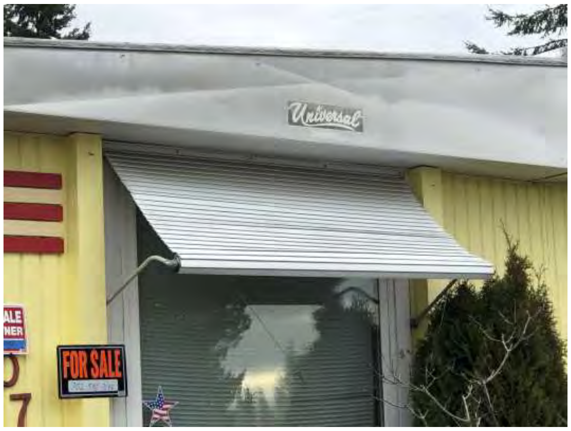

BelmorPark_MobileHome_FederalWay (18).JPG


BelmorPark_MobileHome_FederalWay (17).JPG

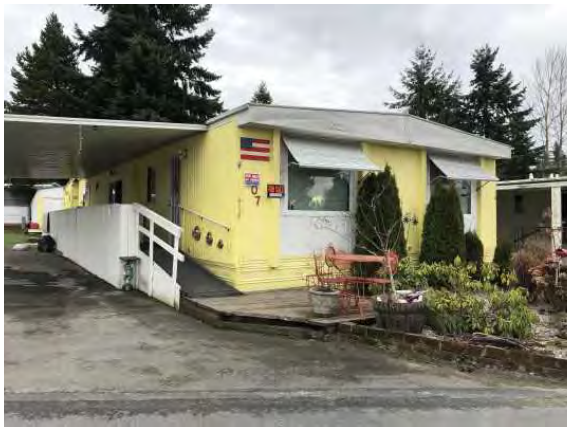

BelmorPark_MobileHome_FederalWay (16).JPG


BelmorPark_MobileHome_FederalWay (15)_Homette.JPG

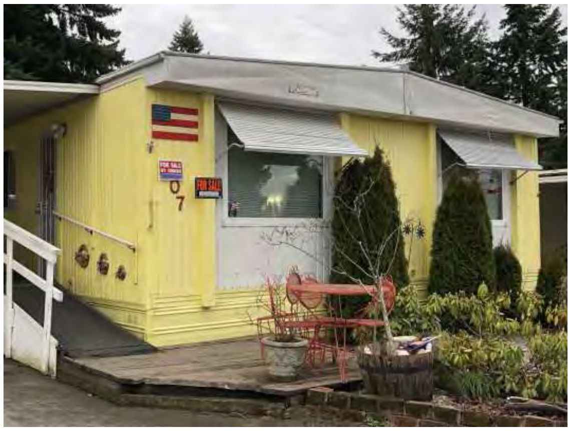

BelmorPark_MobileHome_FederalWay (14).JPG



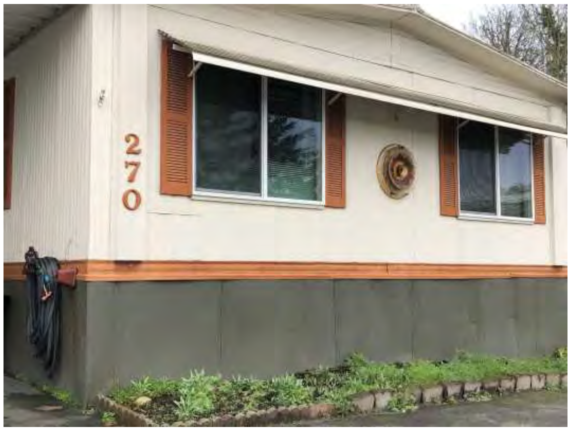
BelmorPark_MobileHome_FederalWay (13)_Universal.JPG



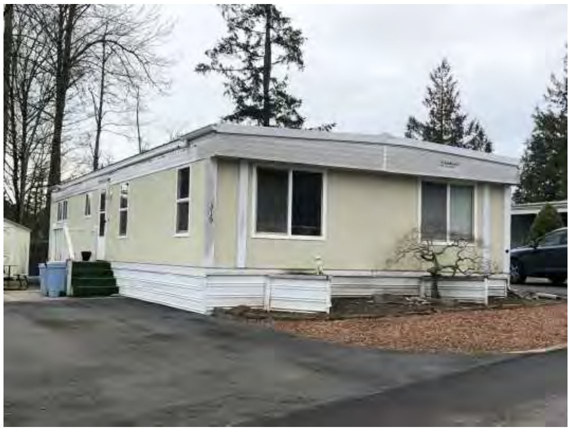
BelmorPark_MobileHome_FederalWay (12)_Universal.JPG



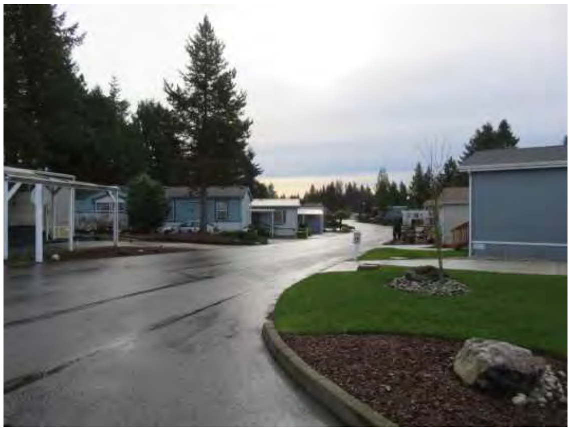
BelmorPark_MobileHome_FederalWay (11)_Universal.JPG



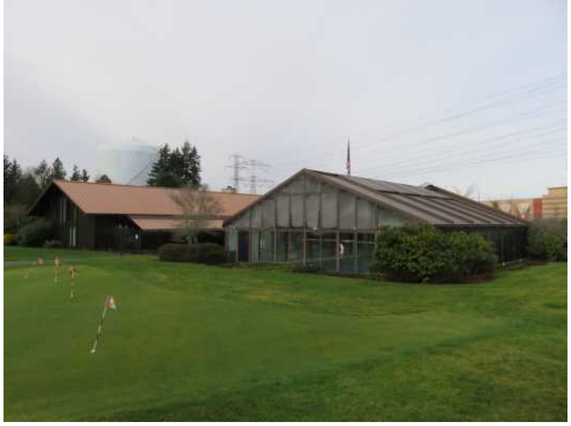
BelmorPark_MobileHome_FederalWay (10)_Safeway.JPG



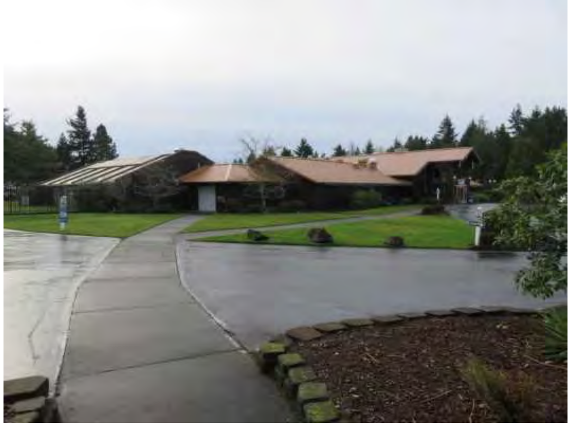
BelmorPark_MobileHome_FederalWay (9)_Brookwood.JPG



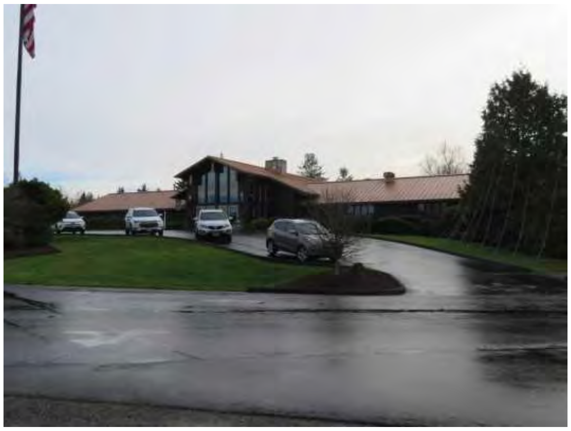
Mobile homes associated with 2101 S 324th Street, view southeast.JPG



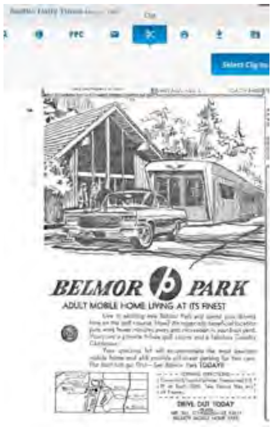
Clubhouse and attached pool house located at 2101 S 324th Street, view northwest.JPG



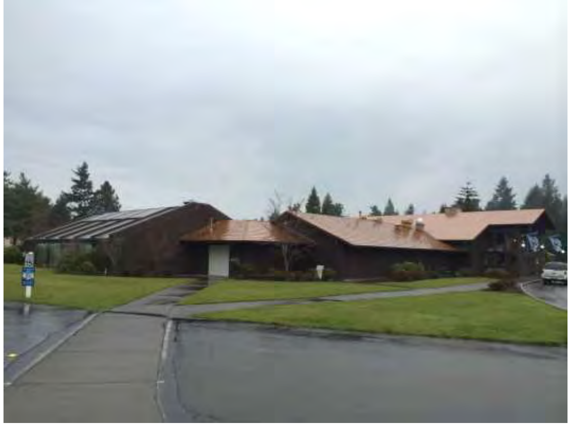
Clubhouse and attached pool house located at 2101 S 324th Street, view southwest.JPG



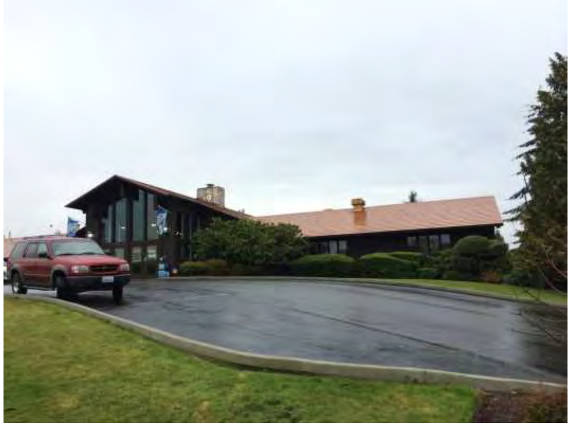
Clubhouse located at 2101 S 324th Street, view southeast.JPG


PPC
Clip
Select Clip
BELMOR PARK
ADULT MOBILE HOME LIVING AT ITS FINEST
DRIVE OUT TODAY

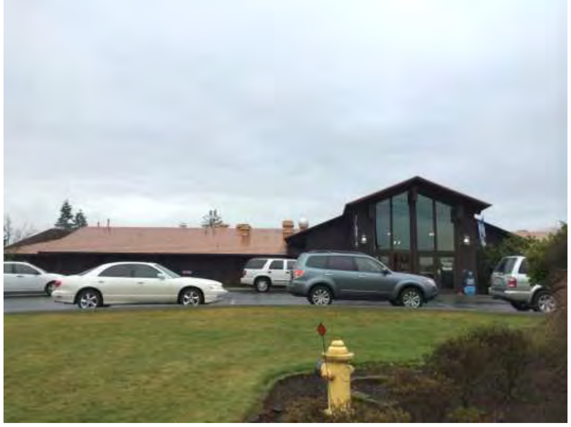
BelmorPark_MobileHome_The_Seattle_Times___May_9_1967.jpg



Northeast corner (2)



Northwest corner



North elevation

Northwest corner, entrance shed

BelmorPark_MobileHome_The_Seattle_Times___May_7_1968__p72.pdf

News_Article__Seattle_Daily_Times_published_as_The_Seattle_Times___May_15_1970__p37.pdf

News_Article__Seattle_Daily_Times_published_as_The_Seattle_Times___October_23_1966__p86.pdf

News_Article__Seattle_Daily_Times_published_as_The_Seattle_Times___May_9_1967__p62.pdf

Seattle_Times___January_21_1969__p61.pdf

Historic Property Report

Resource Name: Belmor Park Mobile Home Park

Property ID: 674318

Inventory Details - 7/2/2011

Common name:	
Date recorded:	7/2/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	1621049037
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Structural System	Wood - Platform Frame

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The building at 2101 S 324th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1966 and is a clubhouse. Also according to the county assessor, the structure was remodeled in 1974. The 1-story building has an other form.

Historic Property Report

Resource Name: Belmor Park Mobile Home Park Property ID: 674318

Inventory Details - 3/17/2014

Common name:	Belmor Mobile Home Park
Date recorded:	3/17/2014
Field Recorder:	MaryNell Nolan-Wheatley
Field Site number:	8019-65
SHPO Determination	102912-18-FTA determined on 10/2/2014

Detail Information

Characteristics:

Category	Item
Plan	Irregular
Roof Material	Metal - Tile
Structural System	Wood - Platform Frame
Roof Type	Gable - Cross
Cladding	Wood - Board & Batten
Foundation	Concrete - Poured
Roof Material	Metal - Corrugated

Styles:

Period	Style Details
Modern Movement	Contemporary

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places:	No
Property is located in a potential historic district (National and/or local):	No
Property potentially contributes to a historic district (National and/or local):	No

Significance narrative: Construction of the original Highway 1 in the state of Washington commenced in 1913. By October 1923, 700 miles of a two-lane highway had been completed connecting Vancouver, British Columbia, to the Oregon-California border. Just after the highway was completed in 1924, however, plans were begun to reroute and improve the conditions of the highway. The project involved creating a new, wider, four-lane route further west that would connect Seattle and Tacoma, Washington, more directly (Kramak, 2010). The new roadway was completed in 1928 and acquired the title of Highway 1, while the original eastern route was renamed Highway 5 (Caster, 2007). The new Highway 1 became known as the Pacific Highway. Over the years, various parts of Highway 1 acquired alternative names, including the portion known as Pacific Highway S, which starts near Federal Way, Washington, and continues north, through Kent, Des Moines, and SeaTac, Washington (Kramak, 2010).

In 1926, Pacific Highway (HWY 1) was included as a numbered U.S. Highway (US 99) (U.S. Route 99, 2013). The following decades witnessed the rapid growth of businesses along the highway and the formation of a new auto-oriented roadside culture characterized by a proliferation of motels, restaurants, and rest stops (Des Moines Historical Society, 2007). Increased automobile ownership changed people's perceptions about distance and allowed populations to sprawl around urban centers, increasing the number of residents in suburban towns and cities, including SeaTac, Des Moines, Kent, and Federal Way (Boyles, 2010).

Federal Way was originally settled as a rural logging community in the late 1800s. In 1928 , when the Pacific Highway (HWY 1/US 99) between Tacoma and Seattle opened, it linked Federal Way to the larger neighboring communities, spurring economic and residential development. The name Federal Way came from an eponymous school built in 1929 on Pacific Highway S (Caster, 2007). During the 1950s, Federal Way witnessed substantial growth, transforming from a small lumber town into a metropolitan area. Auto-oriented businesses emerged and thrived along the Pacific Highway. Community growth was bolstered by Boeing and Weyerhaeuser industries in the 1960s. In 1968, Weyerhaeuser purchased 430 acres of land for its corporate headquarters, which opened in April 1971 (Caster, 2007). Federal Way was incorporated as a city in 1990.

The property at 2101 South 324th Street in Federal Way, Washington, which is a clubhouse for a mobile home park constructed in 1966, is not eligible for listing in the NRHP. The property is not eligible for the NRHP under Criterion A, which applies to buildings that are associated with events that have made a significant contribution to the broad patterns of history, as no significant events are associated with this property. To be eligible for the NRHP under Criterion B, a property must be directly associated with a person considered significant within a historic context whose specific contribution to history has been both identified and documented. No such person who meets that definition is linked to this building. The property is not eligible for the NRHP under Criterion C as it is a typical mid-twentieth century building and does not embody the distinctive characteristics of a type, period, or method of construction; it is not the work of a master and does not possess high artistic value. The property is not eligible for the NRHP under Criterion D for information potential because the materials and construction methods of the building do not convey important information that could contribute to understanding history or prehistory. Therefore, the property is not eligible for listing in the NRHP because it does not meet any of the eligibility criteria. In addition the property is altered including the replacement of the original roof and some windows and a large addition. As a result, the building has lost integrity of materials and design. The building retains integrity of workmanship, setting, location, feeling, and association.

Physical description:	2101 South 324th Street is a one-story, wood frame, 6,510-square foot clubhouse constructed in 1966 that is associated with the Belmor Park mobile home community. The irregular plan building, which is constructed on a poured concrete foundation and has a 1,290-square foot finished basement, is primarily clad in wood board and batten siding. Non-original metal shingles cover the large cross gabled roof with deep open eaves. All of the visible windows contain fixed, single-lights. The building is composed of two parts: the T-shaped original building and a large rectangular plan building that extends from the south elevation of the east wing. The date of the addition is unknown. Two sets of double glass and metal doors are located in the center of the front (north) elevation and serve as the main entrance. This center section of the façade, which is covered by the primary front gabled roof, projects out and has a double-height with large, exposed rafter tails under the open gable. A large interior slope stone chimney protrudes from the west side of the roof over the central entrance. Above the two sets of double doors is a row of four, large, fixed, singe-light quadrilateral windows that extend from the top of the entrance to just under the roof. The east and west elevations of the projecting entrance area each contain two levels of windows, each with three, fixed, single-light windows. Behind the main entrance, the south end of the front gabled roof widens to cover the clubhouse's wider, central section. Wings extend east and west from the center of the building's east and west elevations, creating a T shape. The side wings are covered by side gabled roofs that cross the primary front gable. The north elevation of the west wing contains two adjacent rows of four, fixed, single-light windows, while the north elevation of the east wing contains no fenestration. A small, rectangular plan addition likely used for storage extends from the east elevation of the east wing and is covered by a hipped roof with a lower roof height. The small addition's east elevation contains a vehicle bay with a retractable metal door. A large, rectangular plan addition extends from the south elevation of the small storage addition and is covered by a steeply pitched, corrugated metal, front gabled roof with flush eaves. The exterior walls, which are primarily clad in board and batten siding, extend into low parapets on the gabled (north and south) elevations. The center of the large addition's east elevation contains four pairs of large, fixed, single-light windows that extend the entire height of the exterior wall. A circular road surrounds the property, which includes a front parking area, several concrete walking paths, and green space. A small driveway leads to the circular road from South 324th Street, passing a small gatehouse. The gatehouse has a front gabled roof covered in metal shingles and exterior walls clad in board and batten siding. The north and west elevations of the gatehouse each contain a replacement two-light horizontal sliding window. According to the King County Assessor's website, a 10 by 20-foot building used as a cable/internet building to service the golf club and its members was constructed on the property circa 2007. The small service building is not visible from the public right-of-way. The residential community, which contains 331 property lots, is located south of the clubhouse on 62.74 acres of land. The mobile homes were all built between 1964 and 2012.

Bibliography:

Boyles, E. 2010. The Suburb. Selected Cultural and Historical Geographies of the Greater Seattle Area. Available at: https://sites.google.com/site/alinehistoryprojectsite/home/line-b/community-identities--bellevue-and-redmond/the-suburb. Accessed March 18, 2013.

Caster, D. 2007. Historical Society of Federal Way Timeline. Available at: http://www.federalwayhistory.org/timeline.php. Accessed March 15, 2013.

Des Moines Historical Society. 2007. Time Line Page. Available at: http://www.dmhs.org/timeline/history.html. Accessed March 13, 2013.

King County. 2013. King County Department of Assessments. Available at: http://www.kingcounty.gov/Assessor.aspx. Accessed October 20, 2013.

Kramak, J.E., ed. 2010. Establishing the Pacific Highway South. Selected Cultural and Historical Geographies of the Greater Seattle Area. Available at: https://sites.google.com/site/alinehistoryprojectsite/home/map/theme-transportation/establishing-the-pacific-highway-south. Accessed March 14, 2013.

U.S. Route 99 – The Pacific Highway. 2013. Waymarking: A Groundspeak Website. Available at: http://www.waymarking.com/cat/details.aspx?f=1&guid=698ed7e3-3af8-4cd0-a795-03b89a23288e&exp=True. Accessed March 19, 2013.

Inventory Details - 3/12/2020

Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

Inventory Details - 6/26/2020

Common name:	
Date recorded:	6/26/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Historic Property Report

Resource Name: Belmor Park Mobile Home Park

Property ID: 674318

Inventory Details - 10/5/2020

Common name:	
Date recorded:	10/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Styles:

Period	**Style Details**
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

The Belmor Mobile Home Park (which the community has renamed Belmor Park Golf & Country Club) was constructed in 1966 by a joint venture of Sherwood Development Company and San Juan Homes. Jack Woodman designed the clubhouse, which Gavin Brown constructed. Raymond Coleman built the golf course. Additional building and engineering were completed by Mallory Company of Woodinville, Hugh Goldsmith Associates, and Turf and Toro, who engineered the sprinkler system (Seattle Times 1966a). In response to a previous historic property inventory form, the Federal Transit Authority (FTA) determined the primary permanent building in the Belmor Mobile Home Park, the clubhouse (1966), not eligible for listing in the NRHP in 2014 (DAHP 2020). However, the clubhouse is only one element of a resource that includes additional associated buildings, structures, and sites that could, potentially, qualify as a historic district.

As described by the National Park Service, a historic district “possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (NPS 1997). In addition, historic districts consist of contributing and non-contributing resources thematically linked by architectural style or designer, date of development, distinctive urban plan, and/or historic association (NPS 1997).

Belmor Mobile Home Park is most appropriately evaluated as a potential historic district with a variety of buildings, structures, and sites that could potentially qualify as contributing resources to a district united historically by plan and physical development. The Belmor Mobile Home Park includes:
- a clubhouse (1966)
- 336 mobile homes (1964–2020);
- a designed neighborhood and landscape with associated circulation patterns (1966);
- a nine-hole golf course (1966);
- a garage and maintenance shed (1966);
- the Belmor Mobile Home Park site.

Integrity of the Belmor Mobile Home Park
According to NPS guidance for evaluating historic districts, "for a district to retain

integrity as a whole, the majority of the components that make up the district's historic character must possess integrity even if they are individually undistinguished. In addition, the relationships among the district's components must be substantially unchanged since the period of significance” (NPS 1997). Integrity evaluation takes into account the impact of intrusions into the potential district, their size, scale, design, and relative number. “The majority of the components that add to the district's historic character, even if they are individually undistinguished, must possess integrity, as must the district as a whole” (NPS 1997). Additionally, “a district is not eligible if it contains so many alterations or new intrusions that it no longer conveys the sense of a historic environment” (NPS 1997).

The Belmor Mobile Home Park is made up of numerous resources. Integrity is assessed first for each resource and then for the subdivision as a whole. In the case of a resource type with multiple examples, namely the mobile homes themselves, which are inherently impermanent and most appropriately understood collectively, one integrity statement is made for the entire resource type, as per DAHP recommendations during consultation.

Clubhouse (1966): The clubhouse retains integrity of location, setting, workmanship, feeling, and association, as it remains in place and continues to serve as a recreational amenity for the surrounding development. The replacement of the roof and some windows, along with a large addition (natatorium), have diminished its integrity of design and materials, as indicated in a 2014 evaluation that led FTA to determine that the clubhouse was not eligible for listing in the NRHP (DAHP 2020).

336 mobile homes (1964–2020): Approximately 35 percent of existing homes date to the period of significance (1975 or earlier), and many of those have been renovated, according to the King County Assessor. Survey indicates that the majority of the park's mobile homes no longer retain the character-defining features of historic-period examples, including compact massing, metal siding and windows, and rectangular plans with minimal or non-existent porches and stoops. Additionally, more than 65 percent of the historic-period resources have been lost. Based on the significant loss of original material, the remaining mobile homes, as a group, retain integrity of location, setting, and association, but have lost integrity of design, materials, workmanship, and feeling.

Designed neighborhood and landscape with associated circulation patterns (1966): The subdivision landscape retains much of its original layout, including its character-defining circulation patterns, and angled parking pads for trailers and mobile homes that sit side-by-side alongside paved, curvilinear roadways. Walking/golf cart paths circulate through the development and through golf course fairways. Landscaping includes mature trees, lawns, and other plantings. The neighborhood, roads, landscaped areas, and paths that serve the subdivision retain integrity of location, setting, materials, workmanship, feeling, and association. The addition of wastewater management facilities within former green spaces have slightly diminished the landscape's integrity of design.

Nine-hole golf course (1966): Belmor Mobile Home Park was designed around the five fairways of a nine-hole golf course, all of which remain in place and retain their character-defining greens and sand pits. Additionally, a putting green remains near the clubhouse. The golf course retains integrity of location, although the replacement of historic-period mobile homes and the addition of water retention facilities on its perimeter have diminished its integrity of setting and design. The golf course retains integrity of location, materials, workmanship, feeling, and association.

Garage and maintenance shed (1966): The garage and maintenance shed at the southwest end of the development have been altered by additions and replacements and no longer retain their character-defining plan and materials. The garage and maintenance shed retain integrity of location, setting, feeling, and association, but have lost integrity of design, materials, and workmanship.

The Belmor Mobile Home Park's exterior site is located in a developed section of Federal Way and is now surrounded by residential and commercial development from the late twentieth century. Based on construction that replaced the forest that once surrounded Belmor and contributed to the site's character, the subdivision site appears to retain integrity of location, design, materials, workmanship, feeling, and association, although it has lost integrity of setting.

Evaluation
Belmor Mobile Home Park is best understood within the local, state, and national context associated with the housing boom that post-dated World War II in the United States. Development in King County boomed, and developers built extensive subdivisions for Seattle’s growing labor force. As noted by the Seattle Times’ Real Estate writer and editor, Alice Staples, “It was soon after the Second World War that the bulldozer became infamous as it crashed its way through the virgin areas, and builders rushed to provide the needed housing. Everything fell in the wake of the huge machines. Lot by lot, the forest receded and the buyers lost the backdrop of trees which had framed their houses when they bought. Suddenly, they were in raw new subdivisions” (Staples 1968).

History of Mobile Home Developments:
While many post-war subdivisions were constructed for single-family residences, mobile home parks in Washington, either for travel trailers or more permanent mobile homes, date to as early as 1945, when the Barnes Automobile Trailer Camp was constructed in Vancouver, Washington. WISAARD states that FTA determined the development not eligible for listing in the NRHP in 2008. WISAARD documents three additional trailer parks from the 1940s and 1950s, all of which have been determined not eligible for listing in the NRHP. These include the Coast Post Trailer Park in Olympia, which was constructed in 1948 and determined not eligible for listing in the NRHP by DAHP in 2016; the Riverbend Mobile Home Park outside Renton, constructed in 1957 and determined not eligible for listing in the NRHP by DAHP in 2018; and the Tip Top Mobile Home Park in Kent, which began with a single-family residence and expanded into a collection of cottages and trailers at an unknown date. FTA determined the Tip Top Mobile Home Park not eligible for listing in the NRHP in 2014 (DAHP 2020). Based on WISAARD records and aerial photographs, these mobile home parks appear to remain in place today.

By the late 1950s and early 1960s, housing developments of all kinds, including mobile home subdivisions, became increasingly common throughout Washington and the country, and many of them incorporated recreational amenities. In 1958, for example, John F. Long of Home Builder, Inc., provided a published plan for a possible subdivision of single-family homes grouped around green spaces, each of which held a fairway of an integrated nine-hole golf course. Like the future Belmor development, Long’s subdivision plan was generally square, with limited access from exterior streets and curvilinear roadways throughout the interior. The golf course's first three holes were centrally located, while the final six were located along narrow fairways bordered by single-family homes throughout the surrounding development (Rosenthal 1960). Referred to as "golf course subdivisions," developments like this heightened property values for developers and grew increasingly popular with buyers. As described by the American Society of

Planning Officials, "the fairways are located in the interior of the blocks. Homes are built in the conventional side-by-side manner, but the rear lot lines adjoin the golf course itself. One reason for building this type of subdivision is the additional value imputed to each lot, which, according to a study by the Urban Land Institute, has been estimated at approximately $2,000 for an average lot" (Rosenthal 1960).

In response to the growing popularity of "golf course subdivision," new single-family residential developments increasingly integrated clubhouses, pools, and golf courses into their neighborhood plans. Mobile home parks, however, were often a harder sell for developers than single-family residential developments and less likely to feature high-end amenities. Considered a low-cost option for housing new arrivals, and particularly those with children, mobile home or trailer parks were touted by builders but unpopular with surrounding residents. According to a Seattle Times article on the pros and cons of mobile home parks in commercial and light manufacturing zones, developers complained about their limited (and expensive) land options and the public's knee-jerk negative response to mobile home projects. “About the only contribution the public has made so far is to protest each time a mobile-home park is proposed, a developer said” (Staples 1966).

While developers sought to create more mobile home subdivisions, mobile homes themselves also evolved throughout the 1960s, becoming more permanent and losing the “mobility” for which they were known. They grew larger, more comfortable, and were soon seen as a permanent housing option for those retiring, those just growing their young families, and those who wanted a close-knit community but didn’t want to maintain a large yard.

Developers, perhaps in response to these conditions, began designing upscale examples of mobile home parks in the 1960s, some of which prioritized recreational opportunities, a trend already popular in subdivisions in vacation destinations like Florida, where Temple Terrace Estates, considered one of the first golf course communities, had invited wealthy owners to live and play golf since the 1920s--as it does today (Hostetler 2011). In 2013, Temple Terrace became the first 18-hole golf course in Florida to be listed in the NRHP (Reams 2013). In 1960, Tucson Estates, a mobile home park in Arizona, was master-planned to include 1,684 mobile home lots, some of which were adult only, as well as an 18-hole golf course (Tucson Estates 2020). Tucson Estates, which remains in place today, was highlighted by planner Frederick H. Bair Jr. in a 1960 professional paper for the American Society of Planning officials (Bair 1961). By 1960, according to Bair, ten percent of new non-farm single-family dwellings were mobile homes, up from seven percent in 1955. While municipalities rushed to create codes, standards, and regulations for mobile home subdivisions, planners worked on the effort to integrate them into existing communities. By 1960, there were approximately 50 mobile home subdivisions in America, according to Bair, "of which a small part are very good and most are not" (Bair 1961).

As mobile homes were hardly mobile anymore, Bair thought their neighborhoods were more appropriately understood as subdivisions. Therefore, good mobile home subdivisions should echo neighborhoods, including clusters, cul de sacs, loops and courts with narrow roads and walking paths through the grounds. Quiet, private areas should be available, and cars should move slowly and carefully. "And the trees should be there, not only to discourage hot-rodding adolescents of all ages, but as part of a carefully preserved (if possible) and carefully planted (if not) general landscaping. Nothing builds more character into a subdivision than trees, and nothing about a subdivision grows more slowly. A good subdivision should have a general landscaping plan as well as a plan for streets and lots, and the landscaping plan should start early, making the most of the native vegetation and the natural topography" (Bair 1961).

Bair also noted that these mobile home subdivisions needed amenities for residents and should follow the best practices of single-family residential developments, as defined in professional planning literature like G. H. Crabtree Jr.'s "Developing Golf Course Subdivisions," published in the September 1958 issue of the Urban Land Institute's Urban Land newsletter. While it is not clear if Washington developers relied on papers like Crabtree's, the design of Belmor suggests that its developers followed a growing body of literature on the topic of subdivision design.

Mobile Home Subdivisions in Washington:
Washington state may not have had the sunny reputation of Florida or the southwest, but by 1961, King County had its own upscale mobile home subdivision and numerous other developments with their own golf courses. Bow Lake Trailer Town in SeaTac was constructed by 1961, five years ahead of Belmor, and offered "enclosed playground, modern exclusive private club and recreational center with swimming pool, dancing, game rooms, shuffle boards, golf green, horse shoe, etc., plus a modern shopping center all within the park" (Seattle Times 1961). Bow Lake Trailer Town did not accept children at all or pets without leashes. It was, according to the Seattle Times, "oriented toward middle-aged or retired couples" (Andrews 1972). Today, aerial photos show that the Bow Lake mobile home park remains on the edge of Sea-Tac International Airport and includes an activities center and a large, naturalistic park, although no golf course is evident. In 1962, soon after Bow Lake was completed and four years before Belmor was constructed, the Seattle Times ran ads for the new Crossroads Village Apartments in Bellevue, which included a golf course on its list of amenities along with a pool and wall-to-wall carpeting (Seattle Times 1962). The Crossroads Par 3 Golf Course remains today. Other examples of golf course-centered multi-family developments included Lakeway Mobile Estates, a 100-unit mobile home park near Bellingham, which was constructed, like Belmor, in 1966, and advertised as fronting on a golf course with additional recreational facilities including "swimming pool, recreation hall, community kitchen, workshop and putting area" (Seattle Times 1966b). While the mobile home park remains, the Lakeway Golf Course does not.

The enthusiastic development of new golf courses in the area was noted in a 1967 Seattle Times article that detailed Belmor's construction and claimed that "golf course construction in the Seattle metropolitan area is going ahead at a hectic, unprecedented pace. Investors trying to keep abreast of the region's economic boom are pouring millions into 12 new courses" (Seattle Times 1967a).

By 1966, when Sherwood Development Company was constructing Belmor Mobile Home Park, the company had already created four other high-profile residential developments around and through golf courses in King County. Belmor Mobile Home Park was the only one of the five for mobile homes (Staples 1966). Additionally, Sherwood developed Fairwood, also opened in 1966, a residential community of 565 single-family homes built around and through a golf course in Maple Valley that was praised for its selective development around existing trees; Tam O'Shanter, built as a single-family residential neighborhood around a golf course and park in Bellevue in 1965; Brae Burn, a single-family residential neighborhood built around a golf course in Redmond; and Twin Lakes in Federal Way, also a community of single-family homes constructed in the mid-1960s around a golf course. All five communities remain in place today. While the four residential subdivisions attribute their golf courses to popular landscape architect, William G. Teufel, research did not reveal that Teufel contributed to the design of Belmor's golf course.

Sherwood Development Company placed Belmor Mobile Home Park in an area that was once a forested, undeveloped section of Federal Way. The company cleared the land and constructed the development with sections reserved for families and adults, although at times, the development appears to have been entirely adult-only (Seattle Times 1967b). Today, Belmor has evolved into a retirement community for individuals aged 55 years and older.

Eligibility
Belmor Mobile Home Park, evaluated here as a potential historic district made up of multiple resources, is indicative of local, state, and national trends in the development of new housing during the post-war boom in the United States, including the development of golf course subdivisions. It was, like other mobile home parks and single-family developments of the era, responsive to trends in subdivision planning and recreation. It appears to follow closely the designs of earlier planned subdivisions, including Long’s 1958 plan for a golf course subdivision and the 1961 Bow Lake Trailer Town in SeaTac. It was one of five golf course communities constructed by the same developer in the mid-`960s, but the only one built as a mobile home park. The development provided a lower cost, attractive neighborhood with recreational amenities, and has local significance under Criterion A for its association with events and trends that made a contribution to the broad patterns of local, state, or national history (Criterion A).

Background research did not reveal any association of the resource with the lives of significant persons (Criterion B).

Belmor Mobile Home Park was designed to resemble typical residential subdivisions and included, for instance, curvilinear streets, minimal through-traffic, added green space, and additional recreational amenities like a clubhouse and golf course, all character-defining features of subdivisions of the era (McAlester 2013:68). The mobile home park does possess the distinctive characteristics of its type, period, and method of construction. It does not appear to represent the work of a master, or to possess high artistic values, but it could represent a significant and distinguishable entity whose components may lack individual distinction (i.e., contribute to an existing or potential district) (Criterion C).

Finally, the mobile home development and its architectural resources were built of common construction methods and well-known materials and are unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Belmor Mobile Home Park, evaluated here as a potential historic district, is locally significant under Criteria A and C for its association with development trends in Washington and throughout the United States during its period of significance (1966 to 1975). Its contributing resources, were the district eligible, would include the subdivision's designed neighborhood and landscape with associated circulation patterns; golf course; clubhouse; maintenance shed; and collection of mobile homes. However, based on a loss of integrity, particularly the loss of historic-period motor homes and alterations to its clubhouse and maintenance shed, the subdivision "contains so many alterations or new intrusions that it no longer conveys the sense of a historic environment" (NPS 1997). As noted above, the NPS requires that the majority of components that make up a potential district's historic character must possess integrity, and the relationship between the components must be substantially unchanged. In the Belmor Mobile Home Park, the subdivision's neighborhood landscape and golf course retain sufficient integrity to contribute to a potential district; but the clubhouse, the great majority of the mobile homes, and the maintenance shed have lost integrity and would not be eligible as contributing resources to a potential historic district. As the subdivision's designed neighborhood, landscape, and golf course are not sufficient in and of themselves to qualify as a historic district within the Belmor Mobile Home Park site, HRA recommends that the Belmor Mobile Home Park is not eligible for listing in the NRHP under any criteria.

Physical description:

According to the King County Assessor, the Belmor Mobile Home Park, addressed as 2101 S 324th Street, was constructed in 1966. It is located on 62.74 acres and includes two permanent buildings, a clubhouse and maintenance building, both constructed in 1966 (King County Assessor 2020). Newspaper articles note that the development was constructed with 336 mobile home spaces (Seattle Times 1966a). Today, according to the King County Assessor:

- 118 mobile homes (approximately 35 percent of the total) date to 1975 or earlier;
- 218 mobile homes (approximately 65 percent of the total) host newer mobile homes or are vacant;
- 82 of the newer mobile homes (approximately 25 percent of the total) date from 2000 or later; and
- at least 10 mobile homes have been remodeled since 2000.

The development is located on an irregularly shaped parcel directly west of I-5, south of The Commons at Federal Way, and to the east and north of commercial and residential development. The mobile home park is gated and accessible via one entrance off S 324th Street, where a circular road around the clubhouse leads to paved roads throughout the development, all of which are somewhat curvilinear and lined with diagonal parking spaces for mobile homes, most of which are filled. Lines of mobile homes are grouped around the perimeter of green spaces, all of which include golf holes. The golf greens are long, maintained lawns that include some paved pathways and one to two holes, each with one to two associated sand traps. Additionally, the development includes two catchments or stormwater storage facilities planted with trees and shrubs and secured with fencing. Additional landscaping is minimal but includes a small number of benches with associated plantings and a terraced slope with benches and shrubs at the site’s southwest corner. Additionally, the site includes some trees and planting strips along some paths, on slopes, as boundaries or privacy screens within the development, and in the secured catchments.

The development’s clubhouse was surveyed in 2014, at which time the FTA determined it not eligible for listing in the NRHP under any criteria due to a lack of significance and integrity (DAHP 2020). As noted previously, the building is irregular in plan, constructed on a poured-concrete foundation, and includes a basement. It is clad in board-and-batten, and topped by a cross-gabled metal roof with deep eaves. Windows are large, fixed, single lights, and two sets of double doors are located on the facade, which faces north toward parking. The building includes a large addition to the southeast. Previous surveyors did not provide a date of construction for the addition. However, aerial photographs indicate that it was added between 1998 and 2006 (NETROnline 2020). The addition is a rectangular natatorium with some board-and-batten siding but primarily walls of floor-to-ceiling windows.

The second permanent building is an irregularly shaped garage and maintenance shed at the southwest corner of the site on a large, paved pad. The building includes two front-gabled, wood-framed buildings with overhead or swinging garage doors attached to a flat-roofed central bay and including a large shed-roofed mass to the rear, as well as a temporary gambrel-topped storage shed on skids. The building is clad in a combination of vertical boards and wood sheet and is topped by a combination of corrugated metal and asphalt shingles.

The mobile homes themselves vary in size, style, and materials, although many appear to be new or recently renovated with concrete board siding, vinyl windows, and covered porches.

Bibliography:

Andrews, Paul
1972 Mobile Home Trailers. The Solution for some. Seattle Times, November 26:40.

Bair, Frederick H., Jr.
1961 Regulation of Mobile Home Subdivisions, Information Report No. 145. American Society of Planning Officials, Chicago. Electronic document, https://www.planning.org/pas/reports/report145.htm, accessed October 19, 2020.

Department of Archaeology and Historic Preservation (DAHP)
2020 Washington Information System for Architectural and Archaeological Records Data (WISAARD). Electronic document, https://dahp.wa.gov/historic-preservation/find-ahistoric- place, accessed September 26, 2020.

Hostetler, Rachelle
2011 Fantasy, Leisure, and Labor: A Story of Temple Terrace's Historic Architecture. Graduate thesis, University of Sound Florida. Electronic document, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjnm-Tj28HsAhXWqp4KHVM0BP0QFjARegQIBhAC&url=http%3A%2F%2Fscholarcommons.usf.edu%2Fcgi%2Fviewcontent.cgi%3Farticle%3D4350%26context%3Detd&usg=AOvVaw04N8PStWbN-TvJbUrGvKsG, accessed October 19, 2020.

King County Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed September 29, 2020.

McAlester, Virginia Savage
2013 A Field Guide to American Houses. Knopf, New York.

National Park Service (NPS)
1997 Bulletin 15: How To Apply the National Register Criteria for Evaluation. National Park Service, Washington D.C.

NETROnline
2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed September 29, 2020.

Reams, Ashley
2013 Temple Terrace Golf Course Makes National Register of Historic Places, Patch: Temple Terrace, Florida. Electronic document, https://patch.com/florida/templeterrace/temple-terrace-golf-course-makes-national-register-of31a03ab481, accessed October 19, 2020.

Rosenthal, Jon
1960 Cluster Subdivisions. Information Report No. 135. American Society of Planning Officials, Chicago. Electronic document, https://www.planning.org/media/document/9150666/, accessed October 19, 2020.

Seattle Times
1961 See the "Parade of Mobile Homes" Now at Bow Lake. August 13:31. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1962 New Crossroads Village Apartments. August 2:39. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1966a Mobile Home Park Near Completion. October 23:86. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1966b Mobile Home Park Near Bellingham. June 12:107. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1967a Golf Course Construction at Record Pace. January 29:36. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1967b Belmor Park. Mobile Home Living with a New Family Park Area. June 18:98. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.

Staples, Alice
1966 Low-Cost Housing Still Puzzles Builders, Planners. Seattle Times, November 27:39. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.
1968 "Trees Sell Houses," Some Land Developers Preserve Natural Setting. Seattle Times, July 14:97. Electronic document, https://www.spl.org/online-resources/magazines-and-newspapers, accessed September 29, 2020.

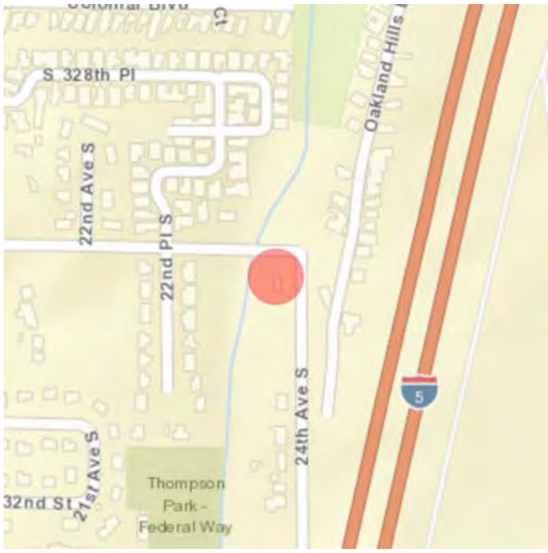
Tucson Estates
2020 History of Tucson Estates. Electronic document, https://www.tucsonestates.com/view/history-of-tucson-estates.aspx, accessed October 19, 2020.

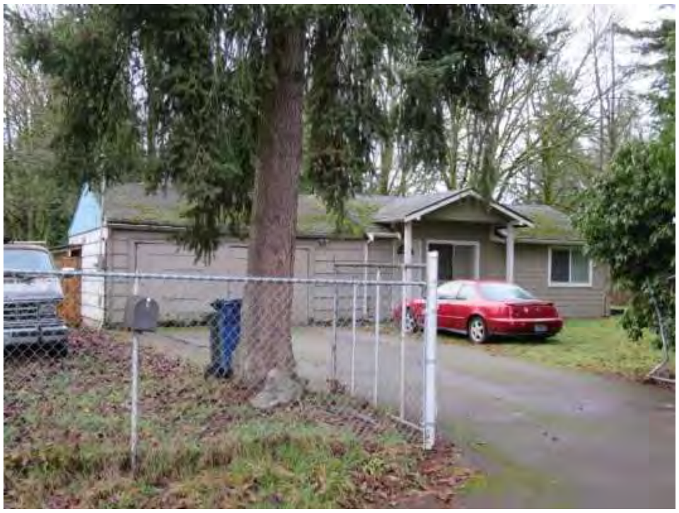
Historic Property Report

Resource Name: Residence

Property ID: 308853

Location


Colonial Blvd
S 328th Pl
22nd Ave S
22nd Pl S
Oakland Hills
24th Ave S
5
21st Ave S
32nd St
Thompson Park - Federal Way



Address:	33003 24TH AVE S, FEDERAL WAY, WA
Tax No/Parcel No:	7978800682
Plat/Block/Lot:	STATE PLAT SUPL IN SEC 16-21-4N 129.85 FT OF E 116
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1951	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

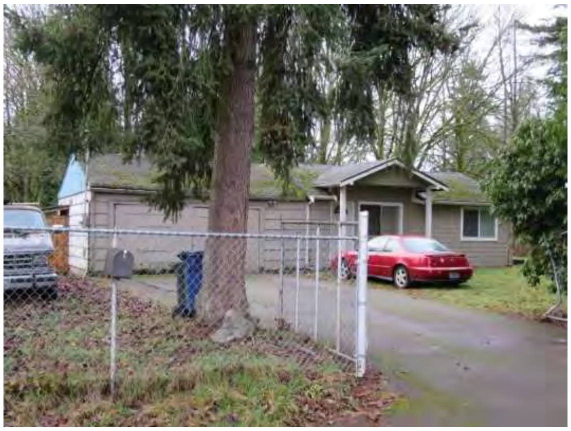
Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/8/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



33003 24th Avenue S, view northwest.JPG

33003 24th Avenue S, view southwest.JPG

Inventory Details - 7/8/2011

Common name:	
Date recorded:	7/8/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978800682
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33003 24th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1951 and is a single family dwelling. The building has a single-family form with an attached garage.

Historic Property Report

Resource Name: Residence

Property ID: 308853

Inventory Details - 2/13/2020

Common name:	
Date recorded:	2/13/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood - T 1-11
Cladding	Wood - Shingle
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1951), 33003 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the encroaching construction of I-5. The building retains integrity of location.

Evaluation

The building at 33003 24th Avenue S was constructed in 1951 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 33003 24th Avenue S does not retain integrity from its period of construction (1951) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1951, the residential building at 33003 24th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of horizontal board, vertical T1-11, and shingles (wood or composition). The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are vinyl framed in altered fenestration. The building features a sliding glass front door beneath a gabled porch. An attached garage is located on the south side of the building.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 308853

Inventory Details - 3/12/2020

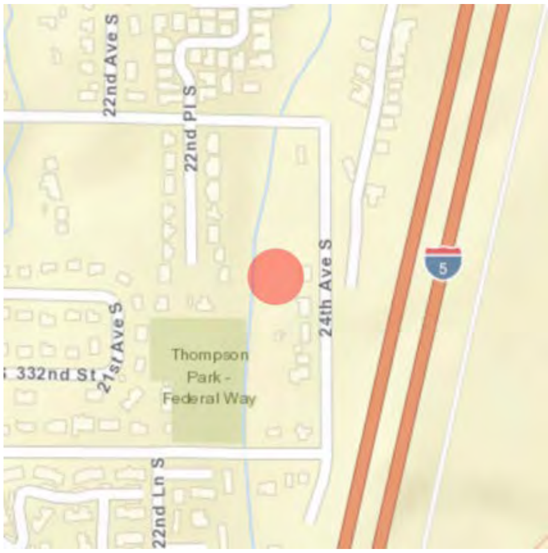
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

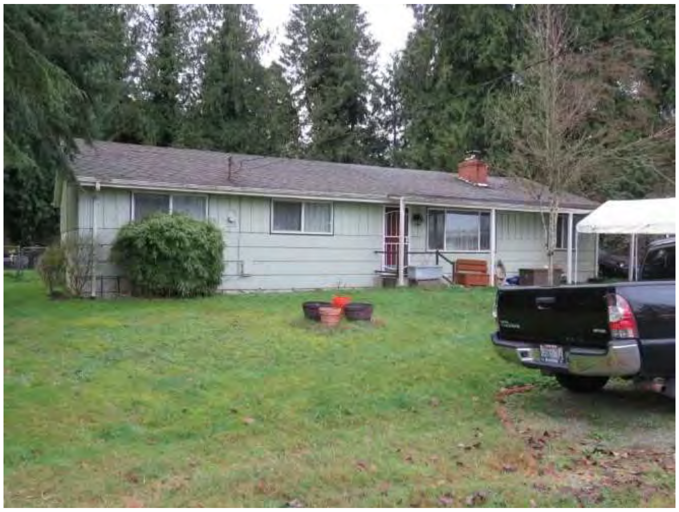
Historic Property Report

Resource Name: Residence

Property ID: 397256

Location


22nd Ave S
22nd Pl S
24th Ave S
5
21st Ave S
332nd St
Thompson Park - Federal Way
22nd Ln S



Address:	33035 24TH AVE S, FEDERAL WAY, WA
Tax No/Parcel No:	7978800679
Plat/Block/Lot:	STATE PLAT SUPL IN SEC 16-21-4N 85 FT OF S 185 FT
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E16

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

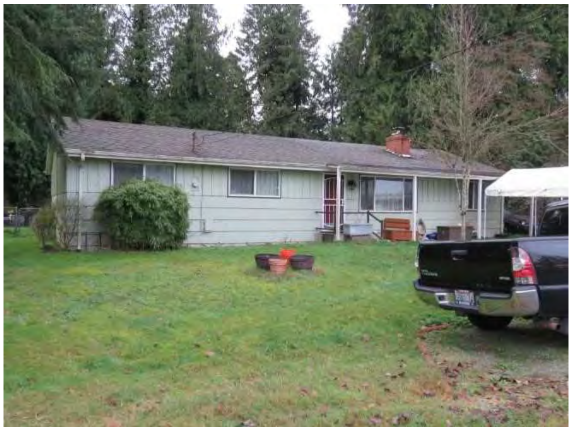
Local Registers and Districts

Name	Date Listed	Notes

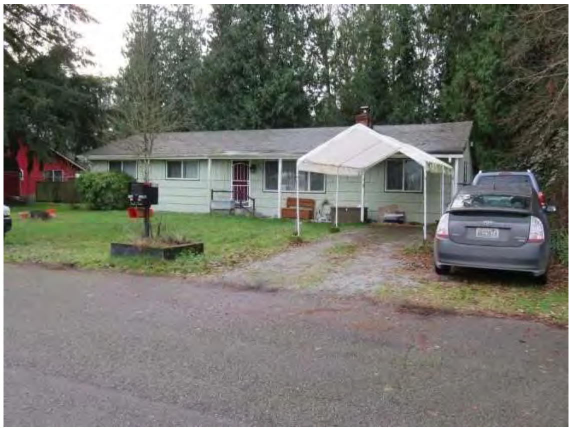
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	6/4/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



33025 24th Avenue S, view northwest.jpg



33025 24th Avenue S, view southwest.jpg

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978800679
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33035 24th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Plan	Rectangle
Cladding	Wood - Board & Batten
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1957), 33025 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location. Evaluation The residential building at 33025 24th Avenue S was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates, Inc. recommends 33025 24th Avenue S does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1957, according to the King County Assessor, the residential building at 33025 24th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of board-and-batten and wood shingles. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are vinyl-framed in altered fenestration. The building was likely originally constructed with a garage on the north side of the east face, which has been converted to living space.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 397256

Inventory Details - 6/4/2020

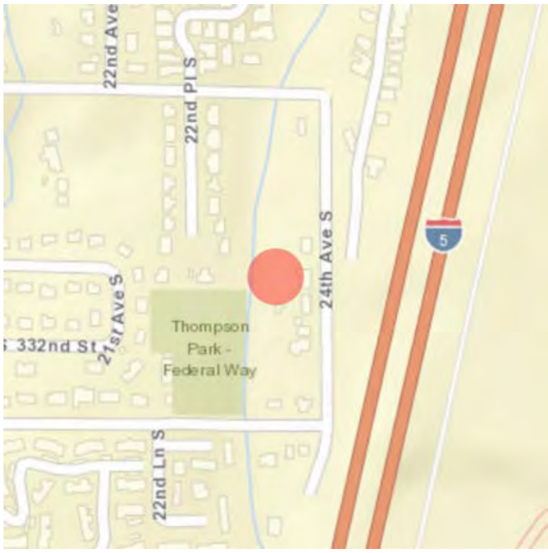
Common name:	
Date recorded:	6/4/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

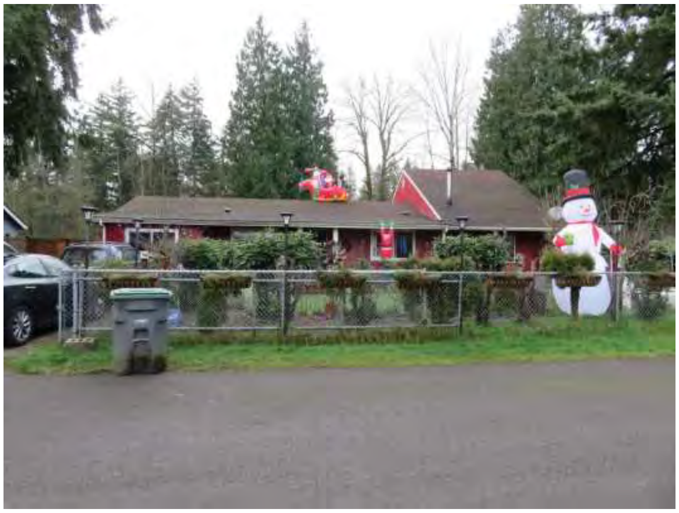
Historic Property Report

Resource Name: Residence

Property ID: 304377

Location


22nd Ave
22nd Pl S
24th Ave S
5
21st Ave S
332nd St
Thompson Park - Federal Way
22nd Ln S



Address: 33049 24TH AVE S, FEDERAL WAY, WA

Tax No/Parcel No: 7978800681

Plat/Block/Lot: STATE PLAT SUPL IN SEC 16-21-4S 100 FT

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1948	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

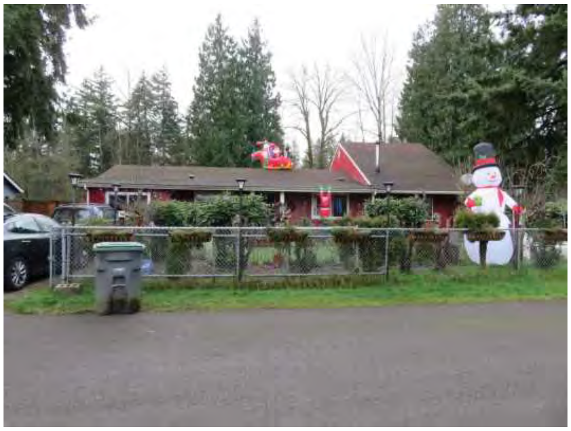
Local Registers and Districts

Name	Date Listed	Notes

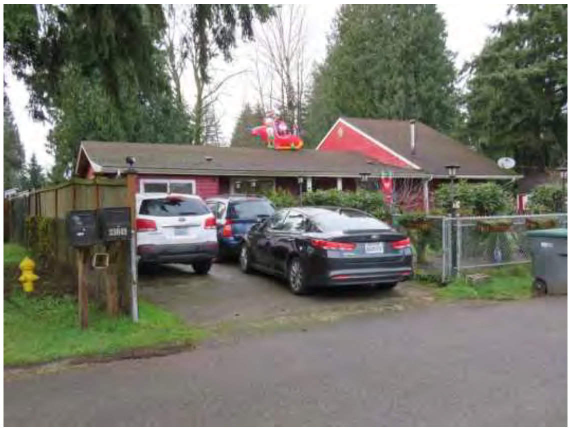
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



33049 24th Avenue S, view west.JPG



33049 24th Avenue S, view northwest.JPG

Historic Property Report

Resource Name: Residence

Property ID: 304377

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978800681
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33049 24th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1948 and is a single family dwelling. Also according to the county assessor, the structure was remodeled in 1993. The building has a single-family form.

Inventory Details - 2/13/2020

Common name:

Date recorded: 2/13/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Wood - Clapboard
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame
Foundation	Concrete - Poured

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1948), 33049 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, alterations to the massing via the large addition to the north, and the encroaching construction of I-5. The building retains integrity of location.

Evaluation

The building at 33049 24th Avenue S was constructed in 1948 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 33049 24th Avenue S does not retain integrity from its period of construction (1948) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description:

Built in 1948, the residential building at 33049 24th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation and is clad in wood clapboard. The building is topped by a side-gabled roof clad in asphalt roofing; the roofline rises to the north, evidence of a large addition to the rear and, possibly, north. Windows throughout are vinyl framed in altered fenestration. The entry is located in a recessed porch. The former garage (on the south end of the east face) was converted to living space.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

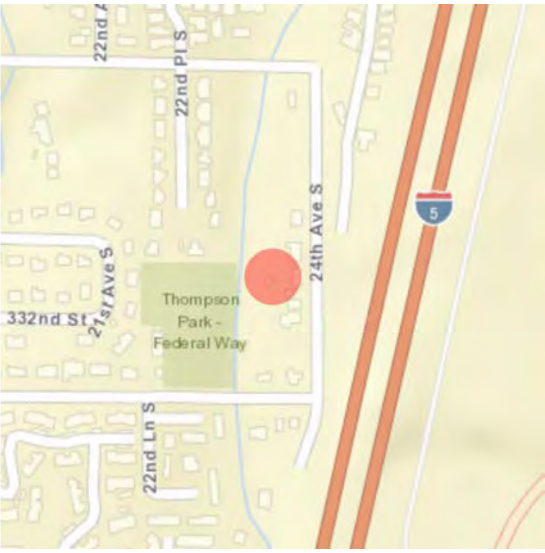
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

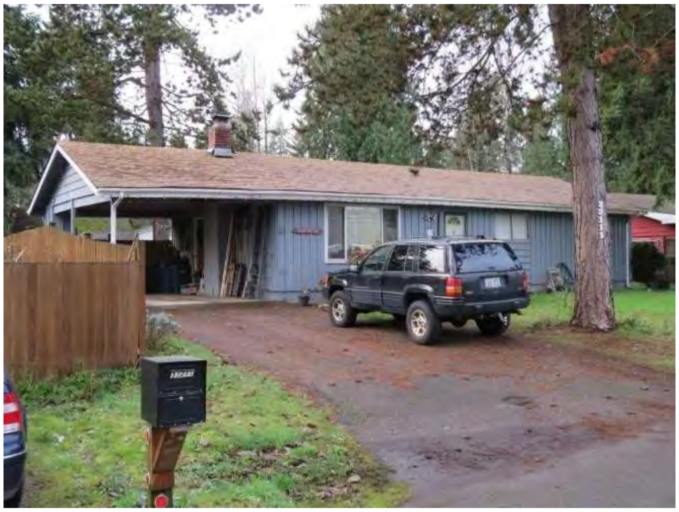
Historic Property Report

Resource Name: Residence

Property ID: 316362

Location


22nd Pl S
22nd Pl S
24th Ave S
5
21st Ave S
332nd St
Thompson Park - Federal Way
22nd Ln S



Address:	33111 24TH AVE S, FEDERAL WAY, WA
Tax No/Parcel No:	7978200164
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 N 77.42 FT OF E 224.34 F
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1968	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

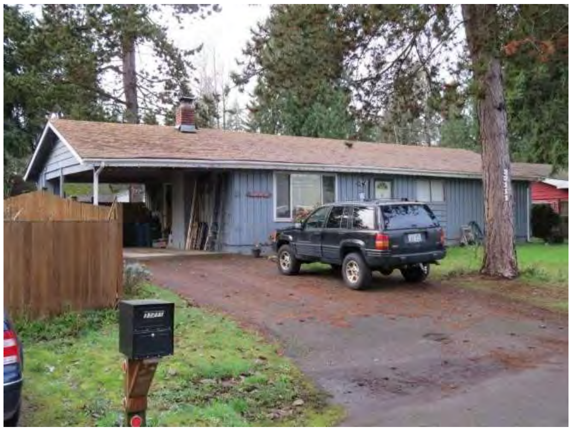
Local Registers and Districts

Name	Date Listed	Notes

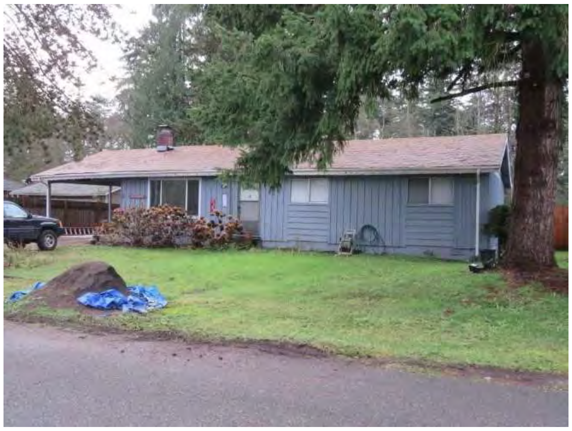
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



33111 24th Avenue S, view northwest.jpg



33111 24th Avenue S, view southwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 316362

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200164
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33111 24th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1968 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/12/2020

Common name:	
Date recorded:	2/12/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Wood - Board & Batten
Cladding	Wood
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1968), 33111 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and some cladding, which have been either altered or covered, and the encroaching construction of I-5 to the west. The building retains integrity of location.

Evaluation

The building at 33111 24th Avenue S was constructed in 1968 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 33111 24th Avenue S does not retain integrity from its period of construction (1968) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description: Built in 1968, the residential building at 33111 24th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation and is clad in a combination of vertical board-and-batten and horizontal wood siding. The building is topped by a side-gabled roof clad in asphalt roofing. A carport is located beneath the roof on the south face, where a chimney breaks the roof at the ridge. Windows are a combination of vinyl- and aluminum-framed, all in altered fenestration. The front door is fiberglass with a decorative arch light.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Historic Property Report

Resource Name: Residence

Property ID: 316362

Inventory Details - 3/12/2020

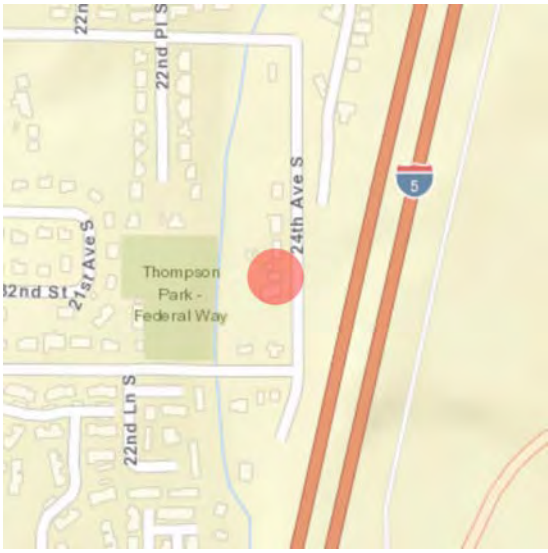
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

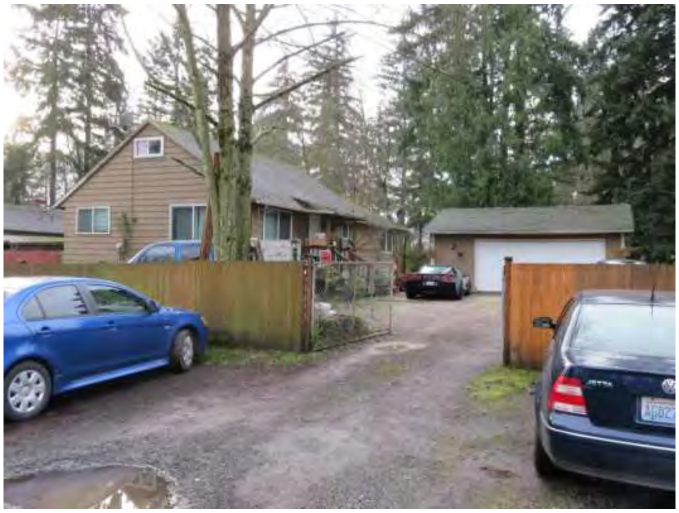
Historic Property Report

Resource Name: Residence

Property ID: 721218

Location


22n
22nd Pl S
24th Ave S
5
21st Ave S
2nd St
Thompson Park - Federal Way
22nd Ln S



Address: 33211 24th Ave S, Federal Way, Washington, 98003

Geographic Areas: POVERTY BAY Quadrangle, T21R04E16, King County

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1975	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

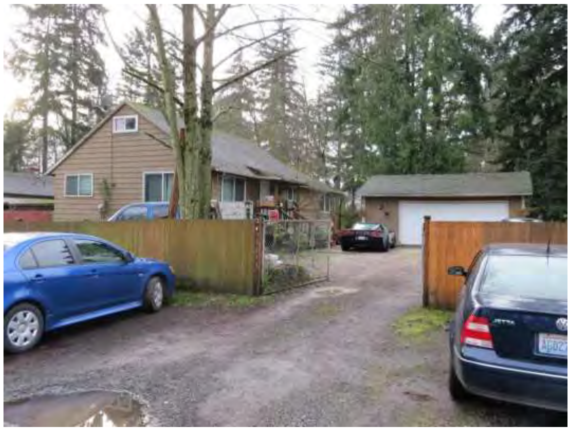
Local Registers and Districts

Name	Date Listed	Notes

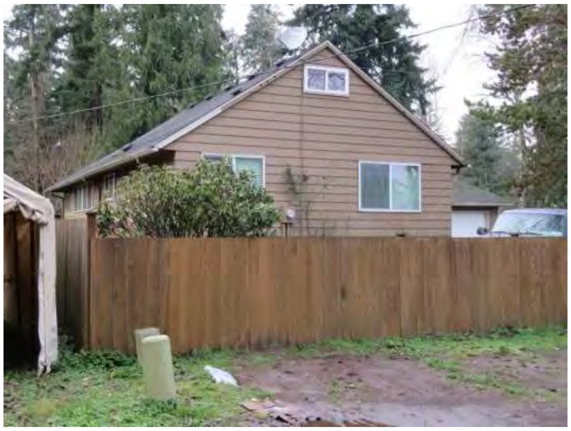
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Determined Not Eligible	Holly Borth, 1/20/2021

Photos



33211 24th Avenue S, view west.JPG



33211 24th Avenue S, view northwest.JPG

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Side Gable
Cladding	Wood - Clapboard
Structural System	Wood - Platform Frame
Foundation	Concrete - Poured

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1975), 33211 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and, likely, cladding, which have been either altered or covered, and the encroaching construction of I-5. The building retains integrity of location.

Evaluation

The building at 33211 24th Avenue S was constructed in 1975 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 33211 24th Avenue S does not retain integrity from its period of construction (1975) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Historic Property Report

Physical description:	Built in 1975, the residential building at 33211 24th Avenue S fronts north away from the street (King County Assessor 2020). The one-and-one-half-story, rectangular building sits on a poured-concrete foundation and is clad in horizontal board siding. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are vinyl framed, likely in altered fenestration. The central entry on the north face is located beneath a shallow shed roof projection. A detached garage with a side-gabled roof is located to the north.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 721218

Inventory Details - 3/12/2020

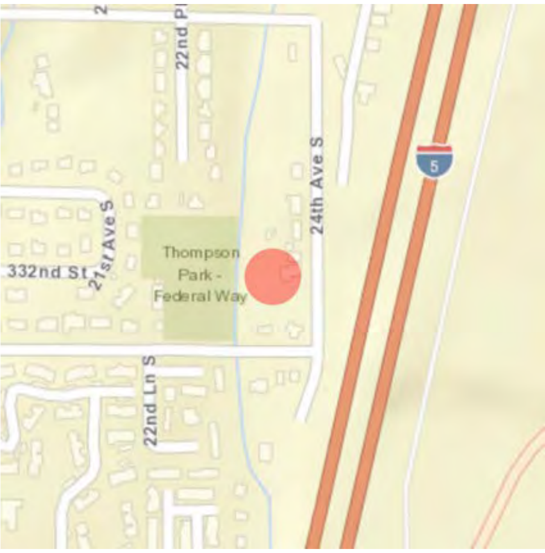
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

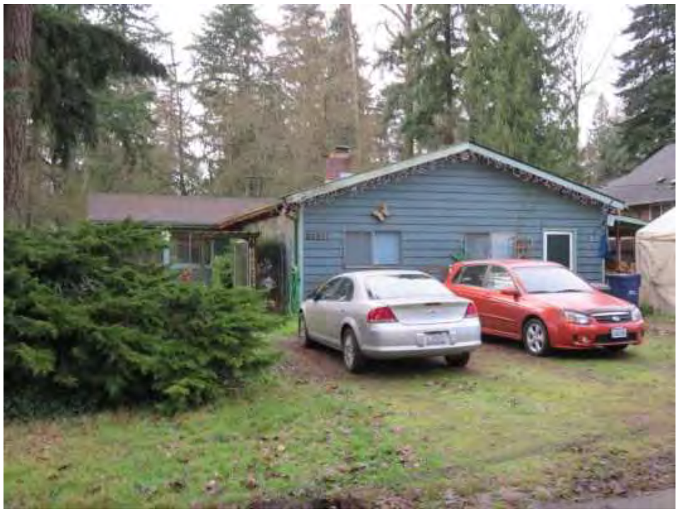
Historic Property Report

Resource Name: Residence

Property ID: 309382

Location


2
22nd Pl
24th Ave S
5
21st Ave S
332nd St
Thompson Park - Federal Way
22nd Ln S



Address:	33217 24TH AVE S, FEDERAL WAY, WA
Tax No/Parcel No:	7978200167
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 LOT A OF KING CO SHORT S
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1969	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

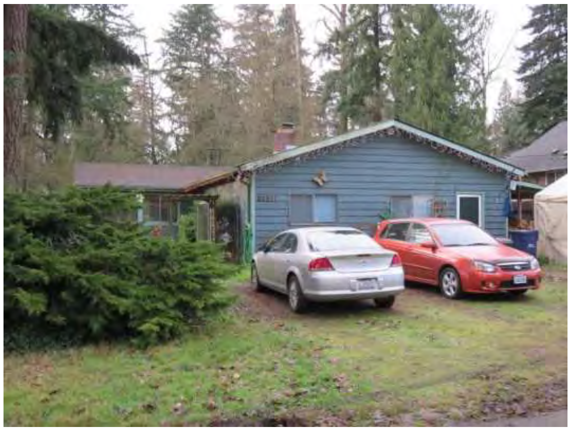
Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/8/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



33217 24th Avenue S, view west

33217 24th Avenue S, view northwest.JPG

Historic Property Report

Resource Name: Residence

Property ID: 309382

Inventory Details - 7/8/2011

Common name:	
Date recorded:	7/8/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200167
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33217 24th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1969 and is a single family dwelling. The building has a single-family form with an attached garage.

Historic Property Report

Resource Name: Residence

Property ID: 309382

Inventory Details - 2/13/2020

Common name:	
Date recorded:	2/13/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	L-Shape
Foundation	Concrete - Poured
Cladding	Wood - Clapboard
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1969), 33217 24th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a perceived loss of all historic-period windows and cladding, the conversion of a garage to living space, and the encroaching construction of I-5. The building retains integrity of location. Evaluation The building at 33217 24th Avenue S was constructed in 1969 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 33217 24th Avenue S does not retain integrity from its period of construction (1969) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria .
Physical description:	Built in 1969, the residential building at 33217 24th Avenue S fronts east (King County Assessor 2020). The L-shaped, one-story building sits on a poured-concrete foundation, is clad in horizontal wood clapboard siding, and is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are aluminum framed, likely in altered fenestration. The projecting massing on the north was constructed as a garage but was then converted to living area at an unknown date, according to plans provided by the King County Assessor (King County Assessor 2020). The former garage has a pedestrian entrance on the north side. A second front entrance is located on the main massing.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

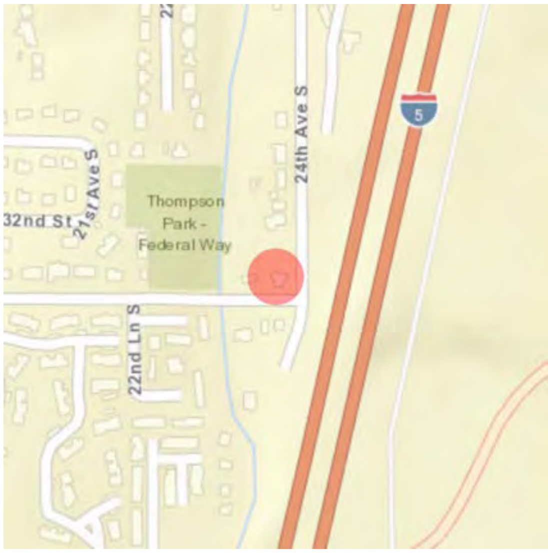
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

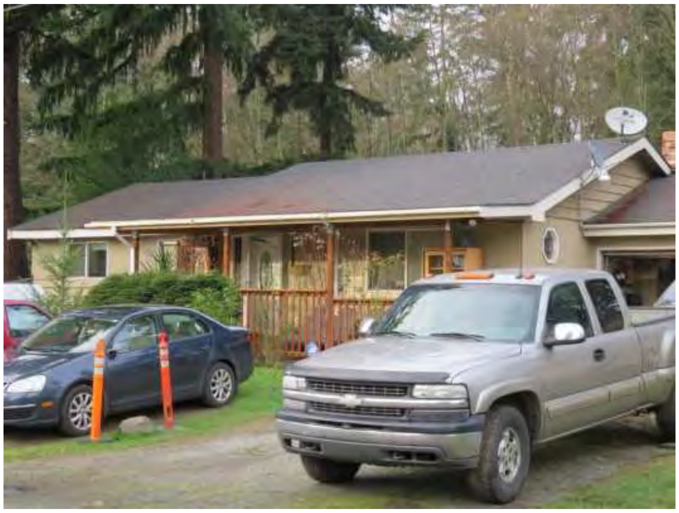
Historic Property Report

Resource Name: Residence

Property ID: 323645

Location





Address:	2244 S 333RD ST, FEDERAL WAY, WA
Tax No/Parcel No:	7978200160
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 POR TR 25 BEG SE COR THO
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1967	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

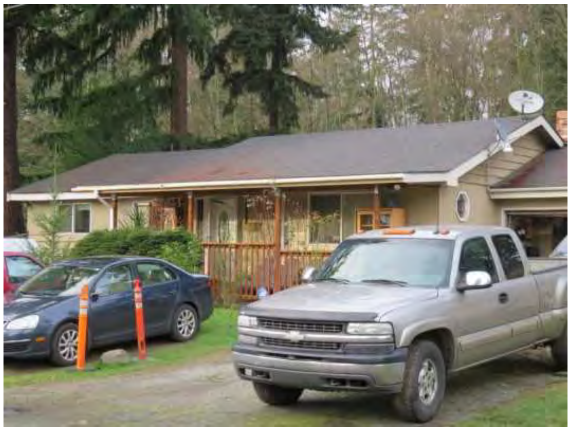
Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



2244 S 333rd Street, view northwest.JPG

2244 S 333rd Street, view west.JPG

Historic Property Report

Resource Name: Residence

Property ID: 323645

Inventory Details - 7/11/2011

Common name:	
Date recorded:	7/11/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200160
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 2244 S 333rd Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1967 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/13/2020

Common name:	
Date recorded:	2/13/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Wood - T 1-11
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Ranch
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1967), 2244 S 333rd Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and some cladding, which have been either altered or covered, and the encroaching construction of I-5. The building retains integrity of location. Evaluation The building at 2244 S 333rd Street was constructed in 1967 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associated recommends 2244 S 333rd Street does not retain integrity from its period of construction (1967) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria (Criteria A-D).
Physical description:	Built in 1967, the residential building at 2244 S 333rd Street fronts south (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation and is clad in a combination of T1-11 and horizontal board siding. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are vinyl framed in altered fenestration, including one octagonal window on the east face. An attached two-car garage is located on the east side of the building. The front door is located beneath a projecting porch.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 323645

Inventory Details - 3/12/2020

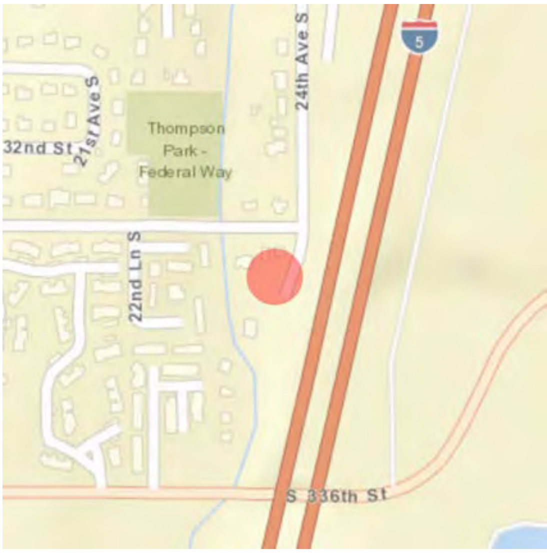
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

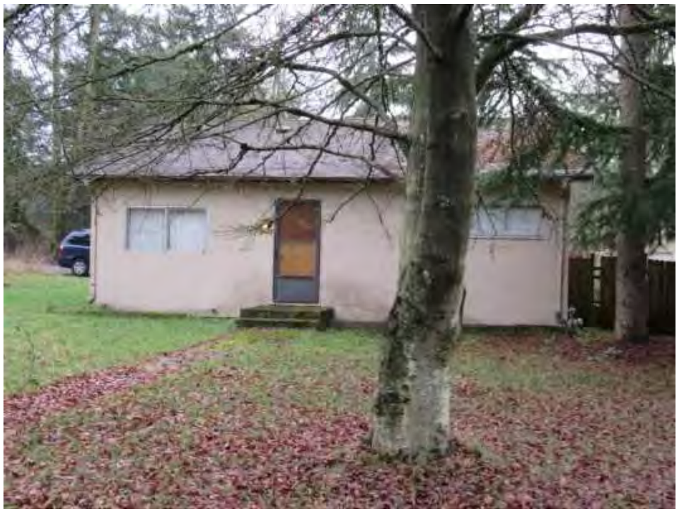
Historic Property Report

Resource Name: Residence

Property ID: 307792

Location


24th Ave S
5
21st Ave S
32nd St
Thompson Park - Federal Way
22nd Ln S
S 336th St



Address:	2245 S 333RD ST, FEDERAL WAY, WA
Tax No/Parcel No:	7978200180
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 LOT 3 KCSP NO 280049 REV
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1948	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

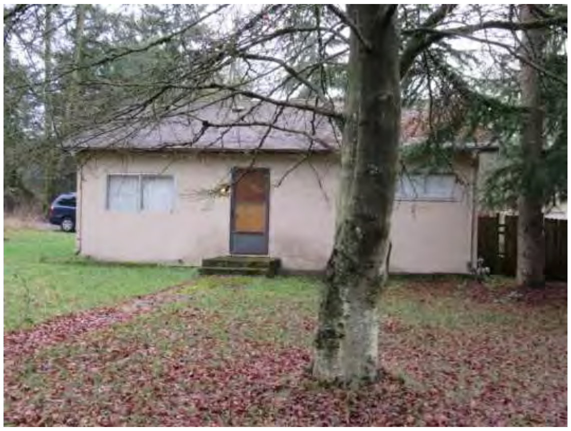
Local Registers and Districts

Name	Date Listed	Notes

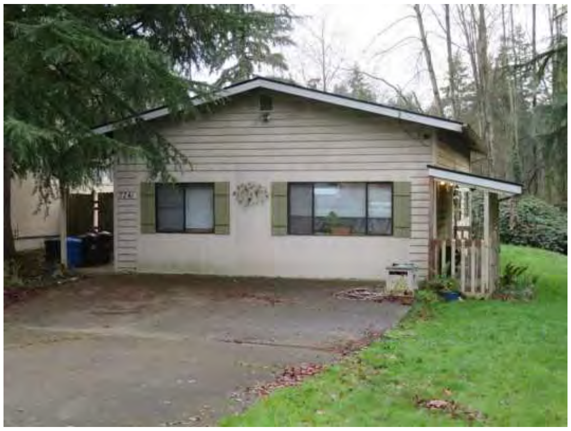
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



2245 S 333rd Street, built in 1948, view southeast.JPG



2241 S 33rd Street, built in 1989, view southeast.JPG

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200180
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2245 S 333rd Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1948 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/13/2020

Common name:	
Date recorded:	2/13/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Stucco
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Form Type	Single Dwelling
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1948), 2245 S 333rd Street retains poor integrity of materials, design, workmanship, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The encroaching construction of I-5 and the addition of a residence (2241 S 333rd Street) on the same parcel but at a separate address has altered the integrity of setting. The buildings retains integrity of location.

Evaluation

The residential buildings at 2241 S 333rd Street and 2245 S 333rd Street were constructed between 1948 and 1989 and do not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The buildings do not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the buildings were built of common construction methods and well-known materials and are unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends the residences addressed as 2241 S 333rd Street and 2245 S 333rd Street do not retain integrity from the period of construction (1948) and are not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description:

Built in 1948, the residential building at 2245 S 333rd Street fronts north (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation and is clad in stucco siding. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are aluminum framed; a central pedestrian entry with a wood door is accessed via a two-step concrete stoop.

A second building to the west dates to outside the historic period (1989) and was likely originally constructed as a garage but altered to living space (King County 2020). It is now addressed as 2241 S 333rd Street. The former garage is a one-story, rectangular building on an unknown foundation, clad in a combination of horizontal (vinyl) and vertical (T1-11) siding. The building is topped by a front-gabled roof clad in asphalt roofing. Windows on the north face are metal; entries are located on the east and west faces. A detached building with a garage door was located to the rear (south).

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

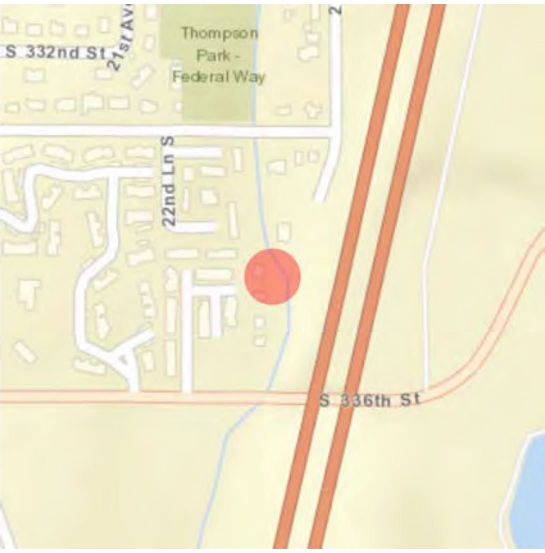
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

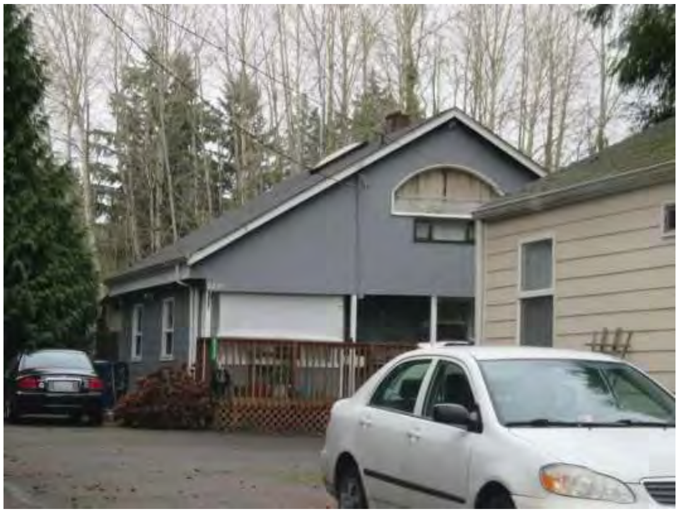
Historic Property Report

Resource Name: Residence

Property ID: 393802

Location





Address:	2230 S 336TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	7978200210
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 LOT 1 OF REV FW SP #SPL9
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E16

Information

Number of stories: 1.50

Construction Dates:

Construction Type	Year	Circa
Built Date	1962	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

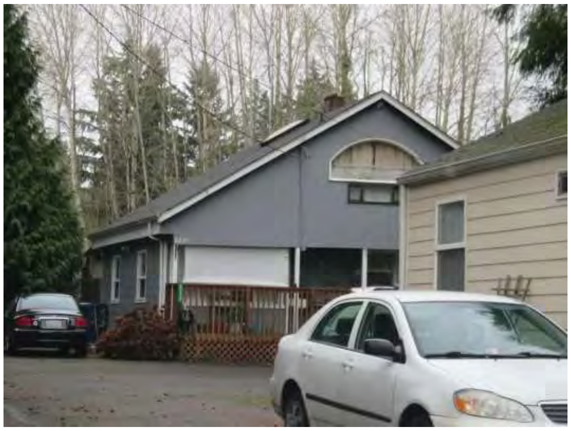
Local Registers and Districts

Name	Date Listed	Notes

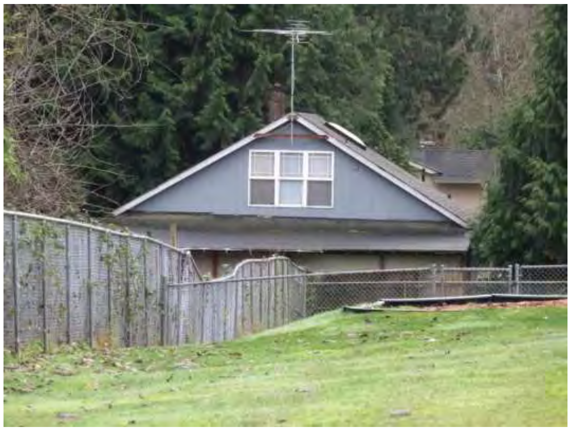
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00115, , Assessors Data Project: King County H	7/5/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



2230 S 336th Street, view northeast.JPG



2230 S 336th Street, view south.JPG

Historic Property Report

Resource Name: Residence

Property ID: 393802

Inventory Details - 7/5/2011

Common name:	
Date recorded:	7/5/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200210
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 2230 S 336th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1962 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/13/2020

Common name:

Date recorded: 2/13/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Cladding	Wood - T 1-11
Roof Type	Gable - Front
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Bungalow
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1962), 2230 S 336th Street retains poor integrity of materials, design, workmanship, feeling, and association, due to a loss of all historic-period windows and cladding, which have been either altered or covered. The building retains integrity of location and setting.

Evaluation

The residential building at 2230 S 336th Street was constructed in 1962 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Based on a lack of significance and integrity, Historical Research Associates recommends 2230 S 336th Street is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description: Built in 1962, the residential building at 2230 S 336th Street fronts south (King County Assessor 2020). The one-and-one-half story, rectangular building sits on an unknown foundation and is clad in T1-11 siding. The building is topped by a front-gabled roof clad in asphalt roofing. The building is located at the end of a private drive and is minimally visible from the ROW; all visible windows appear to be vinyl framed in altered fenestration. A semi-circular vinyl-framed window is located on the south face above the recessed porch and entry. A single-story projection below a ribbon of windows is located off the rear.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 393802

Inventory Details - 3/12/2020

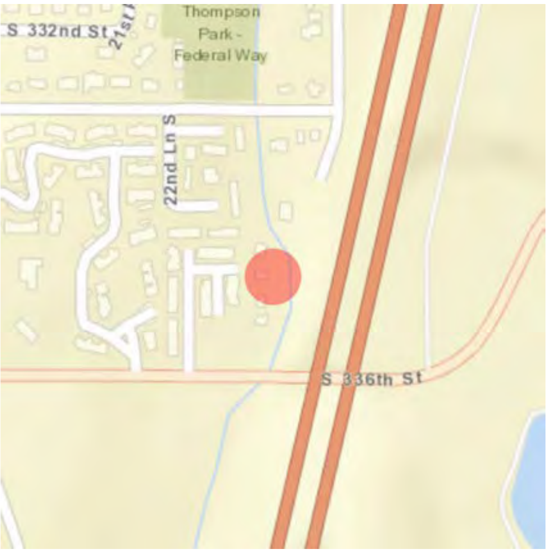
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

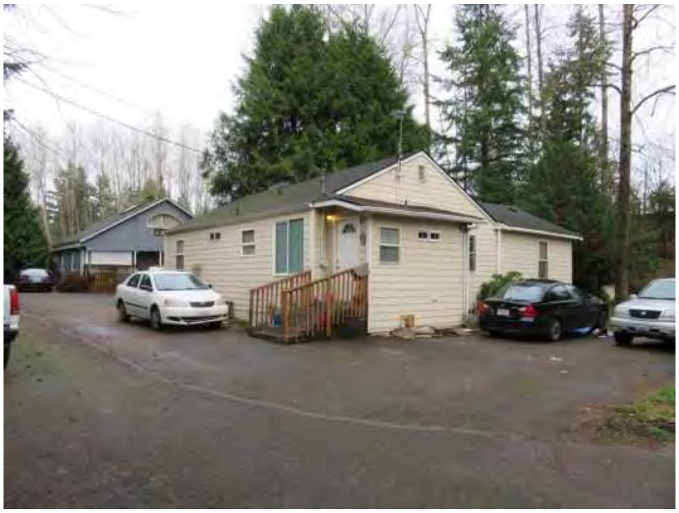
Historic Property Report

Resource Name: Residence

Property ID: 316302

Location





Address:	2234 S 336TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	7978200215
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 LOT 2 OF REV FW SP #SPL9
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1959	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

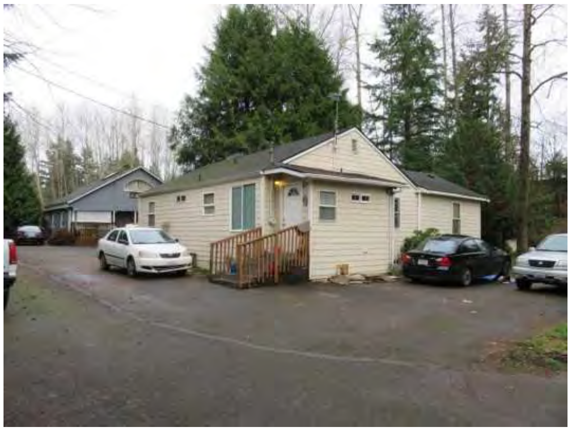
Local Registers and Districts

Name	Date Listed	Notes

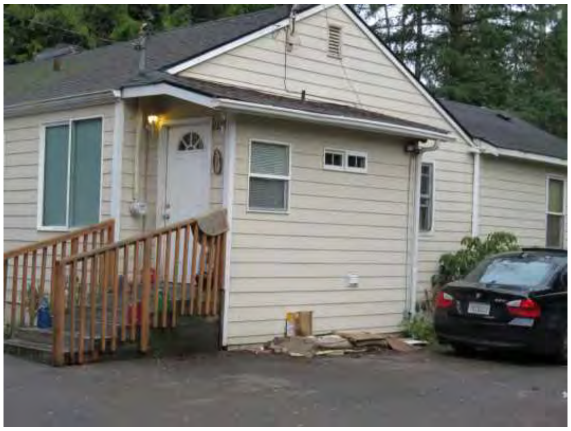
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



2234 S 336th Street, view northeast.JPG



2234 S 336th Street, zoomed, view northeast.JPG

Historic Property Report

Resource Name: Residence

Property ID: 316302

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200215
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 2234 S 336th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1959 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/13/2020

Common name:

Date recorded: 2/13/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Cladding	Fiber Cement Board
Plan	T-Shape
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Form Type	Single Dwelling - Bungalow
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1959), 2234 S 336th Street retains poor integrity of materials, design, workmanship, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The building retains integrity of location and setting.

Evaluation

The residential building at 2234 S 336th Street was constructed in 1959 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Based on a lack of significance and integrity, Historical Research Associates recommends 2234 S 336th Street is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description: Built in 1959, the residential building at 2234 S 336th Street has no facade (King County Assessor 2020). The one-story building sits on an unknown foundation and is clad in fiber-cement board siding. The building is topped by a cross-gabled roof clad in asphalt roofing. All windows are vinyl framed in altered fenestration. A pedestrian entry is located within an enclosed, shed-roofed arctic entry on the north face; the entrance faces west

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 316302

Inventory Details - 3/12/2020

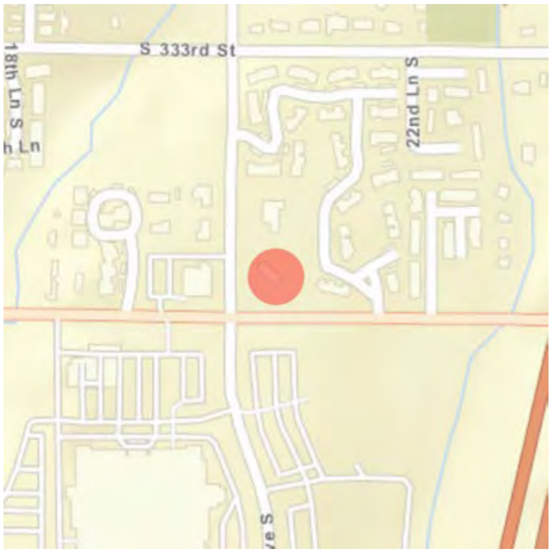
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

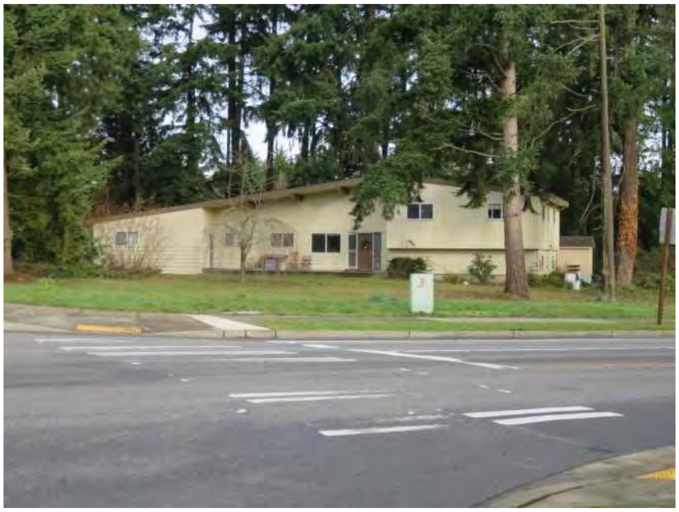
Historic Property Report

Resource Name: Residence

Property ID: 390101

Location





Address:	33366 20TH AVE S, FEDERAL WAY, WA
Tax No/Parcel No:	7978200106
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 S 1/2 OF LOT 21 LESS E 3
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E16

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1967	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

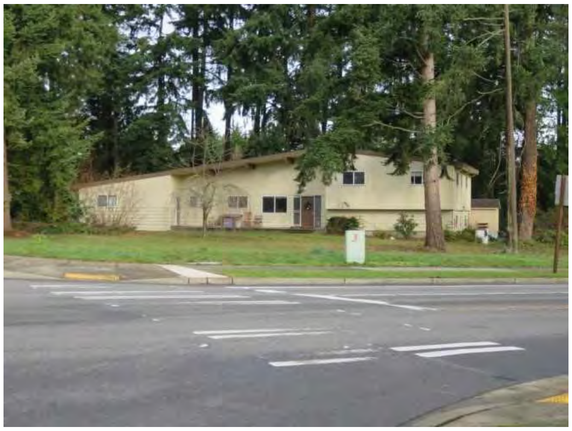
Local Registers and Districts

Name	Date Listed	Notes

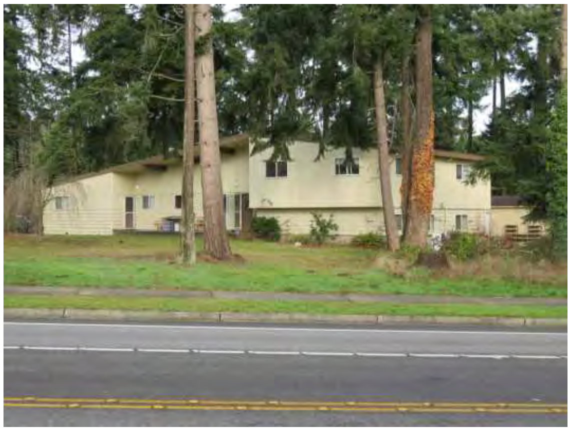
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00114, , Assessors Data Project: King County G	7/4/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

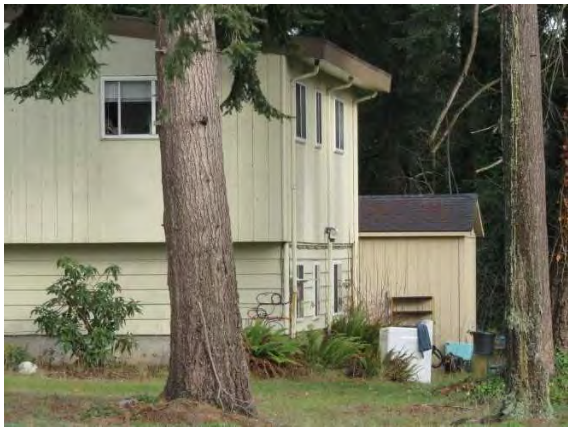
Photos



33366 20th Avenue S, view northeast.jpg



33366 20th Avenue S, view north



33366 20th Avenue S, view northeast_2.jpg

Historic Property Report

Resource Name: Residence

Property ID: 390101

Inventory Details - 7/4/2011

Common name:	
Date recorded:	7/4/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200106
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33366 20th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1967 and is a single family dwelling. The building has a single-family form with an attached garage.

Historic Property Report

Resource Name: Residence

Property ID: 390101

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Plan	Rectangle
Foundation	Concrete - Poured
Cladding	Wood
Cladding	Wood - Plywood
Cladding	Wood - T 1-11
Form Type	Single Dwelling
Roof Type	Gable - Front
Roof Material	Asphalt/Composition - Shingle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Contemporary

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1967), 33366 20th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and some cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location. Evaluation The residential building at 33366 20th Avenue S was constructed in 1967 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, as initially constructed, may have embodied the distinctive characteristics of a Contemporary Split- or Tri-level house; however, the loss of integrity of materials (windows, cladding) and setting, specifically, have rendered the building unable to convey significance as a representative example of its type (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates, Inc. recommends 33366 20th Avenue S does not retain integrity from its period of construction (1967) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1967, according to the King County Assessor, the residential building at 33366 20th Avenue S was originally constructed with the facade on the southwest, though access now seems to be primarily from the northeast (King County Assessor 2020). The one-story rectangular building sits on a poured-concrete foundation and is clad in a combination of horizontal boards, T1-11, and plywood. The building is topped by an off-center, front-gabled roof with exposed rafter tails clad in asphalt roofing. The southwest face features an inset porch with a wood door with sidelights. Windows throughout appear to be vinyl-framed in altered fenestration. The building may be an example of a Tri-level Contemporary.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

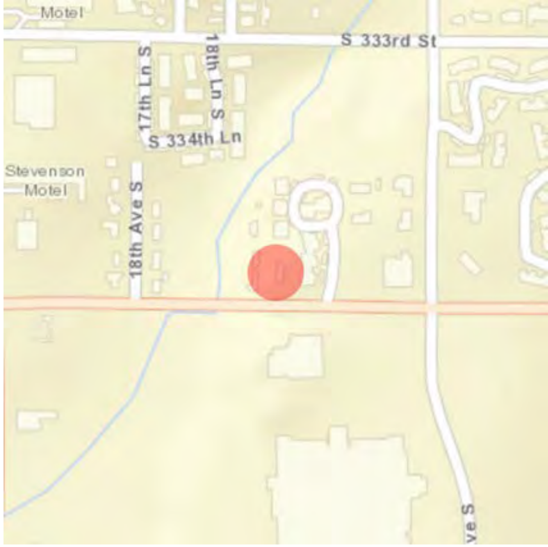
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

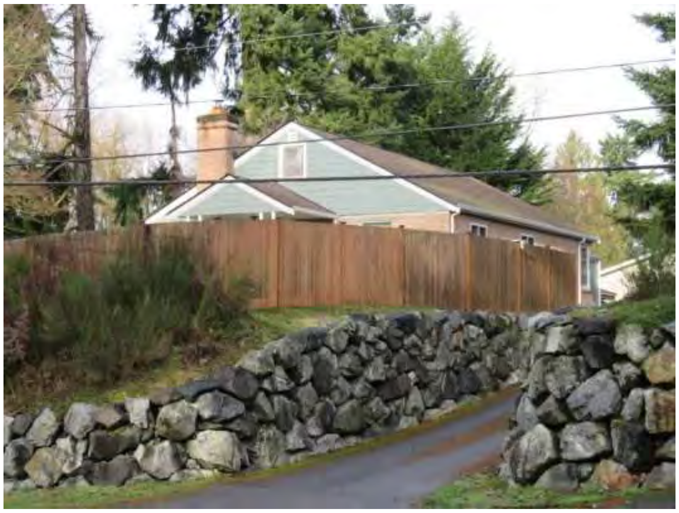
Historic Property Report

Resource Name: Residence

Property ID: 397382

Location


Motel
S 333rd St
17th Ln S
18th Ln S
S 334th Ln
Stevenson Motel
18th Ave S
ve S



Address: 1820 S 336TH ST, FEDERAL WAY, WA

Tax No/Parcel No: 7978200096

Plat/Block/Lot: STATE PLAT IN SEC 16-21-4 POR LOT 19 LY SELY-SLY &

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E16

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1950	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

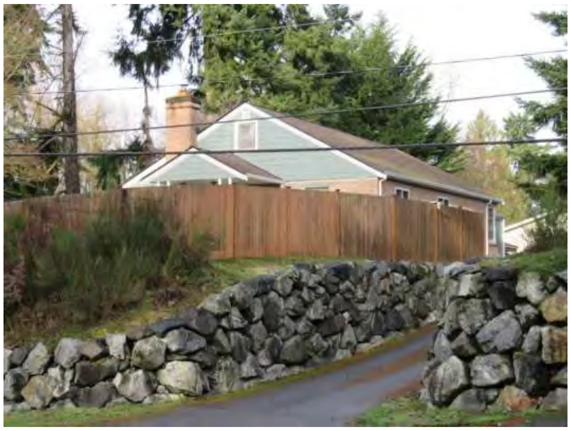
Local Registers and Districts

Name	Date Listed	Notes

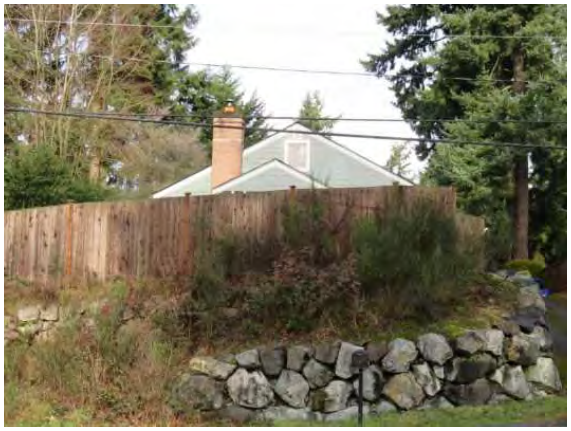
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/7/2020	Survey/Inventory	

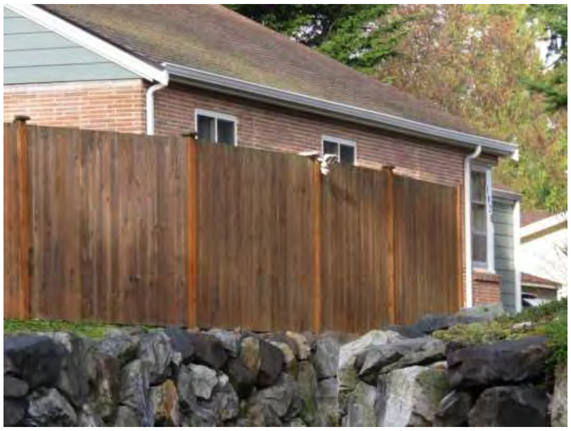
Photos



1820 S 336th Street, view northwest.jpg



1820 S 336th Street, view north



1820 S 336th Street, view northwest.JPG

Historic Property Report

Resource Name: Residence

Property ID: 397382

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200096
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1820 S 336th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1950 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 397382

Inventory Details - 2/7/2020

Common name:	
Date recorded:	2/7/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling - Bungalow
Roof Type	Gable - Front
Roof Material	Asphalt/Composition
Cladding	Brick - Stretcher Bond
Structural System	Wood - Platform Frame
Plan	Rectangle
Foundation	Concrete - Poured

Styles:

Period	Style Details
Modern Movement	Minimal Traditional

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1950), 1820 S 336th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of historic-period windows and possibly cladding, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 1820 S 336th Street was constructed in 1950 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

HRA recommends 1820 S 336th Street does not retain integrity from its period of construction (1950) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1950, according to the King County Assessor, the residential building at 1820 S 336th Street originally fronted south, though a fence now shields the building (King County Assessor 2020). The one-and-one-half-story, rectangular building sits on an unknown foundation and is clad in a combination of brick veneer and horizontal boards in the gable ends. The building features a telescoping front-gabled roof clad in asphalt roofing. A projecting porch supported by paired posts is somewhat visible from the ROW, as are a combination of vinyl-, wood-, and possibly aluminum-framed windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

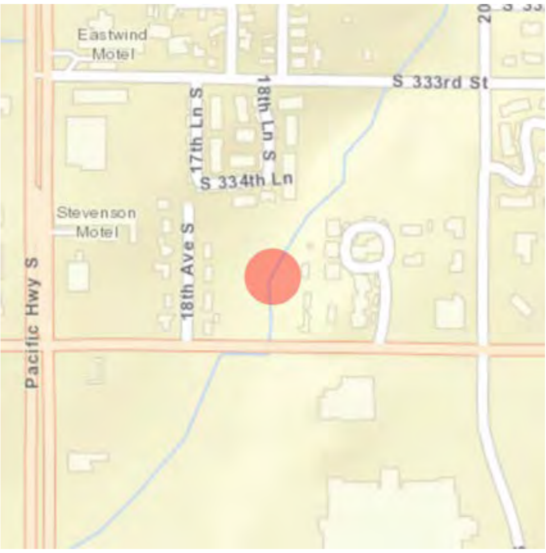
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

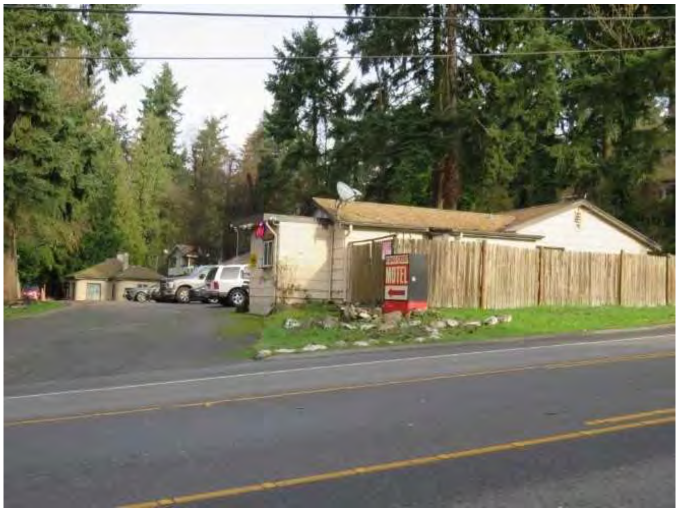
Historic Property Report

Resource Name: Motel

Property ID: 339411

Location


Eastwind Motel
S 333rd St
17th Ln S
18th Ln S
S 334th Ln
Stevenson Motel
18th Ave S
Pacific Hwy S



Address:	1812 S 336TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	7978200070
Plat/Block/Lot:	STATE PLAT IN SEC 16-21-4 LOT 14 TGW POR LOT 19 LY
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E16

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1947	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Hotel
Domestic	Domestic - Hotel

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Historic Property Report

Resource Name: Motel

Property ID: 339411

Thematics:

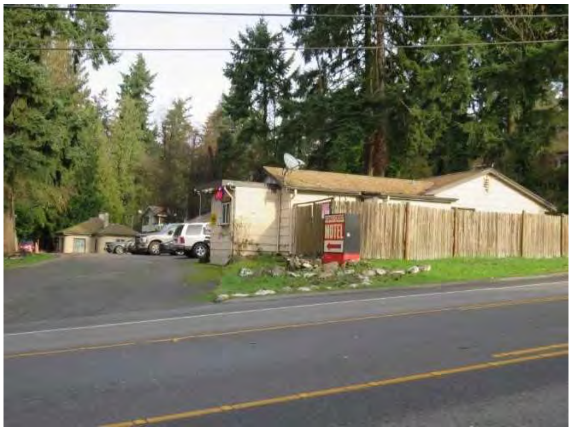
Local Registers and Districts

Name	Date Listed	Notes

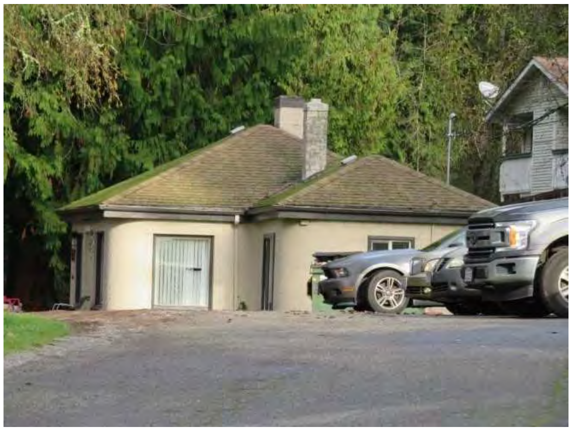
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00111, , Assessors Data Project: King County E	7/2/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



1812 S 336th Street, view northeast.jpg



1812 S 336th Street caretaker’s cottage, view north.jpg

Historic Property Report

Resource Name: Motel

Property ID: 339411

Inventory Details - 7/2/2011

Common name:	
Date recorded:	7/2/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	7978200070
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Structural System	Wood - Platform Frame
Form Type	Hotel/Motel

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The building at 1812 S 336th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1947 and is a hotel. Also according to the county assessor, the structure was remodeled in 1967. The 1-story building has a hotel/motel form.

Historic Property Report

Resource Name: Motel

Property ID: 339411

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Wood - Shingle
Form Type	Hotel/Motel - Motel
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Plan	L-Shape
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1947), 1812 S 336th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location. Evaluation The motel building at 1812 S 336th Street was constructed in 1947. It is not located on Pacific Highway but on a crossing street, where it is generally obscured from view. It was not designed as a roadside attraction. The motel does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history, including development along transportation corridors like Pacific Highway (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody any distinctive characteristics of a type, period, or method of construction. It is not a distinctive example of motel/hotel architecture nor an example of “googie” roadside architecture, which often features highly visible amenities and neon signage. It does not represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates recommends 1812 S 336th Street does not retain integrity from its period of construction (1947) and does not meet any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1947, according to the King County Assessor, the motel building at 1812 S 336th Street has no facade but fronts west towards the parking lot (King County Assessor 2020). The L-shaped, one-story building sits in a poured-concrete foundation and is clad in wood shingle siding. The building is topped by a cross-gabled roof clad in asphalt roofing. Windows throughout appear to be vinyl-framed in altered fenestration. A detached concrete block building is located northwest of the motel and may be the caretaker’s residence or additional hotel space; the building features a hip roof, rounded corners, and vinyl windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

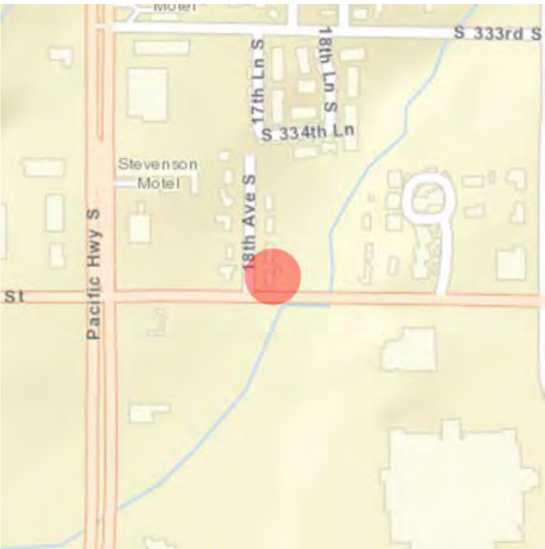
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

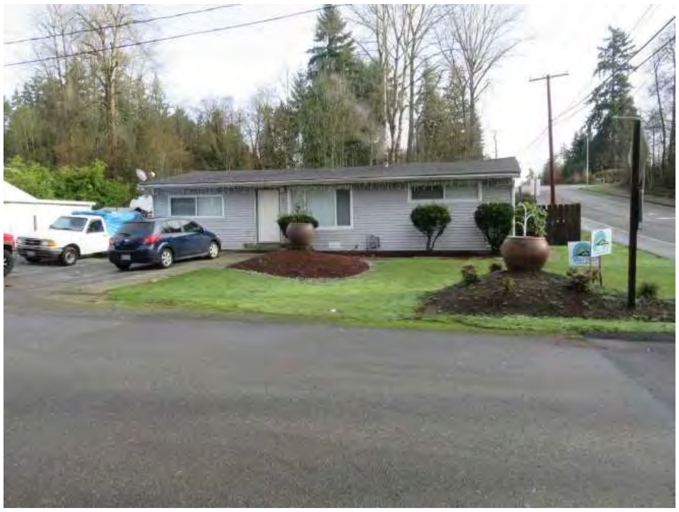
Historic Property Report

Resource Name: Residence

Property ID: 313682

Location


Motel
S 333rd S
17th Ln S
18th Ln S
S 334th Ln
Stevenson Motel
18th Ave S
Pacific Hwy S
St



Address: 33532 18TH AVE S, FEDERAL WAY, WA

Tax No/Parcel No: 4129400050

Plat/Block/Lot: LAKEHAVEN ADD

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1954	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

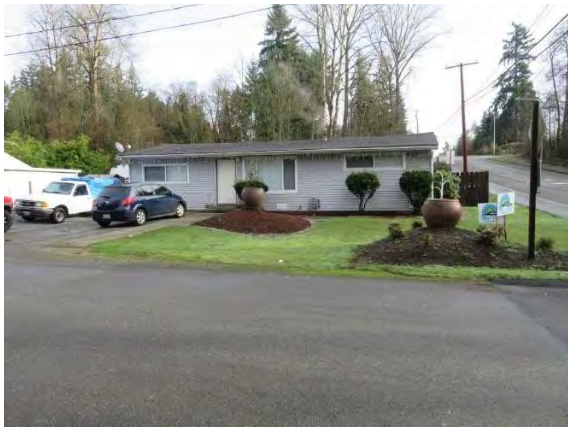
Local Registers and Districts

Name	Date Listed	Notes

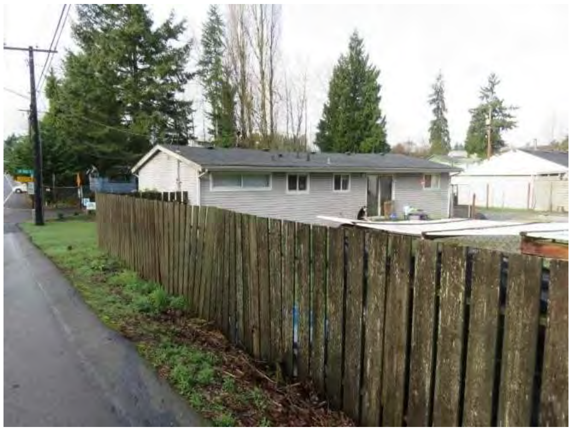
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



33532 18th Avenue S, view east.jpg



33532 18th Avenue S, view northwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 313682

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129400050
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33532 18th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1954 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Vinyl Siding
Roof Material	Asphalt/Composition - Shingle
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1954), 33532 18th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, conversion of the garage to living space, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The commercial building at 33532 18th Avenue S was constructed in 1954 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 33532 18th Avenue S does not retain integrity from its period of construction (1954) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1954, according to the King County Assessor, the residential building at 33532 18th Avenue S fronts west . The one-story, rectangular building sits on a poured-concrete foundation and is clad in vinyl siding. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout are vinyl-framed in altered fenestration. The front door is fiberglass. The building was likely originally constructed with a garage that was converted to living space.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 313682

Inventory Details - 3/12/2020

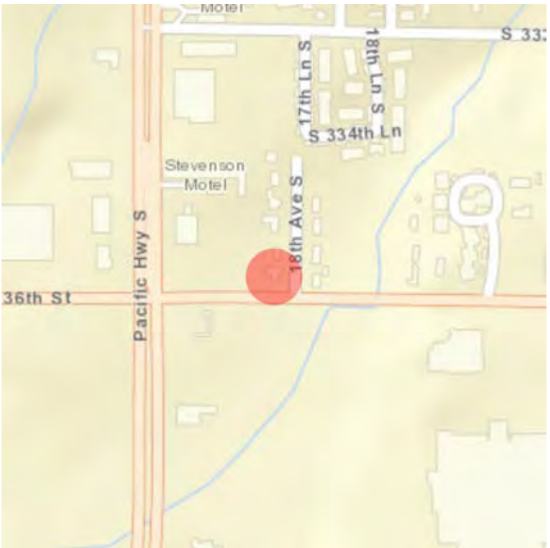
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

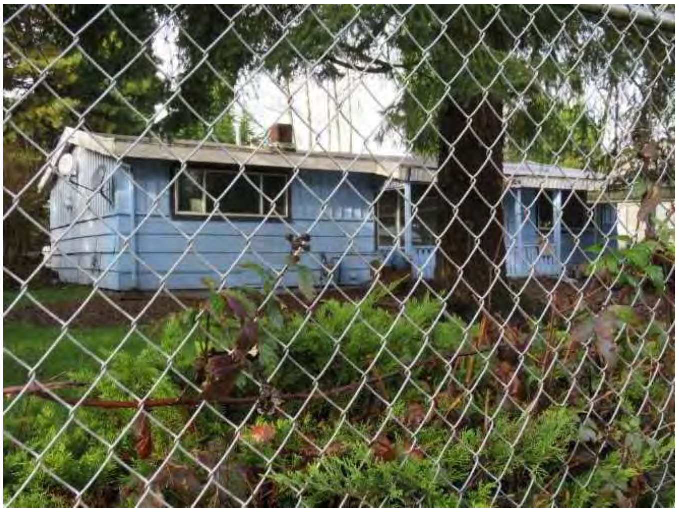
Historic Property Report

Resource Name: Residence

Property ID: 327921

Location


Motel
S 33
18th Ln S
17th Ln S
S 334th Ln
Stevenson Motel
18th Ave S
Pacific Hwy S
36th St



Address: 33531 18TH AVE S, FEDERAL WAY, WA

Tax No/Parcel No: 4129400005

Plat/Block/Lot: LAKEHAVEN ADD LESS POR FOR ST PER REC # 9810202481

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1954	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

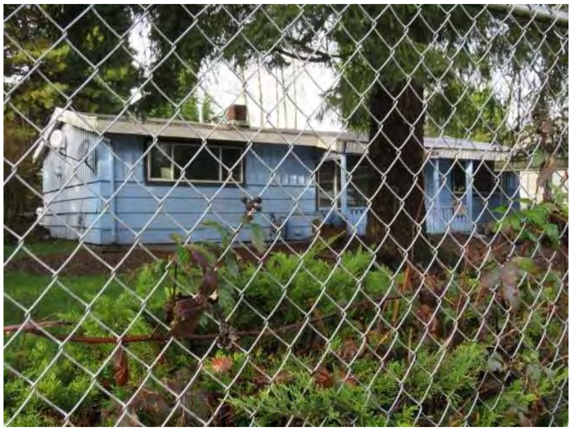
Local Registers and Districts

Name	Date Listed	Notes

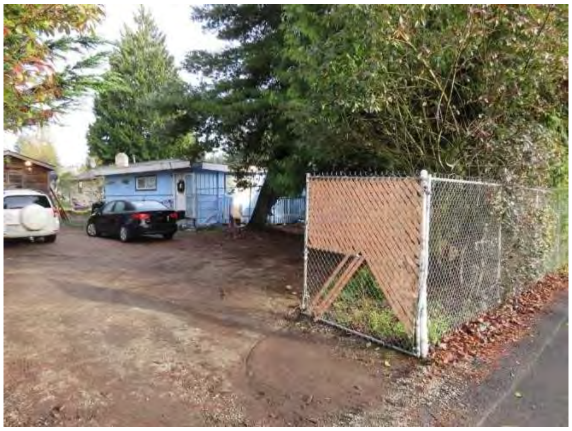
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



33531 18th Avenue S, view northwest.jpg



33531 18th Avenue S, view northeast.jpg

Historic Property Report

Resource Name: Residence

Property ID: 327921

Inventory Details - 7/11/2011

Common name:	
Date recorded:	7/11/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129400005
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 33531 18th Avenue S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1954 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 327921

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Plan	Rectangle
Cladding	Wood - Board & Batten
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Form Type	Single Dwelling
Cladding	Wood - Shingle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1954), 33531 18th Avenue S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and some cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 33531 18th Avenue S was constructed in 1954 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 33531 18th Avenue S does not retain integrity from its period of construction (1954) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1954, according to the King County Assessor, the residential building at 33531 18th Avenue S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of board-and-batten and wood shingle siding. The building is topped by a side-gabled roof clad in asphalt shingles. Windows throughout are vinyl-framed in altered fenestration. The front door is accessed beneath a shed-roofed porch. A large carport is located on the north face.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 327921

Inventory Details - 3/12/2020

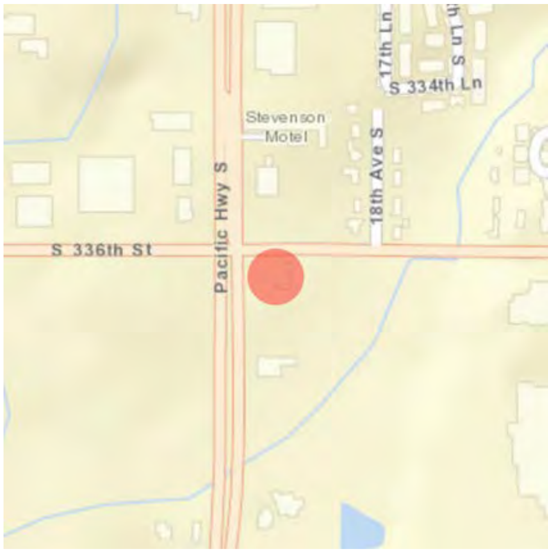
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

Historic Property Report

Resource Name: Commercial building

Property ID: 343935

Location



Address: 33606 PACIFIC HWY S, FEDERAL WAY, WA

Tax No/Parcel No: 2121049025

Plat/Block/Lot: S 100 FT OF N 130 FT OF E 180 FT OF W 241.2 FT OF

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1951	☑

Historic Use:

Category	Subcategory
Commerce/Trade	Commerce/Trade - Business
Commerce/Trade	Commerce/Trade - Business

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Historic Property Report

Resource Name: Commercial building

Property ID: 343935

Thematics:

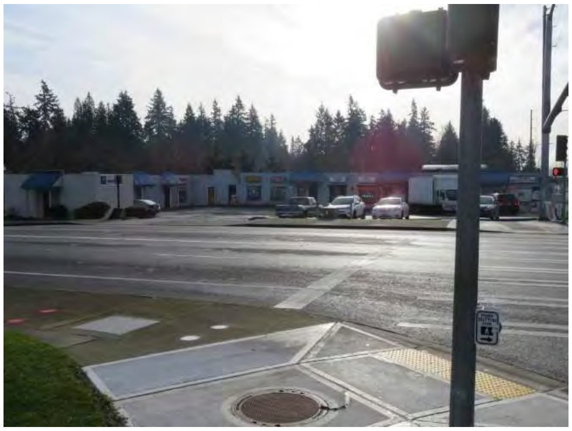
Local Registers and Districts

Name	Date Listed	Notes

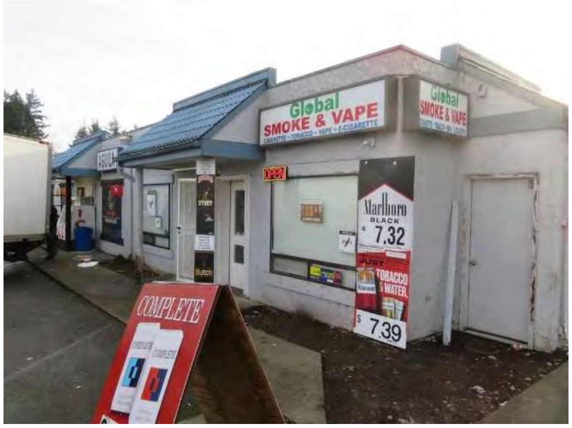
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00111, , Assessors Data Project: King County E	7/3/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



33606 Pacific Highway S, view south.jpg


Global
SMOKE & VAPE
OPEN
Marlboro
BLACK
7.32
7.39
COMPLETE

33606 Pacific Highway S, view southeast.jpg

Inventory Details - 7/3/2011

Common name:	
Date recorded:	7/3/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049025
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Commercial

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The building at 33606 Pacific Highway S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1951 and is a professional building. Also according to the county assessor, the structure was remodeled in 1985. The 1-story building has a commercial form.

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Roof Type	Flat with Parapet
Form Type	Commercial - Strip Commercial
Cladding	Stucco
Plan	L-Shape
Roof Material	Asphalt/Composition - Built Up
Structural System	Masonry - Concrete Block

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1951), 33606 Pacific Highway S retains poor integrity of materials, design, workmanship, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The building retains integrity of location and setting.
Evaluation
The commercial building at 33606 Pacific Highway S was constructed in 1951 and does not appear, based on a review of historic maps and local histories, to have any associatior with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 33606 Pacific Highway S does not retain integrity from its period of construction (1951) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1951, according to the King County Assessor, the commercial building at 33606 Pacific Highway S has no facade but fronts north and west towards a parking lot (King County Assessor 2020). The one-story, L-shaped building sits on a poured-concrete foundation and is clad in stucco. The building is topped by a flat roof with parapet clad in an unknown roofing material. Awnings over entryways are clad in either tile or stamped metal. Windows and doors throughout vary, though most windows are metal commercial.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Commercial building

Property ID: 343935

Inventory Details - 3/12/2020

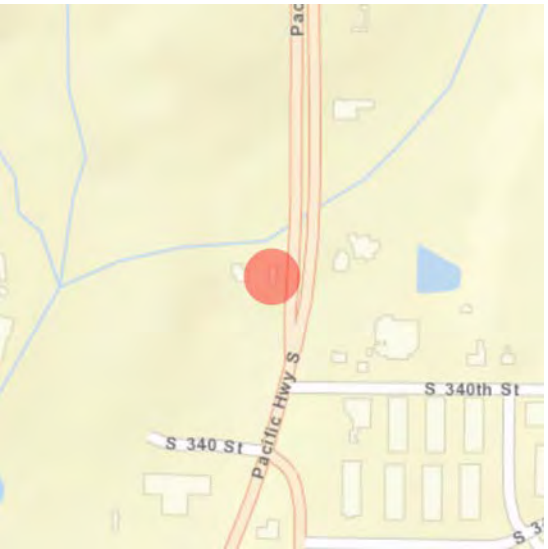
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

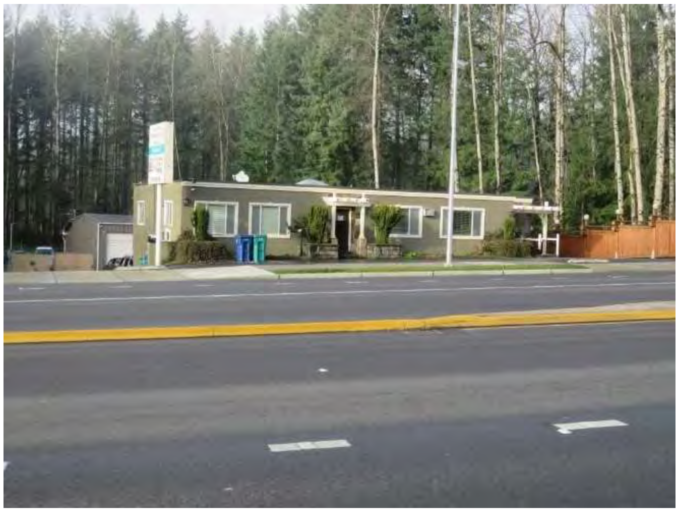
Historic Property Report

Resource Name: Commercial building

Property ID: 339564

Location





Address: 33903 PACIFIC HWY S, FEDERAL WAY, WA

Tax No/Parcel No: 2021049086

Plat/Block/Lot: PCL A OF FEDERAL WAY LLA # BLA 99-0007 REC #200001

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E20

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1947	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

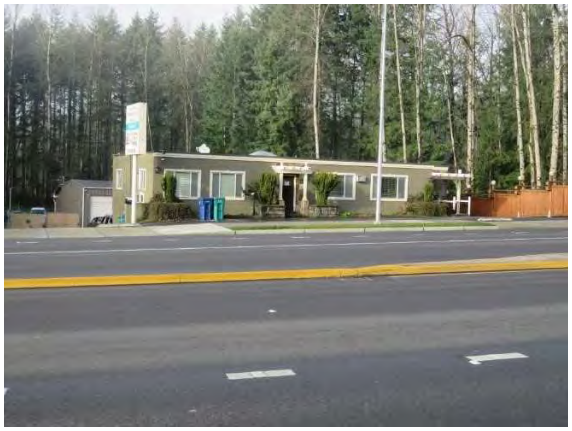
Local Registers and Districts

Name	Date Listed	Notes

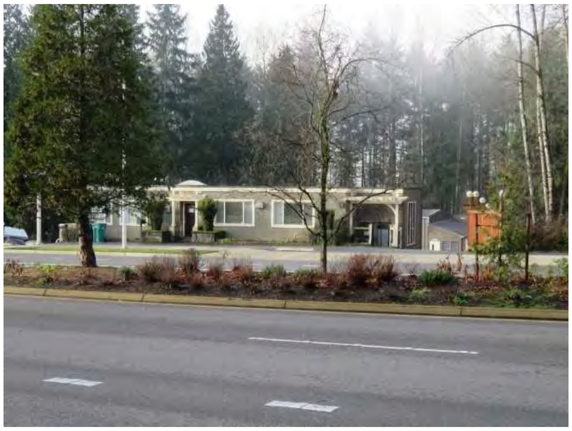
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00111, , Assessors Data Project: King County E	7/2/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



33903 Pacific Highway S, view northwest.jpg



33903 Pacific Highway S, view southwest.jpg

Inventory Details - 7/2/2011

Common name:	
Date recorded:	7/2/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2021049086
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Commercial
Structural System	Wood - Platform Frame

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The building at 33903 Pacific Highway S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1947 and is a professional building. Also according to the county assessor, the structure was remodeled in 1982. The 1-story building has a commercial form.

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Roof Type	Flat with Eaves
Roof Material	Asphalt/Composition
Cladding	Stucco
Cladding	Concrete
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1947), 33903 Pacific Highway S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. Additionally, the building may have been originally constructed for residential purposes. The building retains integrity of location. Evaluation The commercial building at 33903 Pacific Highway S was constructed in 1947, likely as a residence, and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates, Inc. recommends 33903 Pacific Highway S does not retain integrity from its period of construction (1947) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1947, according to the King County Assessor, the commercial building at 33903 Pacific Highway S fronts east, though the building appears to be primarily accessed via the rear (west) face (King County Assessor 2020). The one-story, rectangular building on basement sits on a poured-concrete foundation and is clad in either precast concrete siding or parged/stucco panels, with accents of applied stone. The building is topped by a flat roof clad in asphalt roofing. Windows throughout are vinyl-framed in altered fenestration. The primary east entry is topped by a decorative pergola, which is mimicked on the north end of the east face at a second (recessed) entry. A detached garage clad and roofed in standing-seam metal is located west of the primary building.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Commercial building

Property ID: 339564

Inventory Details - 3/12/2020

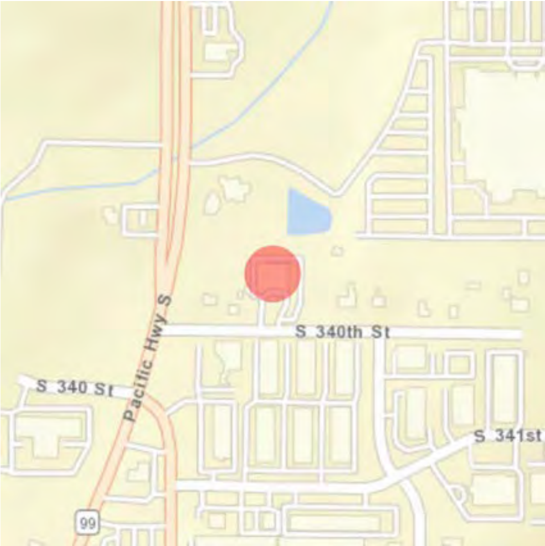
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

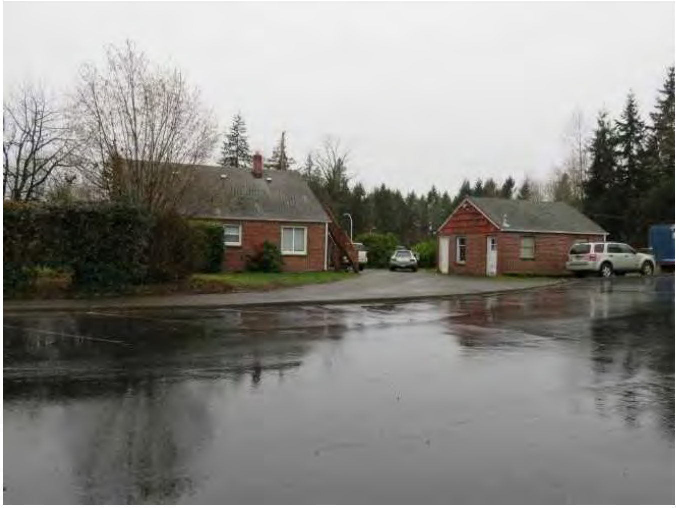
Historic Property Report

Resource Name: Masonic Center Residence

Property ID: 721148

Location





Address: 1700 S 340th St, Federal Way, Washington, 98003

Geographic Areas: POVERTY BAY Quadrangle, King County, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1946	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

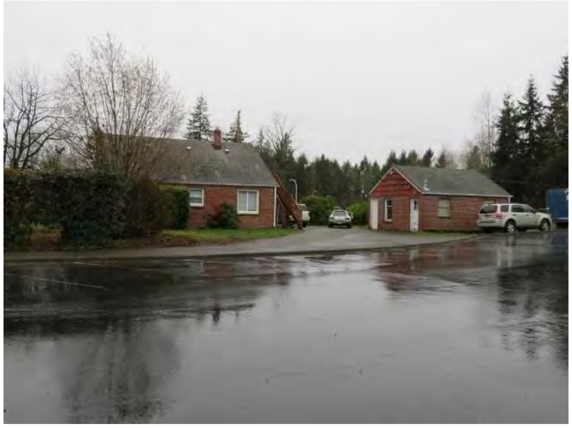
Local Registers and Districts

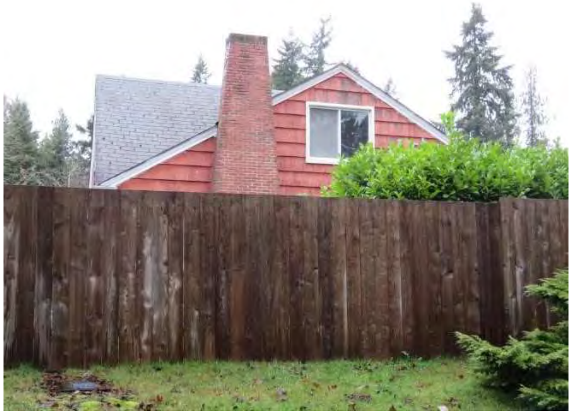
Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos


1700 S 340th Street, associated residential building, view northeast.jpg


1700 S 340th Street, associated residence, view northwest.jpg

Historic Property Report

Resource Name: Masonic Center Residence

Property ID: 721148

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Form Type	Single Dwelling
Cladding	Wood - Shingle
Cladding	Brick
Plan	Rectangle
Foundation	Concrete - Poured
Structural System	Masonry - Brick

Styles:

Period	Style Details
Modern Movement	Minimal Traditional

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1946), the residence at 1700 S 340th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of some historic-period windows and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development, as well as a new association with a Masonic Hall dating to 1974. The building retains integrity of location.

Evaluation

The residence associated with the Masonic Center at 1700 S 340th Street was constructed in 1946, likely as a single-family residence, and later converted to housing serving the neighboring Masonic Center, constructed in 1974 for Thornton F. McElroy Lodge #302. As noted in a separate evaluation for the Masonic Center, Lodge #302 was formed in 1958 and moved into its new building in 1974. As with the lodge building itself, the residence at this location does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of state or national history, although it is somewhat significant locally for its association with Lodge #302 (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). As noted in the associated HPI, the naming of the lodge for Thornton F. McElroy appears to be primarily honorary and not indicative of a direct association with McElroy. McElroy was the first Master of Olympia Lodge, which was the first Lodge in Washington Territory, and was later the first Grand Master of the Grand Lodge of Washington (Miller n.d.). As with the lodge building, the residence at 1700 S 340th Street is a modest example of a common type. This example has been heavily altered. It does not embody the distinctive characteristics of its type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends that the residence at 1700 S 340th Street does not retain integrity from its period of construction (1946) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description:

The Masonic Center residence is a residential building located to the west of the Thornton F. McElroy (Lodge No. 302) Pyramid Masonic Center at 1700 S 340th Street. Built in 1946, according to the King County Assessor, the residential building at 1700 S 340th Street fronts south (King County Assessor 2020). The one-and-one-half-story, rectangular building sits on an unknown foundation and is clad in brick veneer with wood shingle siding in the gables. The building features a cross-gabled roof clad in asphalt materials. The residential building is barely visible from the right-of-way, though at least one wood window (in the gable end) was observed, as was an exterior brick chimney and additional vinyl-framed windows on secondary elevations. The building, as observed, appeared to have been constructed in the Tudor Revival style. The residence had an associated one-story brick outbuilding with a gable roof; wood shingles matching those of the house were present in the gable end. The outbuilding featured two pedestrian entrances on the south face, and various windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

Miller, William R.
n.d. Lodge History. Electronic document, http://www.tfmcelroy302.org/lodge-history.html, accessed January 31, 2020.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

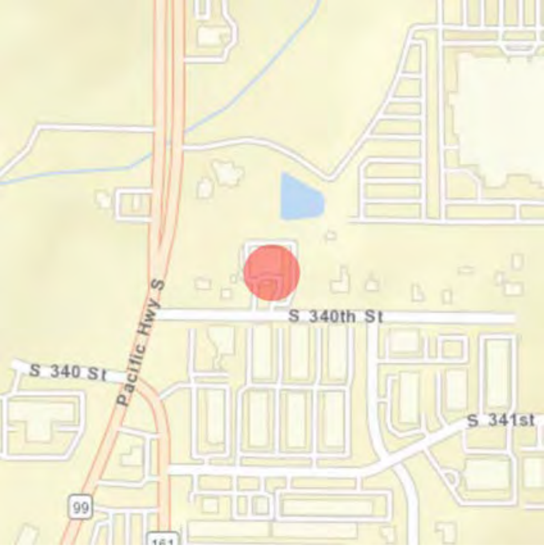
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

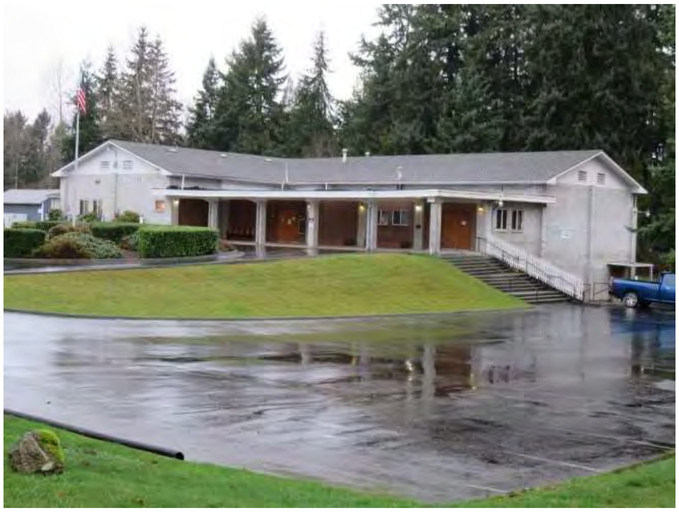
Historic Property Report

Resource Name: Masonic Center

Property ID: 338279

Location





Address: 1700 S 340TH ST, FEDERAL WAY, WA

Tax No/Parcel No: 2121049024

Plat/Block/Lot: S 305.5 FT OF NW 1/4 OF NW 1/4 EX S 16.5 FT & EX S

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1974	☐

Historic Use:

Category	Subcategory
Social	Social - Meeting Hall
Social	Social - Meeting Hall

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company
Architect	Kenneth Figg
Architect	Figg, Kenneth

Thematics:

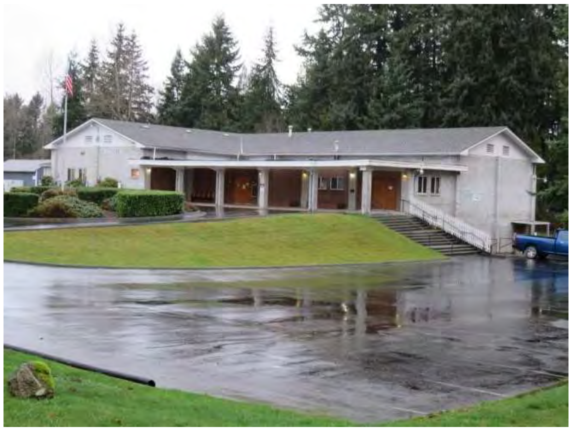
Local Registers and Districts

Name	Date Listed	Notes

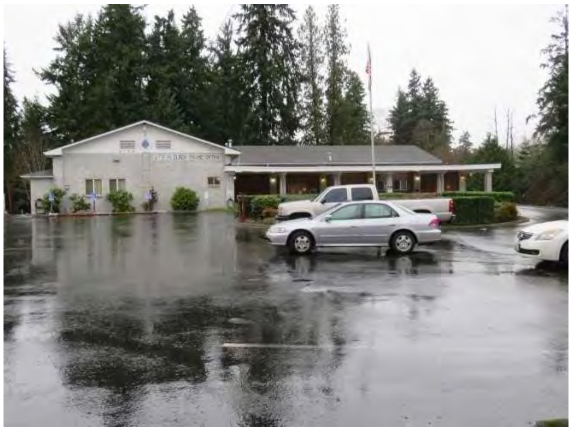
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00111, , Assessors Data Project: King County E	7/2/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



1700 S 340th Street, view northwest.jpg



1700 S 340th Street, view north.jpg

Historic Property Report

Resource Name: Masonic Center

Property ID: 338279

Inventory Details - 7/2/2011

Common name:	
Date recorded:	7/2/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049024
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Structural System	Wood - Platform Frame
Form Type	Multiple Dwelling

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The building at 1700 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1946 and is a multiple family house. Also according to the county assessor, the structure was remodeled in 1946. The 1-story building has a multi-family form.

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Plan	L-Shape
Cladding	Concrete - Block (cmu)
Cladding	Wood - Board & Batten
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Form Type	Commercial
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1974), 1700 S 340th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and doors, and the surrounding construction of heavy commercial development. The building retains integrity of location.
Evaluation
The Masonic Center at 1700 S 340th Street was constructed to serve as a local lodge for members of the Society of Freemasons in 1974 by the Thornton F. McElroy Lodge #302, founded at a separate location in 1958 after receiving a special dispensation to acquire territory from surrounding, previously established lodges (Miller n.d., Mortensen 1984). Due to its relatively young age, the building does not appear to have any specific association with events like the early formation of the Freemasons in Washington, or the founding of Lodge #302 that made a significant contribution to the broad patterns of state or national history. Locally, it possesses some significance as the social meeting hall of Thornton F. McElry Lodge #302 (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The naming of the lodge for Thornton F. McElroy appears to be primarily honorary and not indicative of a direct association with McElroy. McElroy was the first Master of Olympia Lodge, which was the first Lodge in Washington Territory, and was later the first Grand Master of the Grand Lodge of Washington (Miller n.d.). The building is modest in design, constructed of common, mass-produced materials, and does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends the Masonic Center at 1700 S 340th Street locally significant under Criterion A. It does not retain integrity from its period of construction (1974) and is, therefore, not eligible for listing in the National Register of Historic Places or Washington Heritage Register under any criteria.

Physical description:

Built in 1974, according to the King County Assessor and a history of the Lodge, the social building at 1700 S 340th Street fronts south (King County Assessor 2020; Mortensen 1984). The L-shaped, one-story building on basement sits on a poured-concrete foundation and is constructed of CMU with vertical board and batten in the gable ends. The building is topped by a cross-gabled roof clad in asphalt roofing. Windows are altered vinyl-framed in the original fenestration. The primary entrance is located beneath a portico on the south face, supported by CMU posts. Brick veneer accents the solid wood entry doors. At the time of survey, the building served as the Thornton F. McElroy (Lodge No. 302) Pyramid Masonic Center. Also located on the parcel is an apartment associated with the building, evaluated separately, and a small tool shed dating to 2018 (King County Assessor 2020).

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

Miller, William R.
n.d. Lodge History. Electronic document, http://www.tfmcelroy302.org/lodge-history.html, accessed January 31, 2020.

Mortensen, Pete
1984 Thornton F. McElroy Lodge #302, F. & A. M. 25th Anniversary. Electronic document, http://www.tfmcelroy302.org/lodge-history.html, accessed June 25, 2020.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

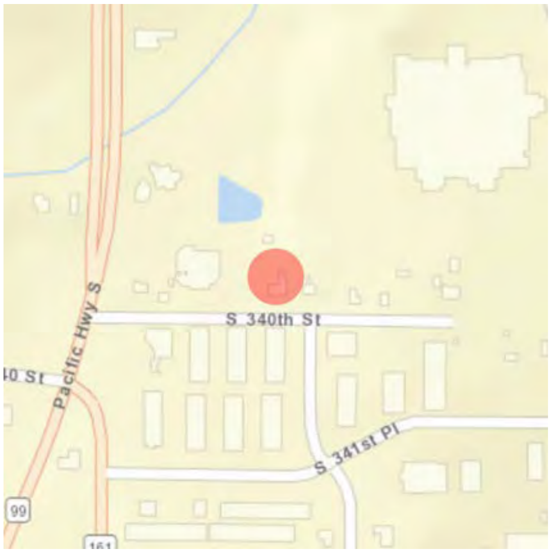
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

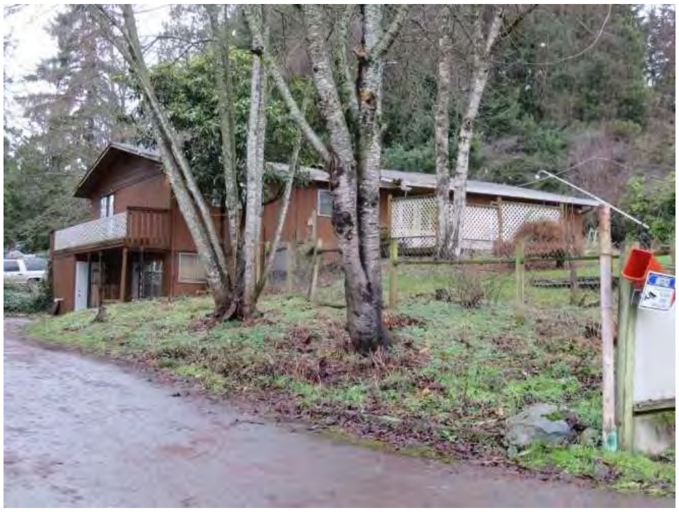
Historic Property Report

Resource Name: Residence

Property ID: 307394

Location





Address: 1724 S 340TH ST, FEDERAL WAY, WA

Tax No/Parcel No: 2121049041

Plat/Block/Lot: W 115 FT OF E 797.5 FT OF S 305.5 FT OF NW 1/4 OF

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1966	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

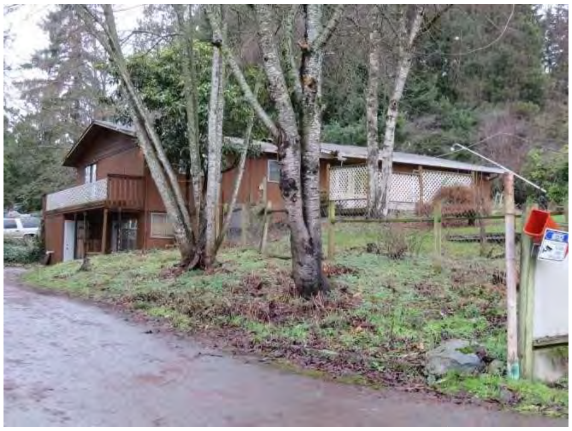
Local Registers and Districts

Name	Date Listed	Notes

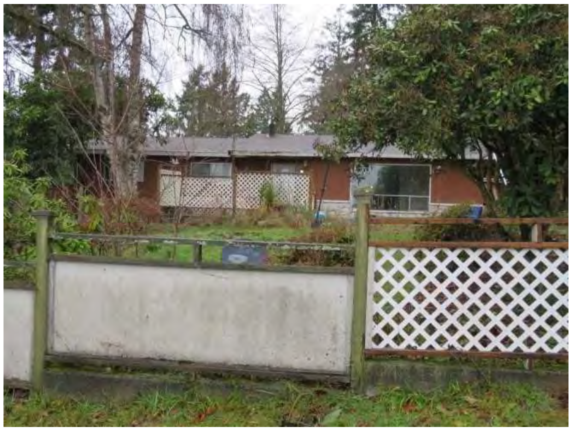
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



1724 S 340th Street, view northeast.jpg



1724 S 340th Street, view north.jpg

Historic Property Report

Resource Name: Residence

Property ID: 307394

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049041
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1724 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1966 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/6/2020

Common name:

Date recorded: 2/6/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Cladding	Wood - T 1-11
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Built Up
Plan	Rectangle
Form Type	Single Dwelling
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1966), 1724 S 340th Street retains moderate integrity of materials, design, workmanship, setting, feeling, and association. Historic-period aluminum windows appear intact, though doors and cladding have been either altered or covered and there has been surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 1724 S 340th Street was constructed in 1966 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1724 S 340th Street does not retain integrity from its period of construction (1966) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1966, according to the King County Assessor, the residential building at 1724 S 340th Street fronts south (King County Assessor 2020). The irregular/rectangular, one-story-on-basement building sits on an unknown foundation and is clad in T1-11 siding with a skirt of applied stone veneer. The building is topped by a side-gabled roof clad in asphalt roofing. Windows throughout appear to be aluminum sash, though portions of the house—including the entry—are obscured behind a latticed privacy screen. On the west face, fiberglass pedestrian doors access the basement level below an exterior deck.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

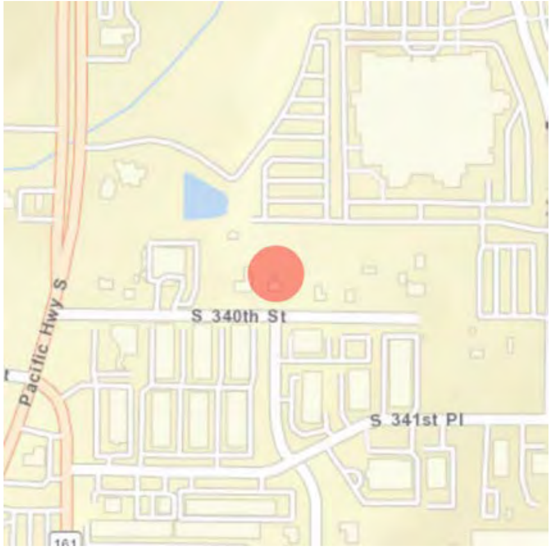
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

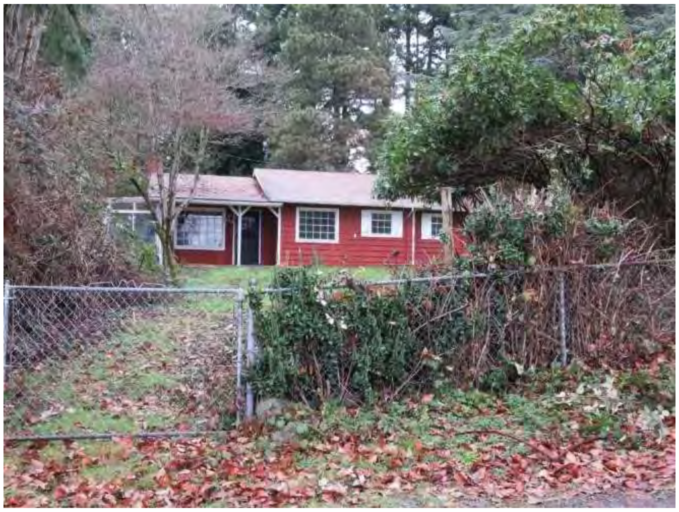
Historic Property Report

Resource Name: Residence

Property ID: 327673

Location





Address:	1800 S 340TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049042
Plat/Block/Lot:	W 115 FT OF E 682.5 FT OF S 305.5 FT OF NW 1/4 OF
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1966	☑
Addition	2000	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

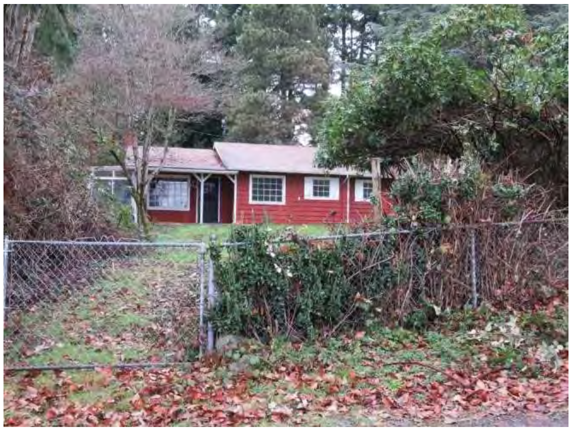
Local Registers and Districts

Name	Date Listed	Notes

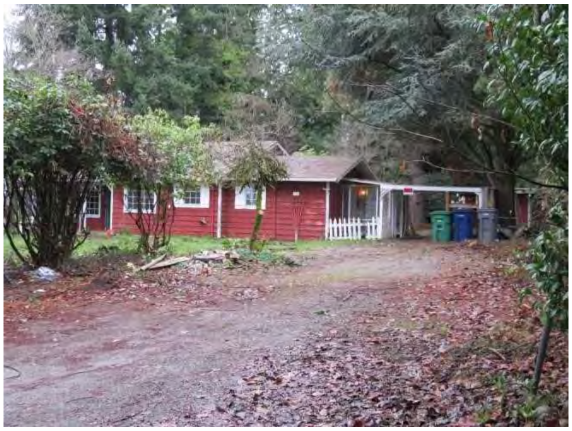
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



1800 S 340th Street, view northeast.jpg



1800 S 340th Street, view northwest

Inventory Details - 7/11/2011

Common name:

Date recorded: 7/11/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 2121049042

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1800 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1966 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Cladding	Wood - Clapboard
Cladding	Wood - T 1-11
Plan	Rectangle
Form Type	Single Dwelling - Ranch
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1966), 1800 S 340th Street retains moderate integrity of materials, design, workmanship, setting, feeling, and association, with minimal alterations to massing via the addition of the sunroom and screened porch, changes to siding in the recessed entry (T1-11), and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 1800 S 340th Street was constructed in 1966 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building was arguably constructed in the Ranch style, though it features none of the distinctive characteristics (aside from the low horizontal massing) that would enable the building to convey significance as a representative example of the type (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1800 S 340th Street does not retain integrity from its period of construction (1966) and is not eligible under any criteria for listing in the National Register of Historic Places or the Washington Heritage Register.

Physical description:

Built in 1966, according to the King County Assessor, the residential building at 1800 S 340th Street fronts south (King County Assessor 2020). The one-story, rectangular building sits on an unknown foundation and is clad in a combination of wood clapboard and T1-11 siding. The building is topped by a telescoping side-gabled roof clad in asphalt roofing. The building features a shed carport and screened porch to the east. The primary entrance is located on the west side of the house, accessed via a recessed porch, and features a six-light-over-one panel door protected by a metal screen door. A sunroom is located on the west face. Windows throughout appear to be multilight and wood-framed, some with decorative wooden shutters.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 327673

Inventory Details - 3/12/2020

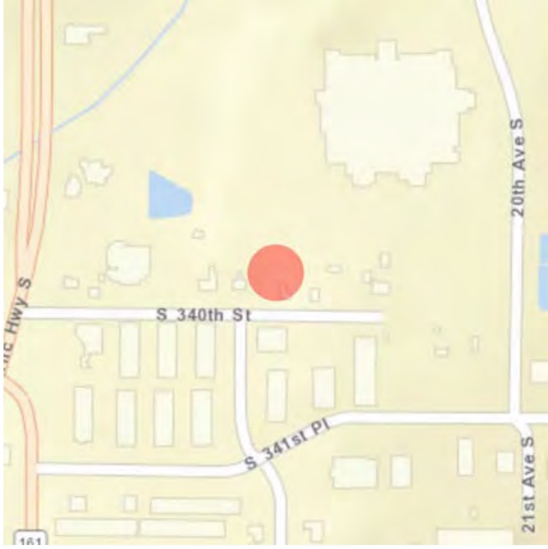
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

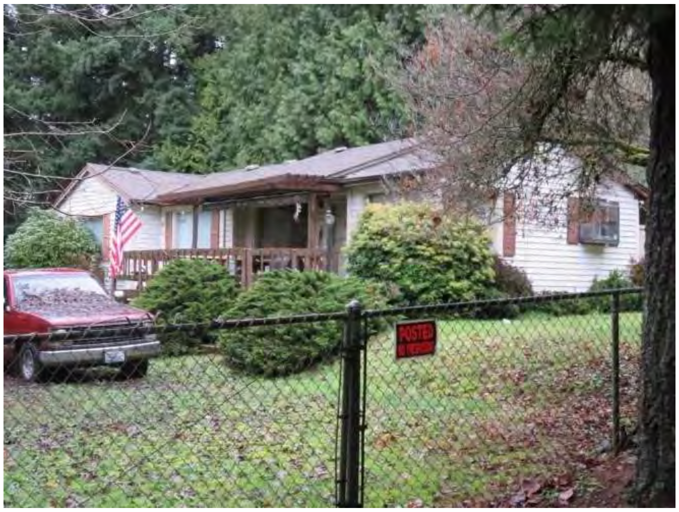
Historic Property Report

Resource Name: Residence

Property ID: 321965

Location





Address:	1816 S 340TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049040
Plat/Block/Lot:	W 115 FT OF E 567.5 FT OF S 305.5 FT OF NW 1/4 OF
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1949	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

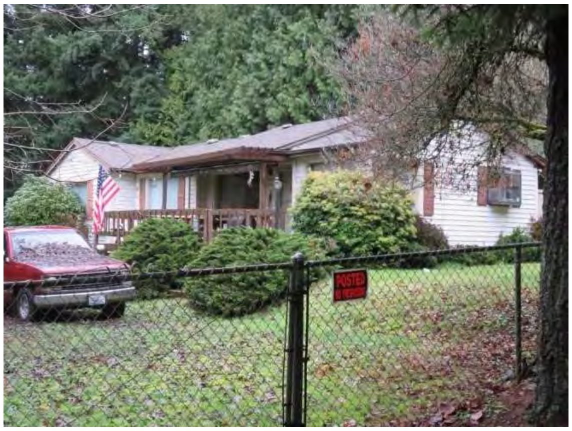
Local Registers and Districts

Name	Date Listed	Notes

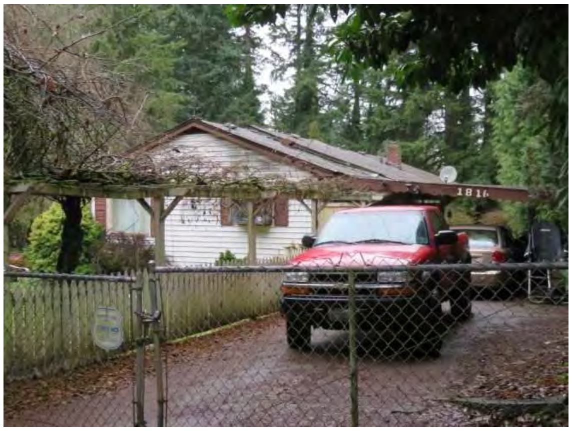
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

Photos



1816 S 340th Street, view northeast.jpg



1816 S 340th Street, view northwest.jpg

Inventory Details - 7/10/2011

Common name:

Date recorded: 7/10/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 2121049040

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1816 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1949 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 321965

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	L-Shape
Form Type	Single Dwelling
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Cladding	Vinyl Siding
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1949), 1816 S 340th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of at least some historic-period windows and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 1816 S 340th Street was constructed in 1949 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1816 S 340th Street does not retain integrity from its period of construction (1949) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1949, according to the King County Assessor, the residential building at 1816 S 340th Street has no front facade; it is accessed via a driveway on the south face, with pedestrian entrances on both the east and west faces (King County Assessor 2020). The L-shaped, one-story building sits on an unknown foundation and is clad in vinyl siding. The building is topped by a side-gabled roof clad in asphalt roofing. A shed-roofed carport is located on the southeast corner. On the west face is a semi-covered deck. Windows varied, with some wood picture windows and at least one metal oriel.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

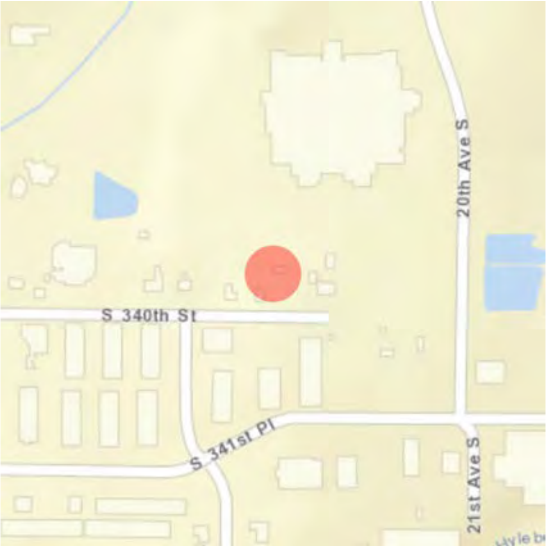
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

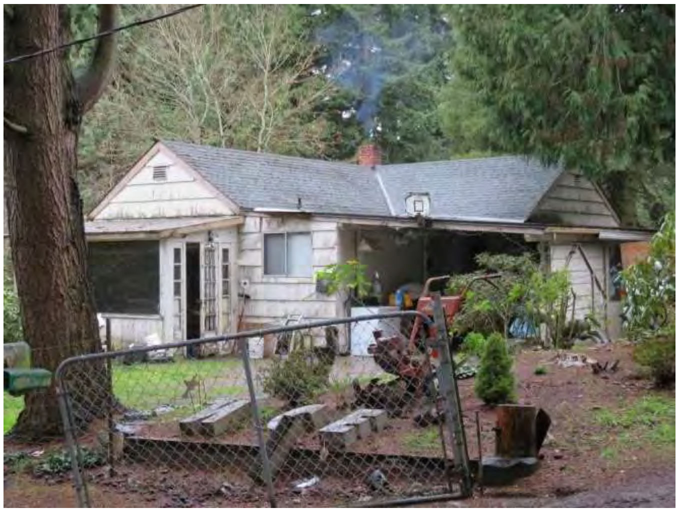
Historic Property Report

Resource Name: Residence

Property ID: 328276

Location





Address:	1828 S 340TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049039
Plat/Block/Lot:	E 452.5 FT OF N 289 FT OF S 30K.5 FT OF NW 1/4 OF
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1946	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

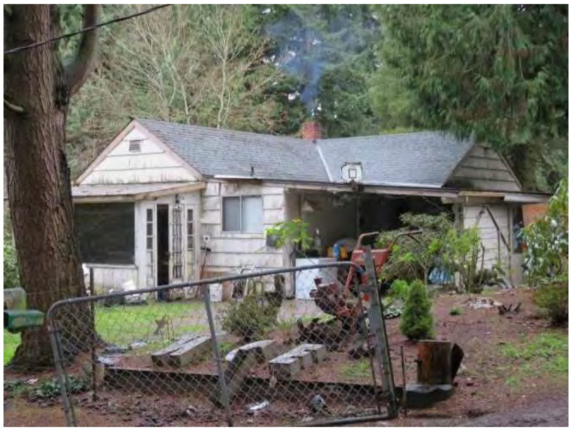
Local Registers and Districts

Name	Date Listed	Notes

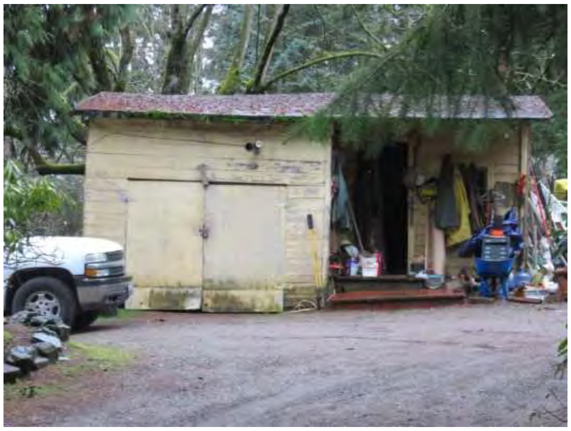
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/12/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/6/2020	Survey/Inventory	

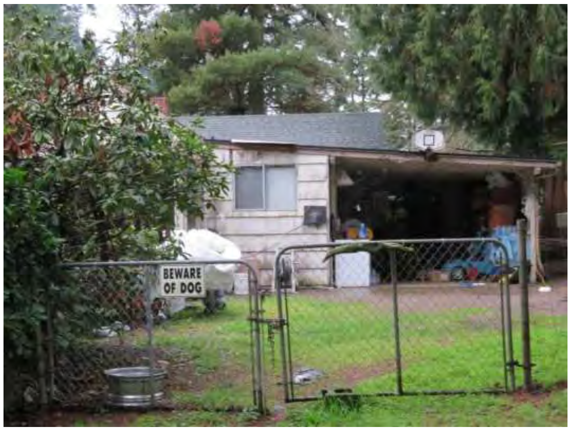
Photos



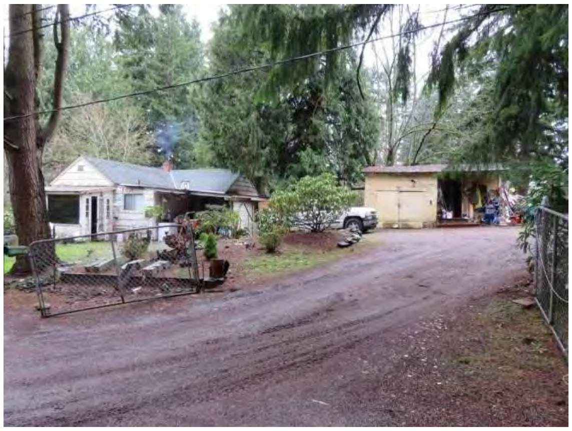
1828 S 340th Street, view northeast_2.jpg



1828 S 340th Street outbuilding, view north



1828 S 340th Street, view north



1828 S 340th Street, view northeast.jpg

Historic Property Report

Resource Name: Residence

Property ID: 328276

Inventory Details - 7/12/2011

Common name:	
Date recorded:	7/12/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049039
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1828 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1946 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 328276

Inventory Details - 2/6/2020

Common name:	
Date recorded:	2/6/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Cladding	Wood - Shingle
Cladding	Wood - Vertical Boards
Plan	L-Shape
Form Type	Single Dwelling
Foundation	Concrete - Poured
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Minimal Traditional

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1946), 1828 S 340th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and cladding, which have been either altered or covered, and the surrounding construction of heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 1828 S 340th Street was constructed in 1946 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1828 S 340th Street does not retain integrity from its period of construction (1946) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1946, according to the King County Assessor, the residential building at 1828 S 340th Street fronts south (King County Assessor 2020). The L-shaped, one-story building sits on an unknown foundation and is clad in a combination of wood or composition shingle siding, various horizontal and vertical boards, and T1-11. The building is topped by a cross-gabled roof clad in asphalt roofing and features a central chimney. Windows throughout appear to be metal sliders in altered fenestration. A shed-roofed addition on the south face appears to have been made from reclaimed historic-period materials. A detached shed-roofed garage/shed building clad in horizontal board is located northeast of the house.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

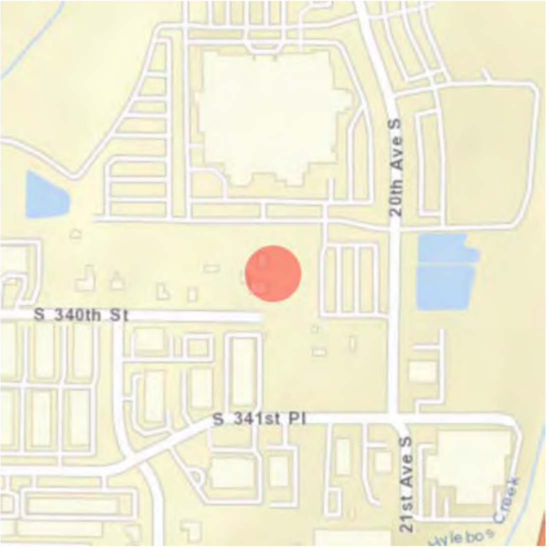
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

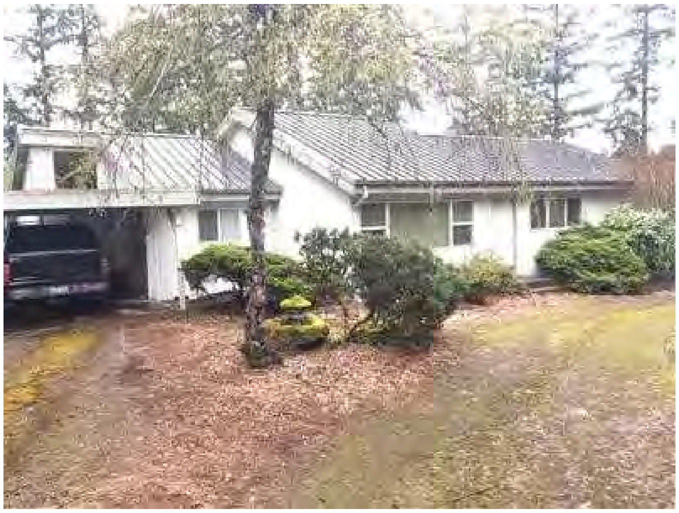
Historic Property Report

Resource Name: Residence

Property ID: 326161

Location





Address:	1920 S 340TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049047
Plat/Block/Lot:	E 226.25 FT OF N 289 FT OFS 305.5 FT OF NW 1/4 OF
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1953	☑
Addition	1975	☑
Built Date	1963	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

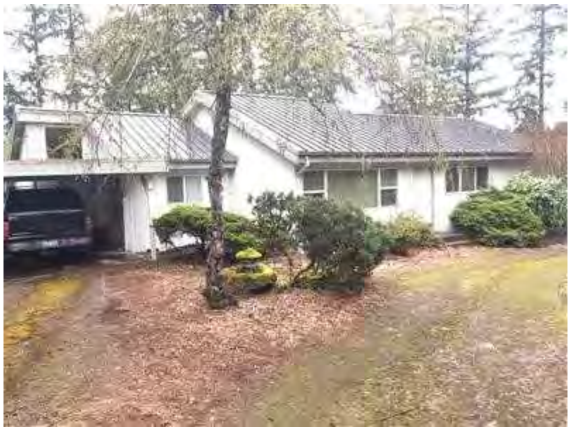
Local Registers and Districts

Name	Date Listed	Notes

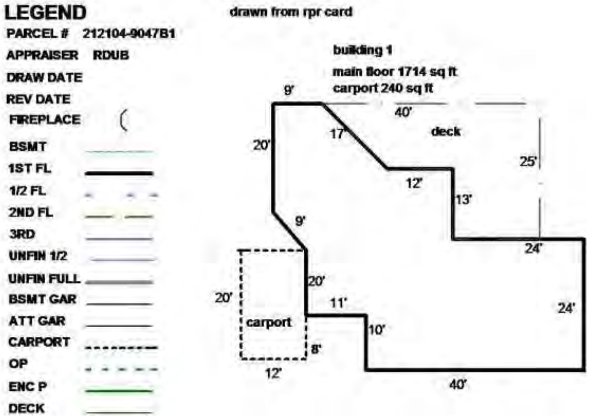
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/13/2020	Survey/Inventory	

Photos



1920 S 340th Street, courtesty of King County Assessor, undated.jpg


LEGEND
PARCEL # 212104-9047B1
APPRAISER RDUB
DRAW DATE
REV DATE
FIREPLACE
BSMT
1ST FL
1/2 FL
2ND FL
3RD
UNFIN 1/2
UNFIN FULL
BSMT GAR
ATT GAR
CARPORT
OP
ENC P
DECK
drawn from rpr card
building 1
main floor 1714 sq ft
carport 240 sq ft
9'
40'
deck
17'
20'
25'
12'
13'
9'
24'
20'
20'
11'
24'
carport
10'
8'
12'
40'

1920 S 340th Street, sketch courtesty of King County Assessor, undated.jpg

Historic Property Report

Resource Name: Residence

Property ID: 326161

Inventory Details - 7/11/2011

Common name:	
Date recorded:	7/11/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049047
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1920 S 340th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1953 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Inventory Details - 2/13/2020

Common name:	
Date recorded:	2/13/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	Irregular
Roof Type	Gable - Side
Roof Material	Metal - Standing Seam
Foundation	Concrete - Poured
Form Type	Single Dwelling
Structural System	Wood - Platform Frame
Cladding	Wood - T 1-11

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

The building at 1920 S 340th Street could not be surveyed from the ROW. However, a review of King County Assessor's data, as well as aerials and other online sources, made a desktop evaluation possible.

Integrity

From its period of construction (1953), the residence at 1920 S 340th Street retains integrity of location and association, as the building remains a single-family residence on its original parcel. However, alterations including encroaching development, window replacement, recladding, replacement roofing material, an addition at the northwest corner, and extensive new construction on the parcel, have diminished its integrity of setting, design, materials, workmanship, and feeling.

Evaluation

The residence at 1920 S 340th Street was constructed in 1953. The building does not appear, based on a review of historic maps and local histories, to hold any historic-period associations with important events or trends that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not suggest that the building held a strong association with the lives of significant persons (Criterion B). The building was constructed as a typical mid-20th Century Bungalow; however, it has been altered and now features few references to the historic style apart from its side-gabled roof and fenestration on the south facing facade. (Criterion C). It does not embody the distinctive characteristics of its particular type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., contribute to an existing or potential historic district). Finally, the building was constructed of common methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates recommends 1920 S 340th Street does not retain integrity from its period of construction (1953) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

According to the King County Assessor, the residence at 1920 S 340th Street was constructed in 1953 (King County Assessor 2020). However, due to the building's setback, and fencing installed in 2004 to screen the building from new construction to the north, it is not visible from the ROW. Based on data from the King County Assessor, in combinatior with aerial photographs, a desktop review was possible. The primary residence is a one-story irregularly shaped building with a south facing facade with main entrance and a ca. 1975 addition at the northwest corner. The building is topped by a side-gabled roof clad in standing-seam metal. The building appears to be clad in T1-11 with vinyl-framed windows. Also on the parcel is an outbuilding and pool. The outbuilding, located to the rear (north) of the main residence, appears to date from 1963, although its original use is unknown. It has been converted to a pool house. Also on the parcel are a detached garage, a swimming pool, and a tennis court, all of which date from between 1969 and 1980 (King County Assessor 2020; NETROnline 2020).

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

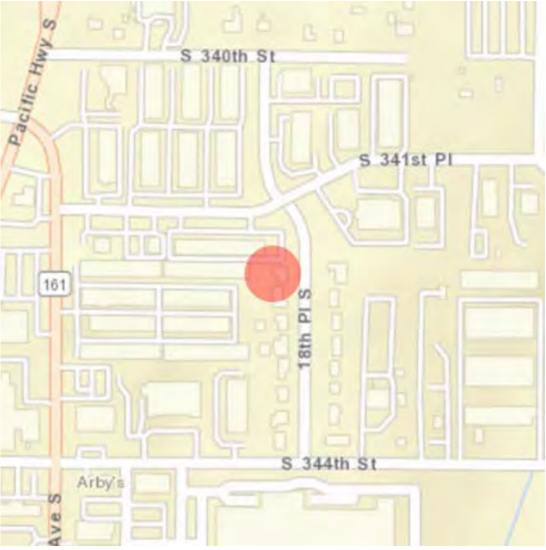
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

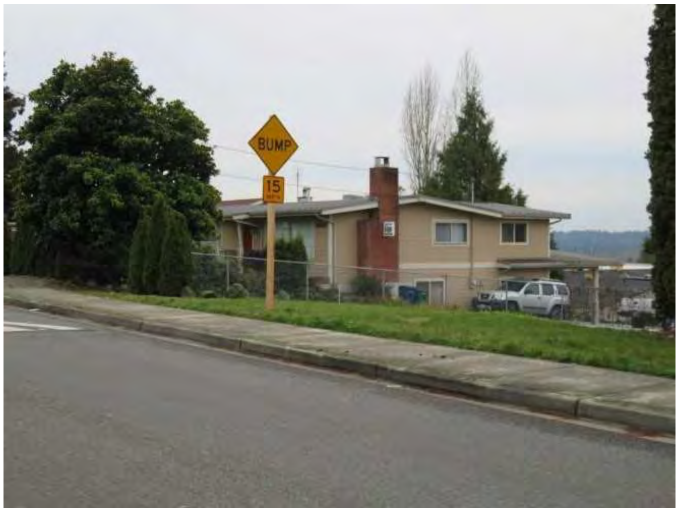
Historic Property Report

Resource Name: Residence

Property ID: 313379

Location


S 340th St
S 341st Pl
Pacific Hwy S
161
18th Pl S
S 344th St
Arby's
Ave S



Address:	34205 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600080
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1959	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

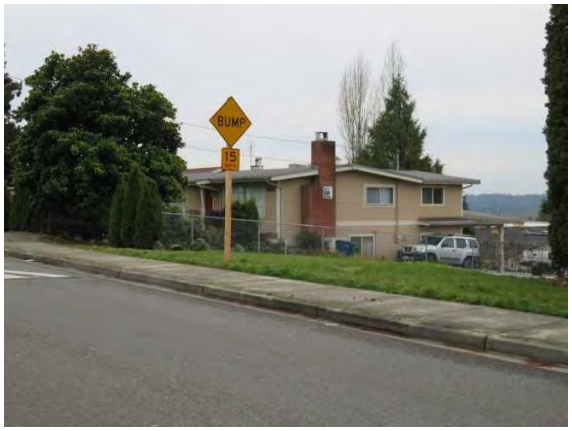
Local Registers and Districts

Name	Date Listed	Notes

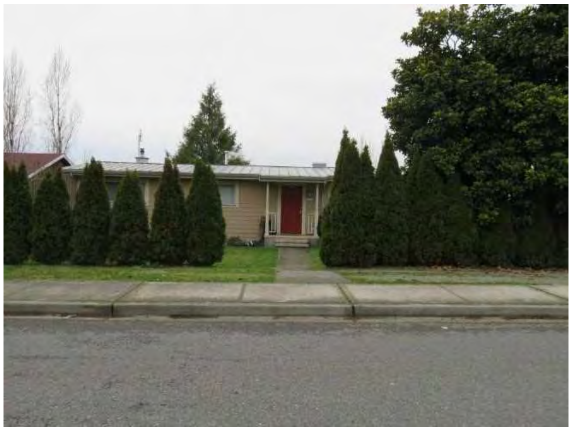
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



3420518th Place S, view southwest.jpg



34205 18th Place S, view west.jpg

Historic Property Report

Resource Name: Residence

Property ID: 313379

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600080
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34205 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1959 and is a single family dwelling. The building has a single-family form with a basement garage.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	**Item**
Foundation	Concrete - Poured
Cladding	Fiber Cement Board
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Roof Material	Metal - Standing Seam
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	**Style Details**
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1959), 34205 18th Place S retains poor integrity of materials, design, workmanship, association, and feeling, due to a loss of all historic-period windows and fenestration, and alterations to siding and roofing materials. The building retains integrity of location but has lost integrity of setting, due to heavy commercial construction to the west, north, and east.

Evaluation

The residential building at 34205 18th Place S was constructed in 1959 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, as initially constructed, may have embodied the distinctive characteristics of the Ranch style; however, alterations to windows, siding, and other materials have rendered the building unable to convey significance as a representative example of its type (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34205 18th Place S does not retain integrity from its period of construction (1959) and is not eligible for listing in the National Register of Historic Places (NRHP) or Washington Heritage Register (WHR) under any criteria.

Physical description:

Built in 1959, according to the King County Assessor, the residential building at 34205 18th Place S fronts east (King County Assessor 2020). The one-story-on-basement building is rectangular in plan and sits on a poured-concrete foundation. The building is clad in horizontal fiber cement board siding and is topped by a side-gabled roof clad in standing-seam metal. The building features some characteristics of the Ranch style, inclusive of its low horizontal massing and exterior brick chimney located on the north face. All windows appear to be vinyl in altered fenestration. The building's central entry features a small shed-covered concrete stoop with tile flooring that accesses the six-panel entry door on the (east) facade; the shed roof is supported by square posts.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 313379

Inventory Details - 3/12/2020

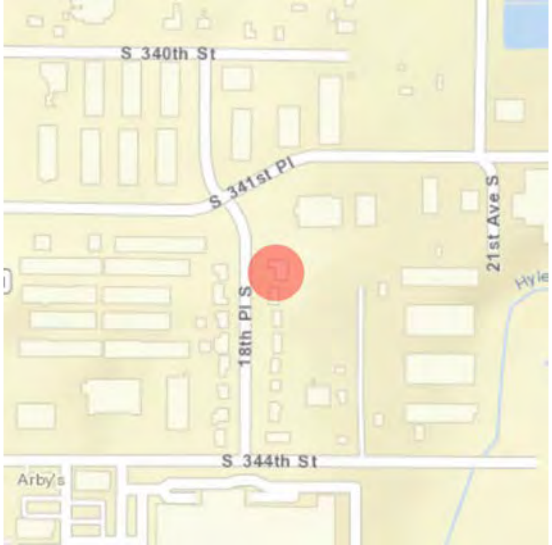
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

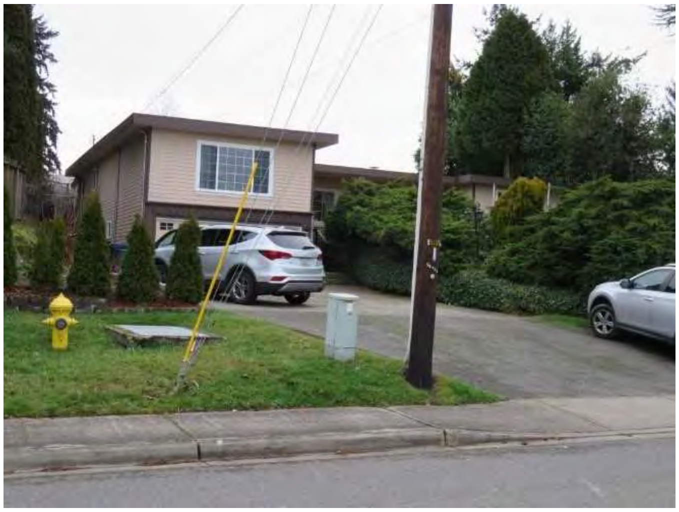
Historic Property Report

Resource Name: Residence

Property ID: 328435

Location





Address: 34204 18TH PL S, FEDERAL WAY, WA

Tax No/Parcel No: 4129600005

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1962	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

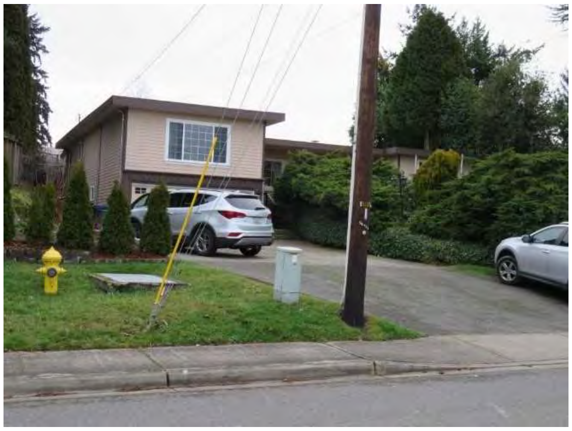
Local Registers and Districts

Name	Date Listed	Notes

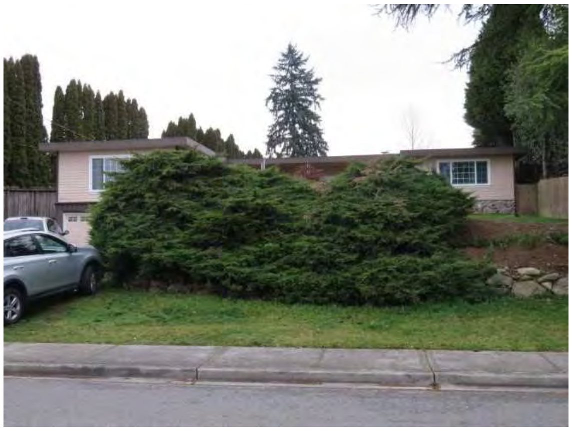
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/12/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34204 18th Place S, view southwest.jpg



34204 18th Place S, view west.jpg

Inventory Details - 7/12/2011

Common name:

Date recorded: 7/12/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 4129600005

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34204 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1962 and is a single family dwelling. The building has a single-family form with a basement garage.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Plan	U-Shape
Form Type	Single Dwelling
Roof Type	Flat with Eaves
Cladding	Wood
Foundation	Concrete - Poured
Roof Material	Asphalt/Composition - Built Up
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Historic Property Report

Resource Name: Residence

Property ID: 328435

Significance narrative:

Integrity
From its period of construction (1962), 34204 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, and the construction of surrounding heavy commercial development. The building retains integrity of location.
Evaluation
The residential building at 34204 18th Place S was constructed in 1962 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34204 18th Place S does not retain integrity from its period of construction (1962) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1962, according to the King County Assessor, the residential building at 34204 18th Place S fronts west (King County Assessor 2020). The one-story-on-basement building is U-shaped in plan and is clad in a combination of applied rock veneer and horizontal board siding. The building is topped by a flat roof with eaves clad in an unknown roofing material. On the north side of the (west) facade, a two-car garage dominates the basement level, topped by decorative dentils below the water table and a faux-grid vinyl-framed window on the main level above. All windows are faux-grid, vinyl-framed in altered fenestration. The front door is accessed via a concrete stair with iron railing.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

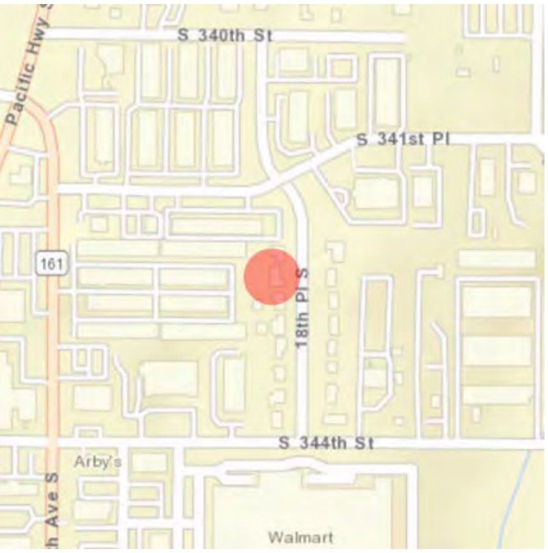
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

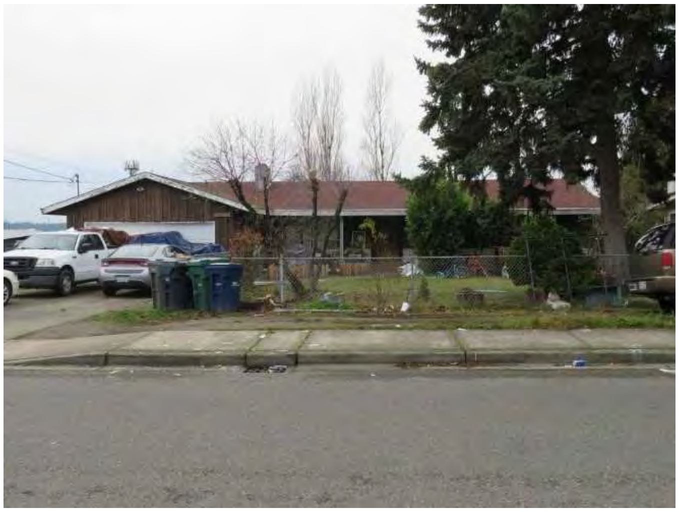
Historic Property Report

Resource Name: Residence

Property ID: 395968

Location


S 340th St
Pacific Hwy S
S 341st Pl
161
18th Pl S
S 344th St
Arby's
Ave S
Walmart



Address: 34213 18TH PL S, FEDERAL WAY, WA

Tax No/Parcel No: 4129600075

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1961	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

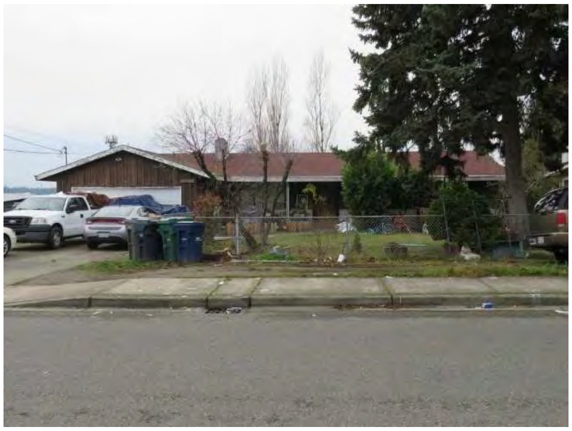
Local Registers and Districts

Name	Date Listed	Notes

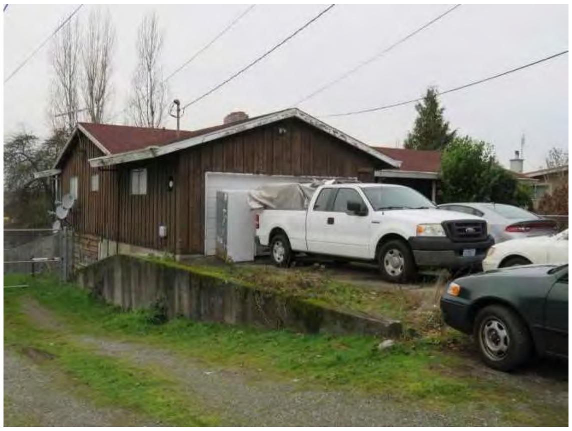
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34213 18th Place S, view west.jpg



34213 18th Place S, view northwest.jpg

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600075
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34213 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1961 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Cladding	Wood
Cladding	Wood - Board & Batten
Cladding	Wood - T 1-11
Cladding	Brick
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Plan	T-Shape
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1961), 34213 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to alterations to doors, cladding, and other historic-period materials, as well as the heavy commercial construction to the west, north, and east. The building retains integrity of location.

Evaluation

The residential building at 34213 18th Place S was constructed in 1961 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, as initially constructed, may have embodied the distinctive characteristics of the Ranch style; however, alterations to siding, and other materials have rendered the building unable to convey significance as a representative example of its type (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34213 18th Place S does not retain integrity from its period of construction (1961) and is not eligible for listing in the National Register of Historic Places (NRHP) or Washington Heritage Register (WHR) under any criteria.

Physical description:

Built in 1961, according to the King County Assessor, the residential building at 34213 18th Place S fronts east (King County Assessor 2020). The one-story, T-shaped building sits on a poured-concrete foundation and is clad in a combination of wood board-and-batten, T1-11, and roman brick veneer on the facade, with horizontal board siding also present on at least the south face. The building features a cross-on-side-gabled roof clad in asphalt/composition roofing. The attached two-car garage projects from the south end of the (east) facade and features a standard (likely fiberglass) door. The facadés entry is sheltered by a shallow porch recessed under the side-gabled roof and supported by square posts. The front door appears to be solid wood, flanked to the south by an aluminum picture window with decorative diamond panes.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

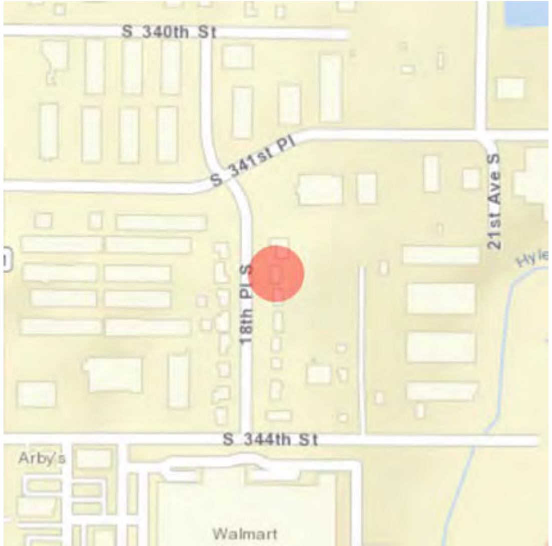
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

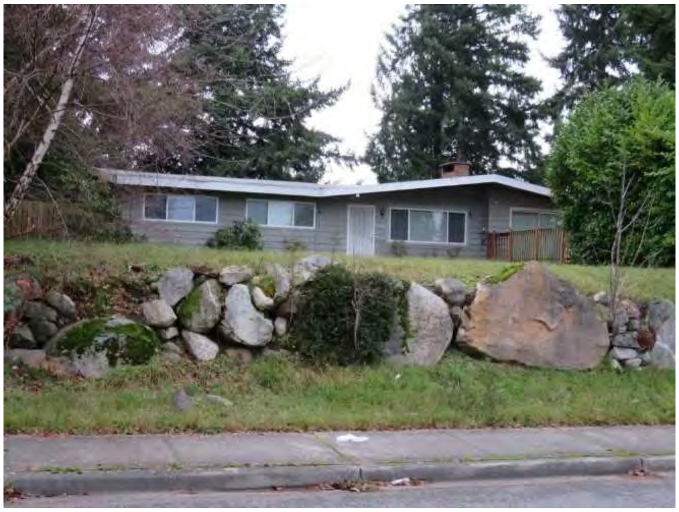
Historic Property Report

Resource Name: Residence

Property ID: 398146

Location


S 340th St
S 341st Pl
21st Ave S
18th Pl S
S 344th St
Arby's
Walmart
Hyle



Address: 34212 18TH PL S, FEDERAL WAY, WA

Tax No/Parcel No: 4129600010

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1959	☑
Addition	1995	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Historic Property Report

Resource Name: Residence

Property ID: 398146

Thematics:

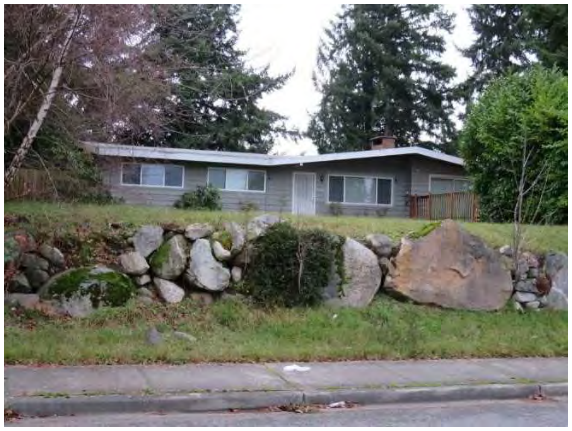
Local Registers and Districts

Name	Date Listed	Notes

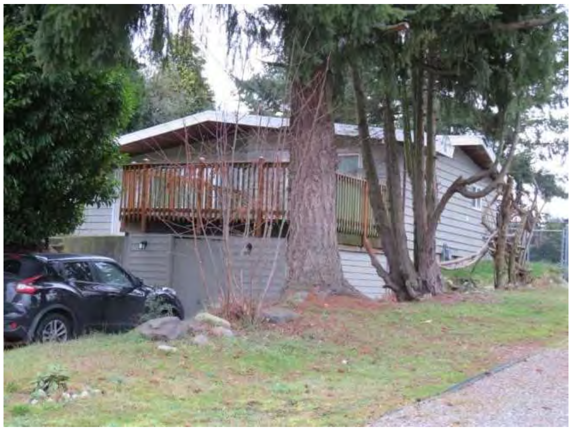
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34212 18th Place S, view southwest.jpg



34212 18th Place S, view northwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 398146

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600010
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34212 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1959 and is a single family dwelling. The building has a single-family form with a basement garage.

Historic Property Report

Resource Name: Residence

Property ID: 398146

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Cross
Roof Material	Asphalt/Composition
Cladding	Wood - Clapboard
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1959), 34212 18th Place S retains moderate integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and fenestration, presumed alterations to cladding based on those alterations, the addition of the deck and enclosure of the garage/storage area, and the construction of surrounding heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 34212 18th Place S was constructed in 1959 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34212 18th Place S does not retain integrity from its period of construction (1959) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1959, according to the King County Assessor, the residential building at 34212 18th Place S fronts west (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in horizontal clapboard siding. The building is topped with a front-on-side-gabled roof clad in asphalt roofing. Beneath the wide eaves is unpainted wood. The building features an attached semi-subterranean garage/storage area on the south side of the (west) facade, which is topped by a wood deck. The deck is accessed via vinyl sliding glass doors. All windows on the house are vinyl-framed in altered fenestration. The front door, located off-center beneath the front gable, is a multi-light door protected by a metal screen door. A brick chimney pierces the roof in the center of the house at the ridge of the front gable.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

Common name:

Date recorded: 3/12/2020

Field Recorder: Lauren Waldroop

Field Site number:

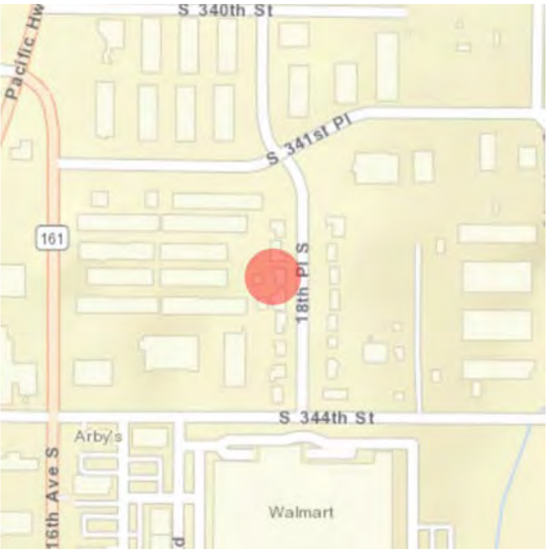
SHPO Determination

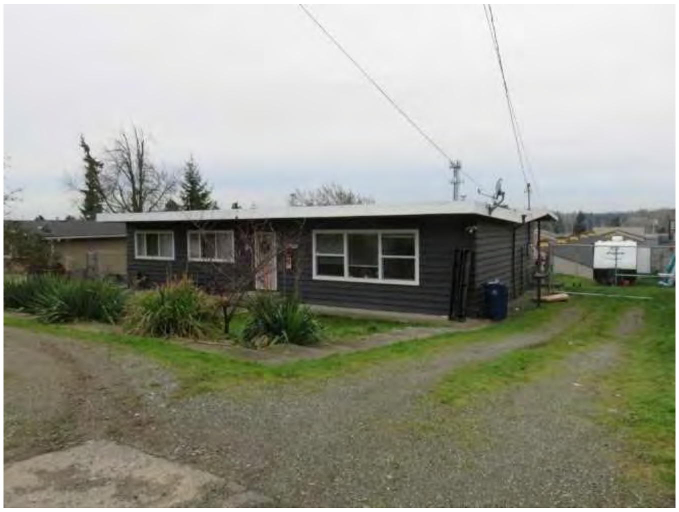
Historic Property Report

Resource Name: Residence

Property ID: 320224

Location


S 340th St
Pacific Hwy
S 341st Pl
161
18th Pl S
S 344th St
Arby's
16th Ave S
Walmart



Address: 34221 18TH PL S, FEDERAL WAY, WA

Tax No/Parcel No: 4129600070

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1958	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

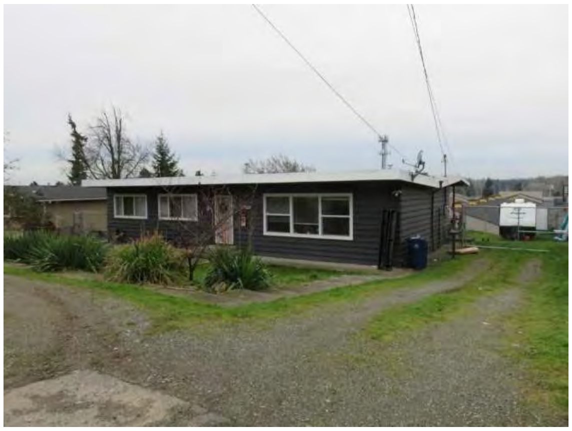
Local Registers and Districts

Name	Date Listed	Notes

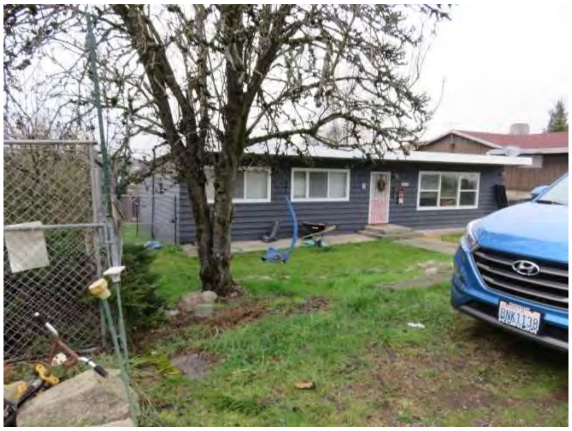
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34221 18th Place S, view southwest.jpg



34221 18th Place S, view northwest.jpg

Inventory Details - 7/10/2011

Common name:

Date recorded: 7/10/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 4129600070

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34221 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1958 and is a single family dwelling. Also according to the county assessor, the structure was remodeled in 1978. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Wood - Clapboard
Form Type	Single Dwelling
Roof Type	Butterfly
Plan	Rectangle
Roof Material	Metal
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Contemporary

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1958), 34221 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of historic-period windows, doors, and cladding, and the heavy commercial construction to the west, north, and east. The building retains integrity of location.
Evaluation
The residential building at 34221 18th Place S was constructed in 1958 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, though constructed with a butterfly roof, a feature often associated with the Contemporary style, does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34221 18th Place S does not retain integrity from its period of construction (1958) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1958, according to the King County Assessor, the residential building at 34221 18th Place S fronts east (King County Assessor 2020). The one-story building is rectangular in plan, sits on a poured-concrete foundation, and is clad in horizontal clapboard siding (possibly wood or fiber cement). The building is topped by a butterfly roof with wide eaves, clad in an unknown material. All windows appear to be vinyl-framed in altered fenestration. The building is accessed via a concrete stoop on the (east) facade, which features a light-over-panel door protected by a metal screen door.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

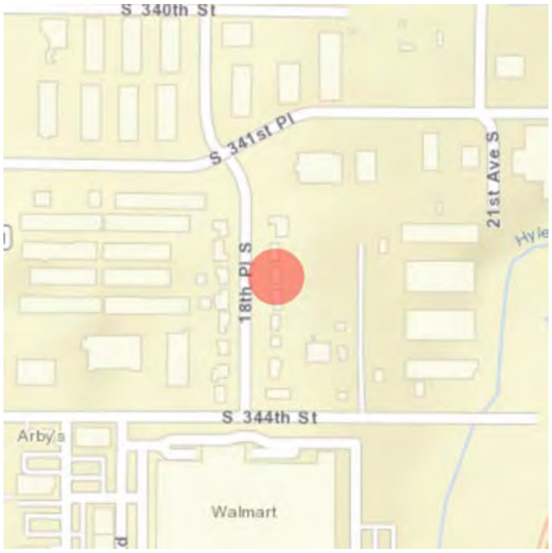
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

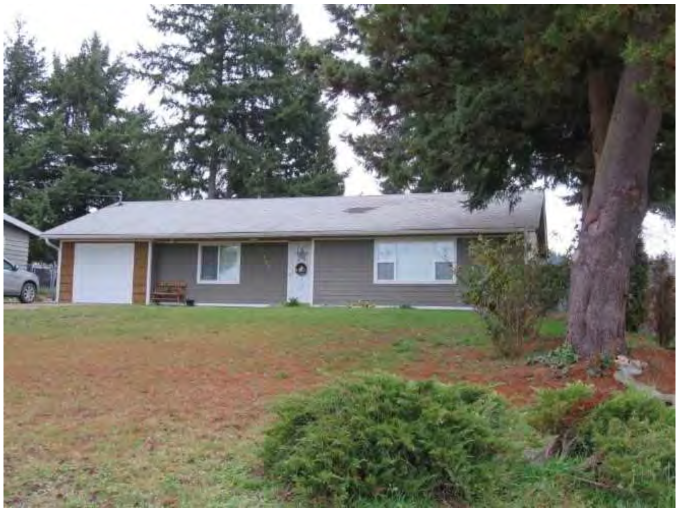
Historic Property Report

Resource Name: Residence

Property ID: 391732

Location


S 340th St
S 341st Pl
21st Ave S
Hyle
18th Pl S
S 344th St
Arby's
Walmart



Address:	34220 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600015
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1958	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

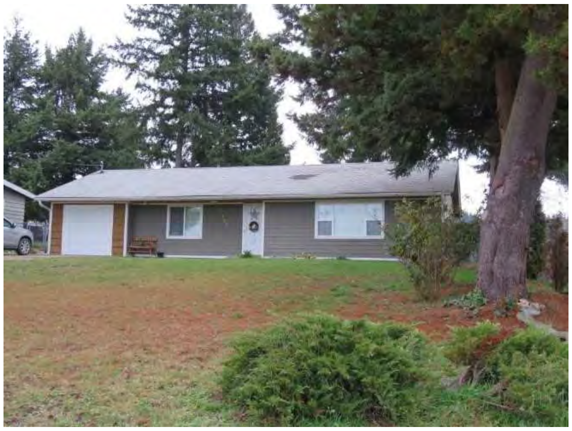
Local Registers and Districts

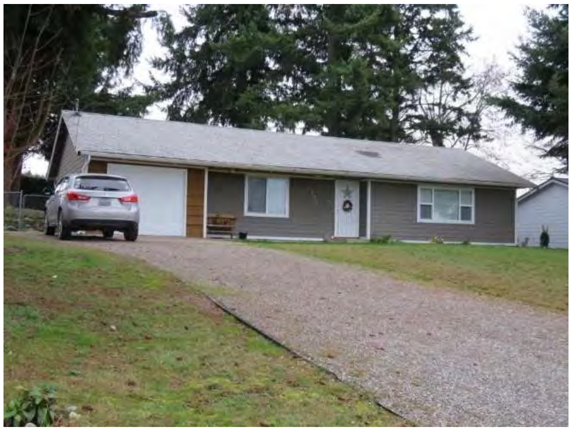
Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00115, , Assessors Data Project: King County H	7/5/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos


34220 18th Place S, view northeast.jpg


34220 18th Place S, view southeast.jpg

Historic Property Report

Resource Name: Residence

Property ID: 391732

Inventory Details - 7/5/2011

Common name:	
Date recorded:	7/5/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600015
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 34220 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1958 and is a single family dwelling. The building has a single-family form with an attached garage.

Inventory Details - 2/5/2020

Common name:

Date recorded: 2/5/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Cladding	Fiber Cement Board
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1958), 34220 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the construction of surrounding heavy commercial development. The building retains integrity of location. Evaluation The residential building at 34220 18th Place S was constructed in 1958 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates, Inc. recommends 34220 18th Place S does not retain integrity from its period of construction (1958) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1958, according to the King County Assessor, the residential building at 34220 18th Place S fronts west (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in fiber cement board siding. The building is topped by a side-gabled roof clad in asphalt/composition roofing. Windows throughout are vinyl-framed in altered fenestration. The front door is an unknown material protected by a metal screen door. The garage door appears to be modern with a decorative wood-shingle surround.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 391732

Inventory Details - 3/12/2020

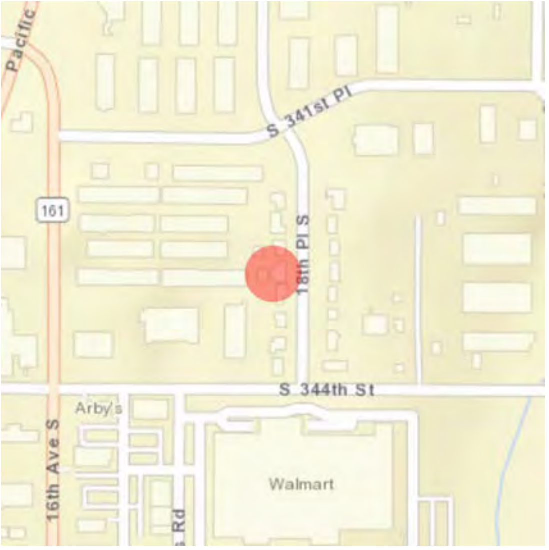
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

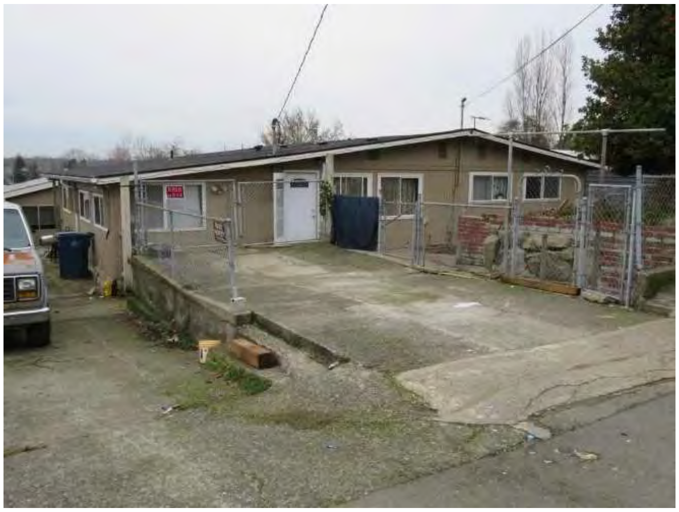
Historic Property Report

Resource Name: Residence

Property ID: 315841

Location


Pacific
161
S 341st Pl
18th Pl S
S 344th St
Arby's
16th Ave S
Walmart
Rd



Address:	34229 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600065
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1955	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

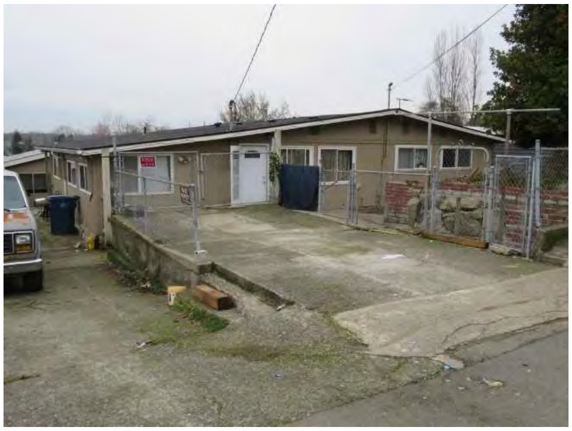
Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34229 18th Place S, view northwest.jpg

234229 18th Place S, view west.jpg

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600065
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative:	Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs). Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).
Physical description:	The house at 34229 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1955 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 315841

Inventory Details - 2/5/2020

Common name:

Date recorded: 2/5/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Gable - Front
Roof Material	Asphalt/Composition
Cladding	Wood - T 1-11
Cladding	Wood - Plywood
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1955), 34229 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and heavy commercial construction to the west. The building retains integrity of location.

Evaluation
The residential building at 34229 18th Place S was constructed in 1955 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34229 18th Place S does not retain integrity from its period of construction (1955) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1955, according to the King County Assessor, the residential building at 34229 18th Place S fronts east (King County Assessor 2020). The one-story building sits on a poured-concrete foundation and is clad in a combination of T1-11 and plywood siding. The building is topped by a front-gabled roof clad in asphalt/composition roofing. All windows appear to be vinyl-framed in altered fenestration. The (east) facade entry door is a fiberglass door with an arched glass light over four panels. A poured-concrete parking pad is located in front of the facade. The lot slopes east–west on the south side of the house, where the driveway leads to a secondary building located (west) behind the primary building. The secondary building also features a front-gabled roof, T1-11 and plywood siding, and vinyl windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

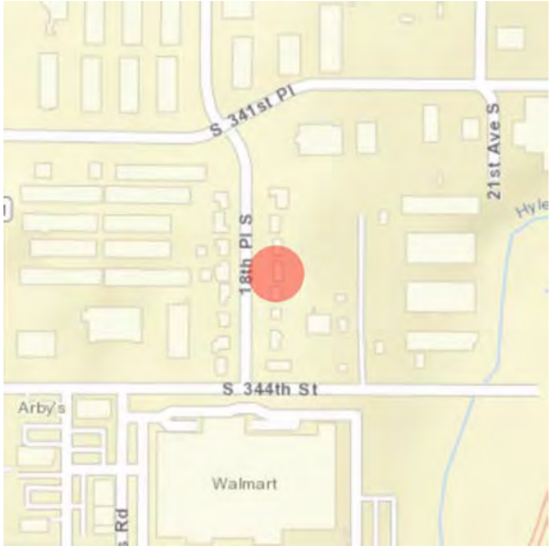
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

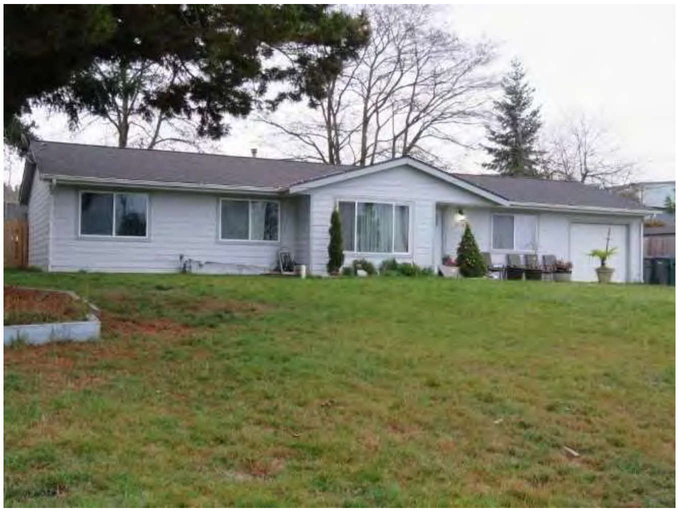
Historic Property Report

Resource Name: Residence

Property ID: 304579

Location





Address: 34228 18TH PL S, FEDERAL WAY, WA

Tax No/Parcel No: 4129600020

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1958	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

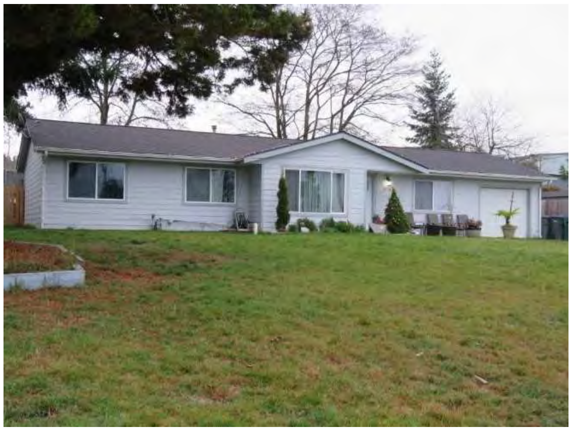
Local Registers and Districts

Name	Date Listed	Notes

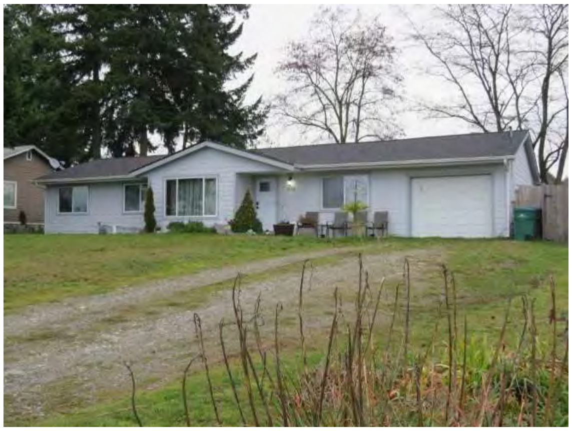
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34228 18th Place S, view southwest.jpg



34228 18th Place S, view northwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 304579

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600020
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34228 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1958 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 304579

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Cladding	Fiber Cement Board
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1958), 34228 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, and construction of surrounding heavy commercial development. The building retains integrity of location.

Evaluation

The residential building at 34228 18th Place S was constructed in 1958 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34228 18th Place S does not retain integrity from its period of construction (1958) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1958, according to the King County Assessor, the residential building at 34228 18th Place S fronts west (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation, is clad in fiber cement board siding, and is topped by a side-gabled roof clad in asphalt /composition roofing. Windows throughout are vinyl-framed in altered fenestration. The (west) facade features a central gable projection, which partially covers a recessed front door; the door is a decorative light over two panel. The building features an attached one-car garage on the south side.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 304579

Inventory Details - 3/12/2020

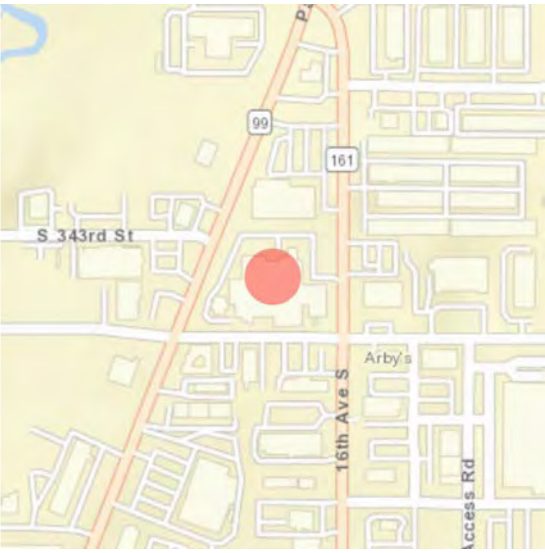
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

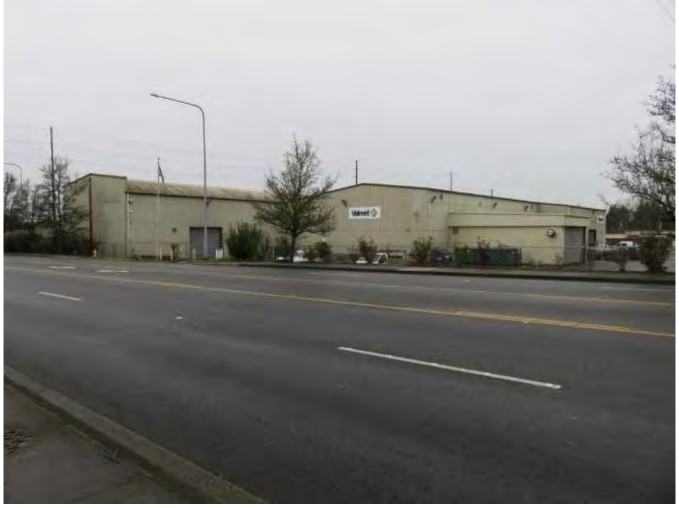
Historic Property Report

Resource Name: Huntington Rubber Co.

Property ID: 721133

Location





Address: 34320 Pacific Hwy S, Federal Way, Washington, 98003

Geographic Areas: King County, T21R04E20, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
	1954	☑
Built Date	1954	☑
Addition	1985	☑

Historic Use:

Category	Subcategory
Industry/Processing/Extraction	
Industry/Processing/Extraction	

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

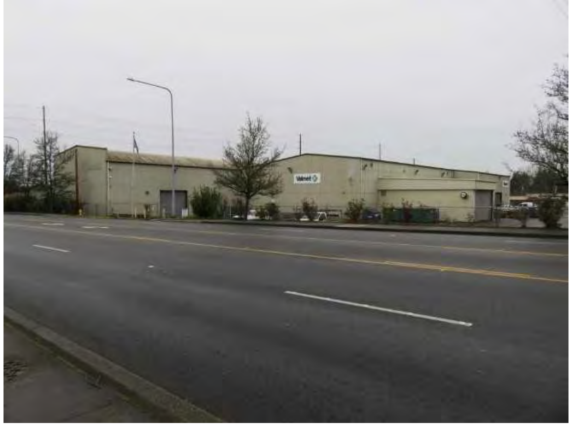
Local Registers and Districts

Name	Date Listed	Notes

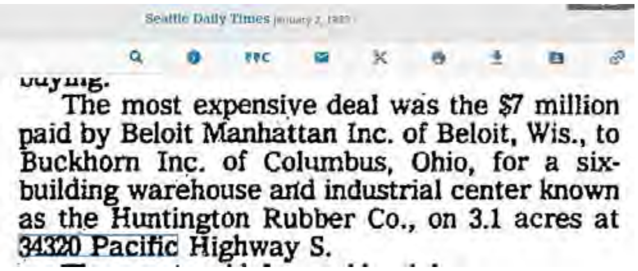
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34320 Pacific Highway S, view southwest.jpg

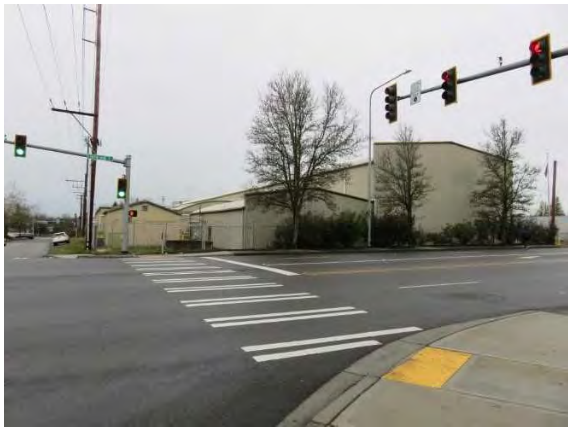


Seattle Daily Times January 2, [illegible]

buying.

The most expensive deal was the $7 million paid by Beloit Manhattan Inc. of Beloit, Wis., to Buckhorn Inc. of Columbus, Ohio, for a six-building warehouse and industrial center known as the Huntington Rubber Co., on 3.1 acres at 34320 Pacific Highway S.

HuntingtonRubberCo_FederalWay.jpg



34320 Pacific Highway S, view northwest.jpg

Inventory Details - 2/5/2020

Common name:	Valmet
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	**Item**
Plan	Irregular
Foundation	Concrete - Poured
Form Type	Utilitarian
Roof Type	Barrel
Roof Type	Gable
Roof Type	Shed
Cladding	Metal
Roof Material	Metal - Corrugated
Structural System	Metal - Steel

Styles:

Period	**Style Details**
Modern Movement	Modern

Surveyor Opinion

Significance narrative:	Integrity From its period of construction (1954), 34320 Pacific Highway S appears to retain poor integrity of materials, design, workmanship, feeling, and association, due to an apparent loss of all historic-period windows, doors, and cladding, which have been either altered or covered, and the apparent construction of additional attached building massings. The building retains integrity of setting and location. Evaluation The industrial building at 34320 Pacific Highway S was constructed in 1954. Seattle Times articles note that the building was constructed for the Huntington Rubber Co., which manufactured rollers for a paper mill (Seattle Times 1951). It does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D). Historical Research Associates, Inc. recommends 34320 Pacific Highway S does not retain integrity from its period of construction (1954) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.
Physical description:	Built in 1954, according to the King County Assessor, the industrial building at 34320 Pacific Highway S has no front facade, though the parking and employee entrances are located on the north face (King County Assessor 2020). The irregular building has a variety of one- and one-and-a-half story massings, all of which sit on poured-concrete foundations. The connected building massings are clad in standing-seam metal siding. Roof lines vary, including barrel, gable, and shed, all of which are clad in standing-seam metal. Entrances on the north face include vehicular/garage roll-up doors; no pedestrian doors were visible from the right-of-way. The building currently houses Valmet, a company that has been operating in Federal Way since 1931 (Valmet 2020).

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Seattle Times
1951 Rubber Firm to Build Plant South of City, April 10.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Valmet
2020 Federal Way Service Center. Electronic document, https://www.valmet.com/en-US/about-us-in-north-america/service-centers-in-north-america/federal-way, accessed January 30, 2020.

Inventory Details - 3/12/2020

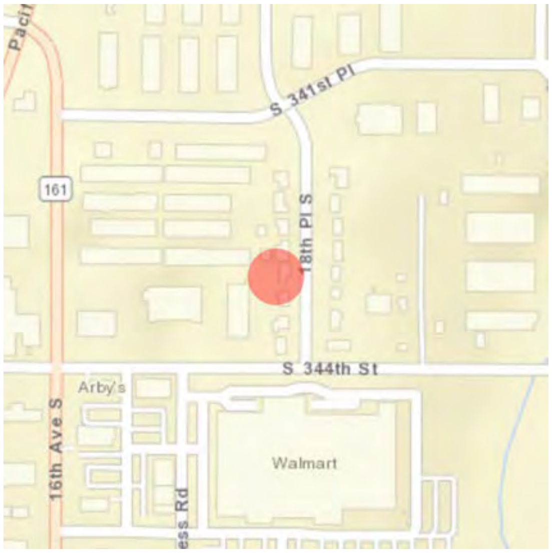
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

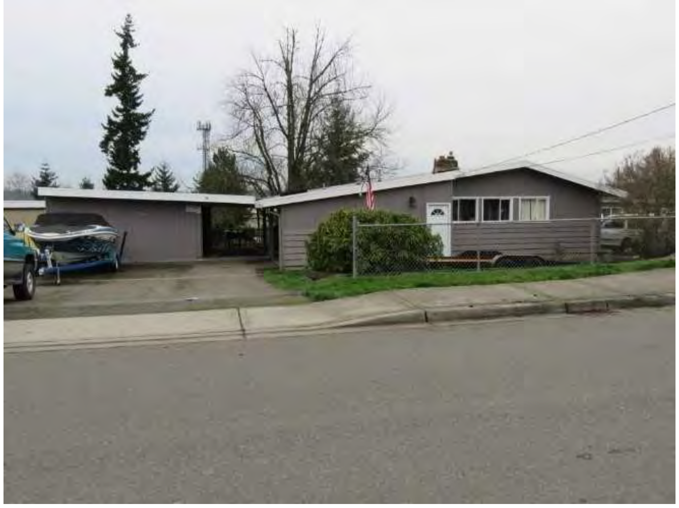
Historic Property Report

Resource Name: Residence

Property ID: 326784

Location


Paci
S 341st Pl
161
18th Pl S
S 344th St
Arby's
16th Ave S
Walmart
ess Rd



Address:	34235 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600060
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1955	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

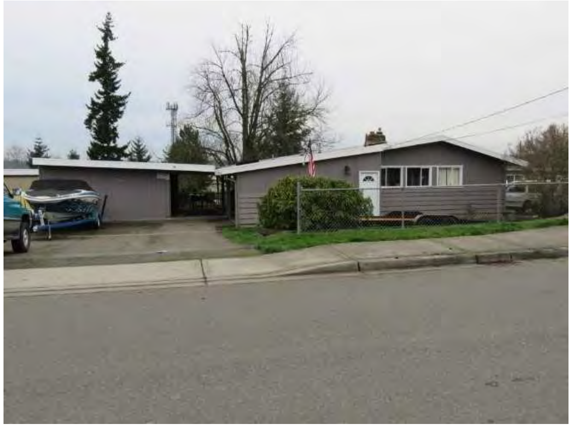
Local Registers and Districts

Name	Date Listed	Notes

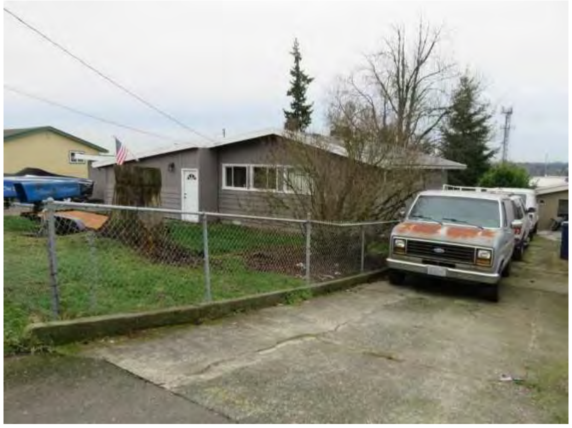
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34235 18th Place S, view west.jpg



34235 18th Place S, view southwest.jpg

Inventory Details - 7/11/2011

Common name:

Date recorded: 7/11/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 4129600060

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34235 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1955 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Gable - Front
Cladding	Wood
Cladding	Wood - T 1-11
Plan	Rectangle
Roof Material	Asphalt/Composition - Rolled
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1955), 34235 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of historic-period windows, doors, and cladding, which have been either altered or covered, as well as alterations to the garage/carport. The building retains integrity of location.
Evaluation
The residential building at 34235 18th Place S was constructed in 1955 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34235 18th Place S does not retain integrity from its period of construction (1955) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1955, according to the King County Assessor, the residential building at 34235 18th Place S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of horizontal wood and T1-11 siding. The building is topped by a front-gabled roof clad in an unknown roofing material. On the (east) façade, the building features casement-on-fixed windows of an unknown material (possibly wood) topped by window trim; both windows and trim are unlikely to be original, due to their location within altered siding materials (T1-11). The front door is a (likely fiberglass) arched light over four panel. A chimney pierces the roof at the center of the massing.

A detached shed-roofed building, likely originally constructed as a carport or garage, is located south of the house; the downslope of the house’s gable meets the downslope of the shed roof, creating the illusion of a butterfly roof. The shed building is clad in T1-11 siding and features no doors or windows on elevations visible from the right-of-way.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

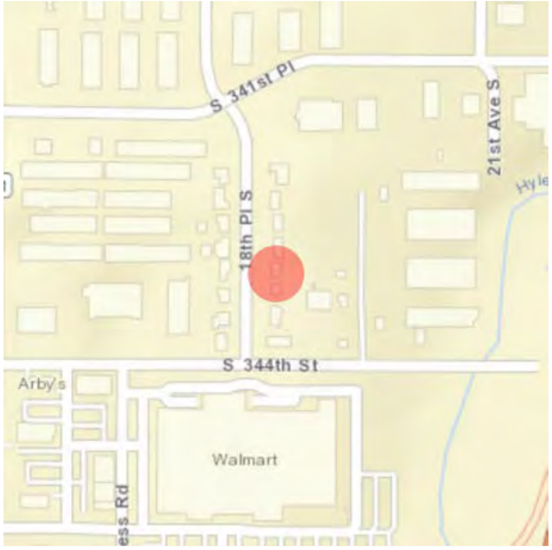
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

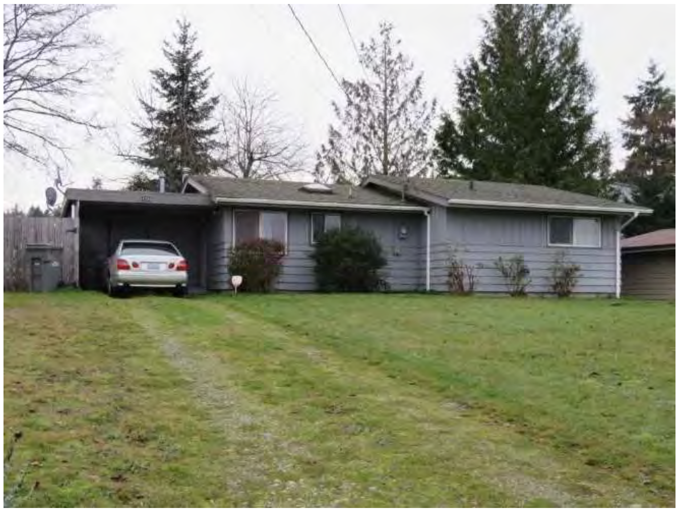
Historic Property Report

Resource Name: Residence

Property ID: 311637

Location


S 341st Pl
21st Ave S
Hyle
18th Pl S
S 344th St
Arby's
Walmart
ess Rd



Address:	34234 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600025
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1957	☐
	1955	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

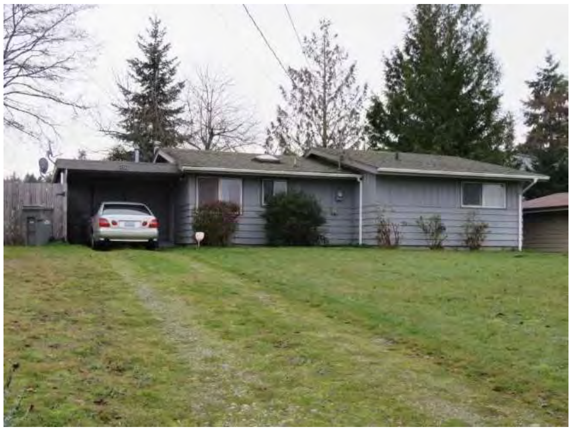
Local Registers and Districts

Name	Date Listed	Notes

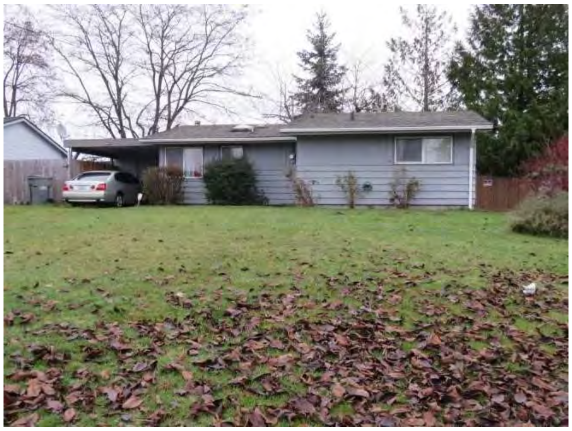
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/8/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34234 18th Place S, view southwest.jpg



34234 18th Place S, view northwest.jpg

Inventory Details - 7/8/2011

Common name:

Date recorded: 7/8/2011

Field Recorder: Artifacts Consulting, Inc.

Field Site number: 4129600025

SHPO Determination

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34234 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1957 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Cladding	Wood
Cladding	Wood - T 1-11
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Plan	L-Shape
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1957), 34234 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and doors, alterations to cladding, the addition of the carport, and the construction of surrounding heavy commercial development. The building retains integrity of location.
Evaluation
The residential building at 34234 18th Place S was constructed in 1957 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34234 18th Place S does not retain integrity from its period of construction (1957) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1957, according to the King County Assessor, the residential building at 34234 18th Place S fronts west (King County Assessor 2020). The one-story building is L-shaped in plan and sits on a poured-concrete foundation. The building is clad in a combination of horizontal board and T1-11 siding and features a telescoping side-gabled roof clad in asphalt/composition roofing. An attached shed-roofed carport supported by square posts is located on the north face. The building features vinyl-framed windows in altered fenestration, with the primary entry door located beneath the carport on the north face.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

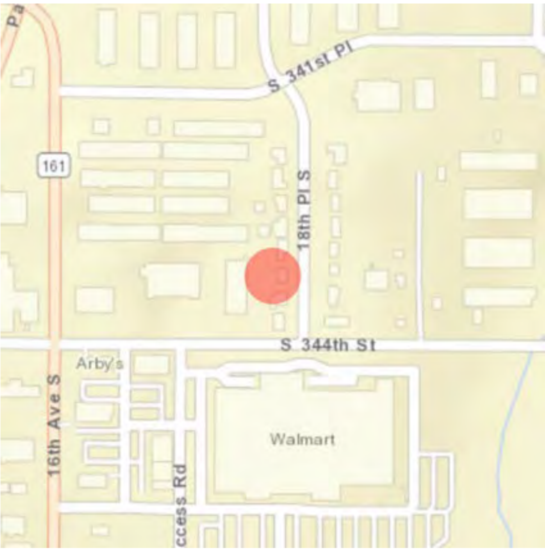
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

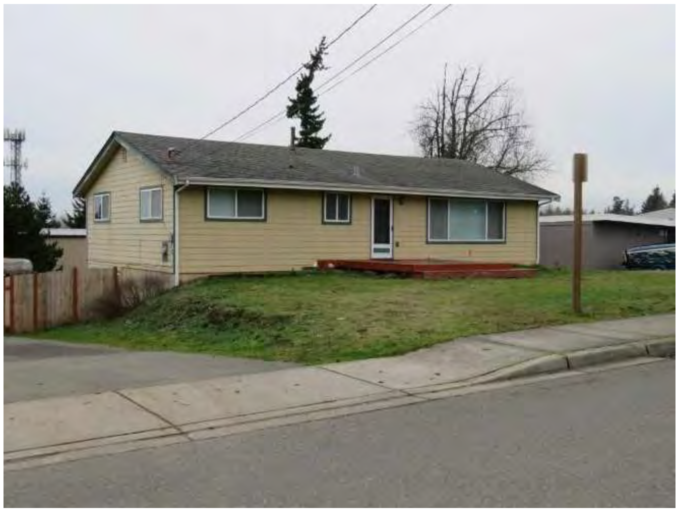
Historic Property Report

Resource Name: Residence

Property ID: 314454

Location


S 341st Pl
161
18th Pl S
S 344th St
Arby's
16th Ave S
Walmart
ccess Rd



Address:	34243 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600055
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1960	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

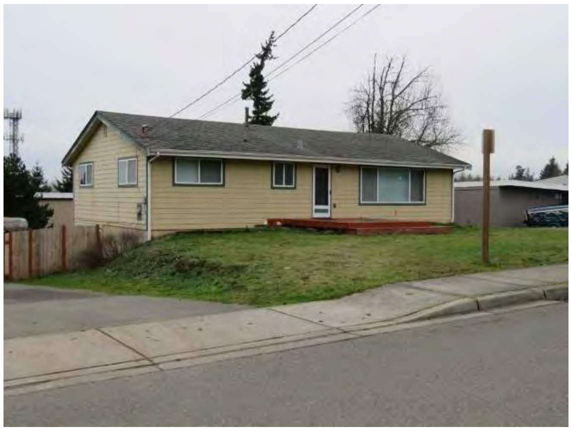
Local Registers and Districts

Name	Date Listed	Notes

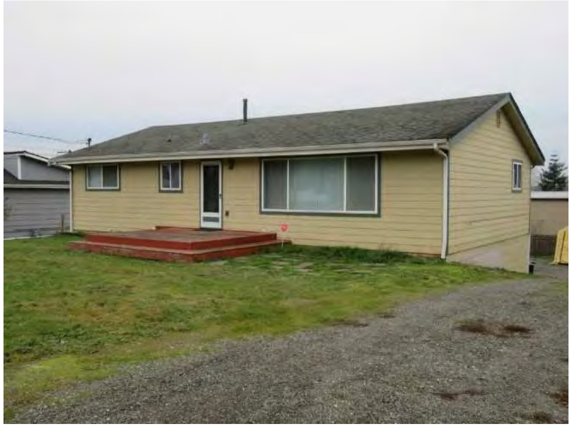
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/9/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34243 18th Place S, view northwest.jpg



34243 18th Place S, view southwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 314454

Inventory Details - 7/9/2011

Common name:	
Date recorded:	7/9/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600055
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34243 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1960 and is a single family dwelling. Also according to the county assessor, the structure was remodeled in 2003. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:

Date recorded: 2/5/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling - Side Gable
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Cladding	Fiber Cement Board
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1960), 34243 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The building retains integrity of location.

Evaluation

The residential building at 34243 18th Place S was constructed in 1960 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34243 18th Place S does not retain integrity from its period of construction (1960) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1960, according to the King County Assessor, the residential building at 34243 18th Place S fronts east (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in fiber cement board siding. The building is topped by a side-gabled roof clad in asphalt/composition roofing. Windows throughout are vinyl-framed in altered fenestration. The (east) facade is accessed via a wood deck; a screen door protects the entry door.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

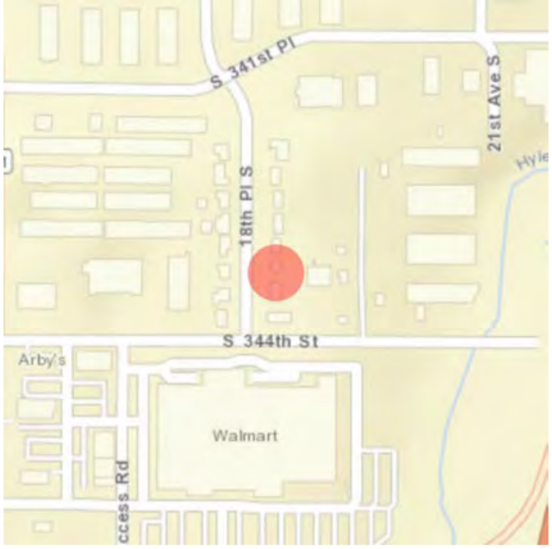
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

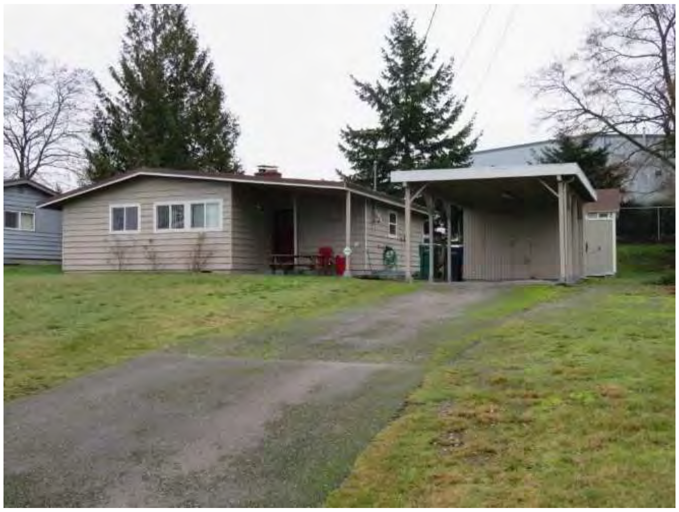
Historic Property Report

Resource Name: Residence

Property ID: 312723

Location





Address:	34242 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600030
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1955	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Village Site
Domestic	Domestic - Village Site

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

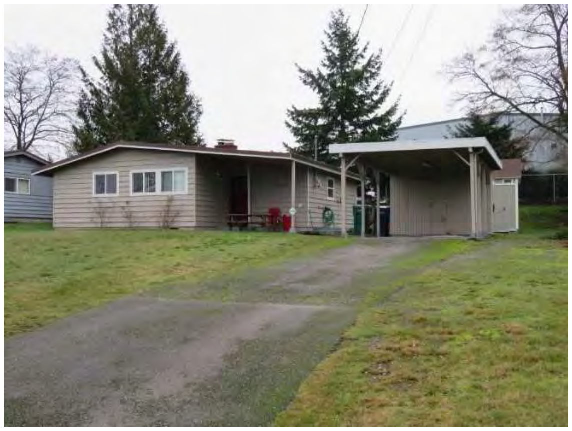
Local Registers and Districts

Name	Date Listed	Notes

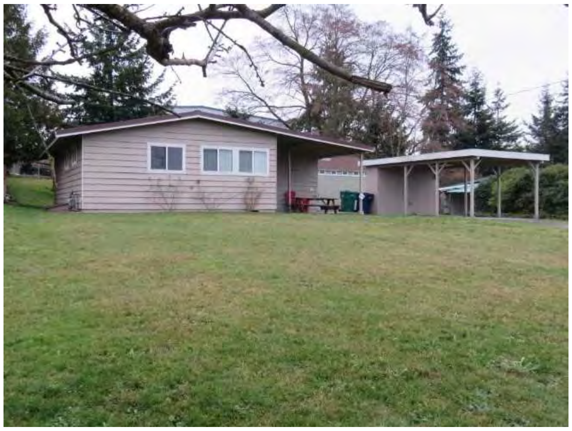
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/8/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34242 18th Place S, view northwest.jpg



34242 18th Place S, view southwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 312723

Inventory Details - 7/8/2011

Common name:	
Date recorded:	7/8/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600030
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 34242 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1955 and is a single family dwelling. The building has a single-family form.

Historic Property Report

Resource Name: Residence

Property ID: 312723

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Gable - Front
Plan	Square
Cladding	Wood - Clapboard
Roof Material	Metal
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1955), 34242 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows and doors, and the surrounding heavy commercial construction. The building retains integrity of location.
Evaluation
The residential building at 34242 18th Place S was constructed in 1955 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34242 18th Place S does not retain integrity from its period of construction (1955) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1955, according to the King County Assessor, the residential building at 34242 18th Place S fronts west (King County Assessor 2020). The one-story building is square in plan and sits on a poured-concrete foundation. The building is clad in horizontal wood clapboard siding and is topped by a front-gabled roof clad in an unknown roofing material with overhanging metal flashing. All windows are vinyl-framed in altered fenestration. The entry is recessed beneath the gable, supported by square posts, with a six light over three panel entry door protected by a metal screen door. A detached shed-roofed carport is located south of the house. The carport features a flat roof supported by square posts, with an enclosed storage area to the rear (west) clad in T1-11 siding. Behind the carport is a prefabricated gable-roofed storage building.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

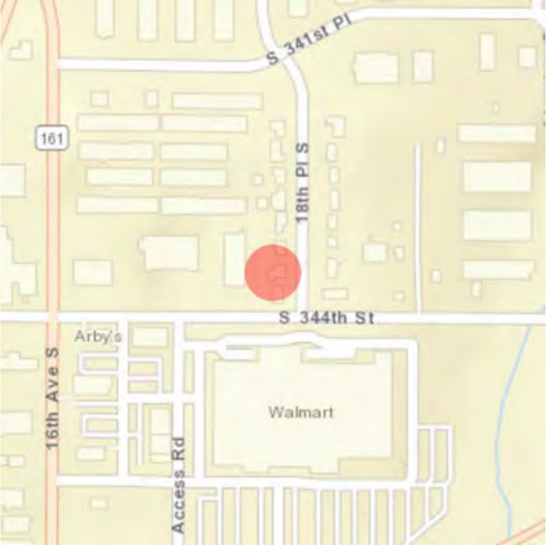
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

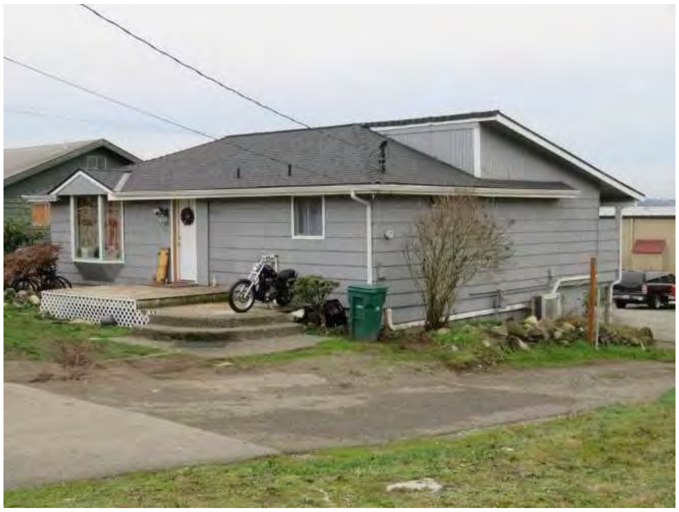
Historic Property Report

Resource Name: Residence

Property ID: 322940

Location


S 341st Pl
161
18th Pl S
S 344th St
Arby's
16th Ave S
Walmart
Access Rd



Address:	34251 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600050
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1955	☑
Addition	2000	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

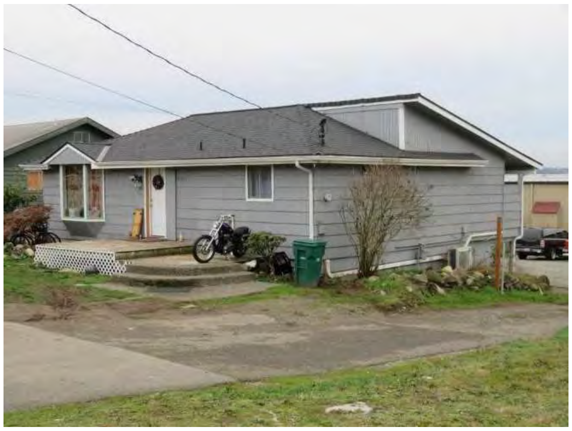
Local Registers and Districts

Name	Date Listed	Notes

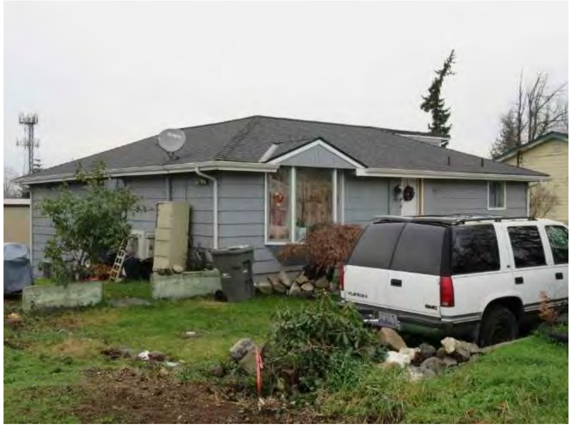
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/14/2020	Survey/Inventory	

Photos



34251 18th Place S, view southwest.jpg



34251 18th Place S, view northwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 322940

Inventory Details - 7/10/2011

Common name:	
Date recorded:	7/10/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600050
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34251 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1955 and is a single family dwelling. The building has a single-family form with a basement garage.

Historic Property Report

Resource Name: Residence

Property ID: 322940

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Hip
Roof Type	Shed
Roof Material	Asphalt/Composition - Shingle
Cladding	Wood - Shingle
Cladding	Wood - T 1-11
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1955), 34251 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of all historic-period windows, doors, and cladding, and a large extension on the rear that altered the roof and massing. The building retains integrity of location.
Evaluation
The residential building at 34251 18th Place S was constructed in 1955 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34251 18th Place S does not retain integrity from its period of construction (1955) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1955, according to the King County Assessor, the residential building at 34251 18th Place S fronts east (King County Assessor 2020). The one-story-on-basement building sits on a poured-concrete foundation and is clad in a combination of wood shingle and T1-11 siding. The building features a variety of roof lines clad in asphalt/composition roofing, which are best described as a shed-on-hip, due to a large addition to the rear (west). Windows throughout appear to be altered, including an oriel and a one-by-one wood slider on the front (east) facade. The entry door on the facade is accessed via a curved concrete step to a wood deck, the concrete portion of which may be indicative of a historic-period feature (porch) that is no longer extant.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 322940

Inventory Details - 2/14/2020

Common name:	
Date recorded:	2/14/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Inventory Details - 3/12/2020

Common name:

Date recorded: 3/12/2020

Field Recorder: Lauren Waldroop

Field Site number:

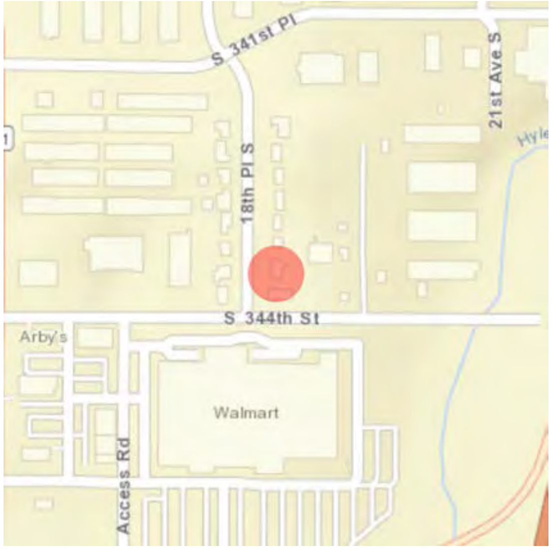
SHPO Determination

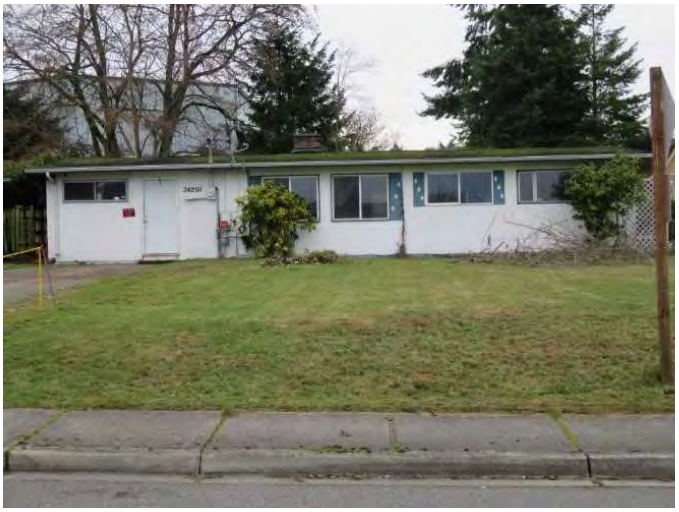
Historic Property Report

Resource Name: Residence

Property ID: 321106

Location





Address:	34250 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600035
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1955	☐

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

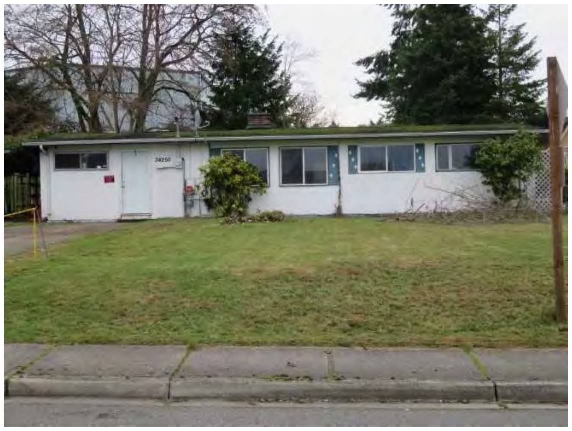
Local Registers and Districts

Name	Date Listed	Notes

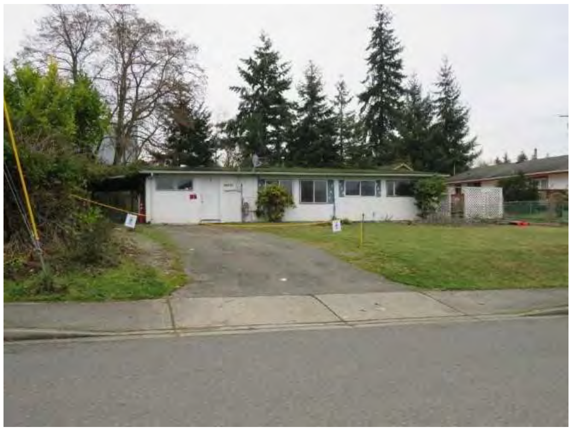
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34250 18th Place S, view west.jpg



34250 18th Place S, view southwest.jpg

Historic Property Report

Resource Name: Residence

Property ID: 321106

Inventory Details - 7/10/2011

Common name:	
Date recorded:	7/10/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600035
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 34250 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1955 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:

Date recorded: 2/5/2020

Field Recorder: Chrisanne Beckner

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	**Item**
Foundation	Concrete - Poured
Cladding	Wood - T 1-11
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Roof Material	Asphalt/Composition
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	**Style Details**
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1955), 34250 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of historic-period windows, doors, and cladding, which have been either altered or covered, as well as the enclosure of the garage and the surrounding heavy commercial construction. The building retains integrity of location.
Evaluation
The residential building at 34250 18th Place S was constructed in 1955 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34250 18th Place S does not retain integrity from its period of construction (1955) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1955, according to the King County Assessor, the residential building at 34250 18th Place S fronts west (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in T1-11 siding. The building is topped by a gable roof clad in asphalt/composition roofing. The building features a dilapidated carport-style shed roof extension on the north face. Adjacent to the carport on the (west) facade, a former attached garage was converted to living space and features a one-by-one slider (either metal or painted vinyl) and a six-panel steel door. The facade also features a combination of slider windows, some that may be original aluminum and others vinyl, in altered fenestration. A decorative diamond detail adorns false shutters that surround the altered vinyl windows.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 321106

Inventory Details - 3/12/2020

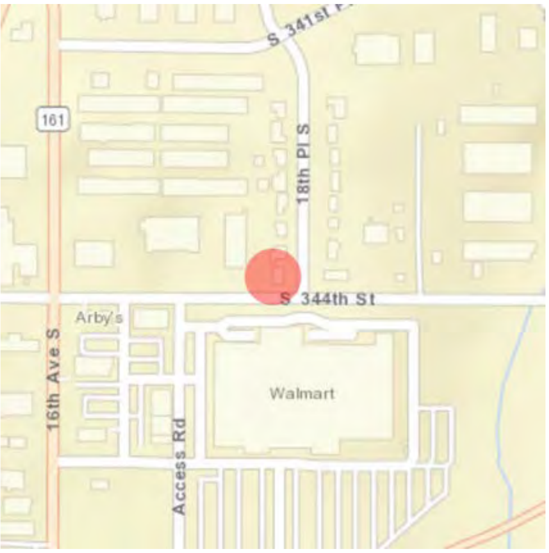
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

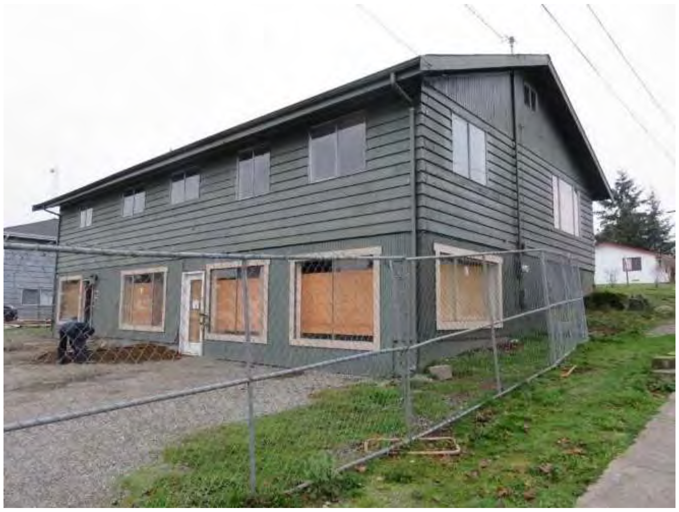
Historic Property Report

Resource Name: Commercial building

Property ID: 396301

Location





Address:	34259 18TH PL S, FEDERAL WAY, WA
Tax No/Parcel No:	4129600045
Plat/Block/Lot:	LAKEHAVEN # 2
Geographic Areas:	King County, POVERTY BAY Quadrangle, T21R04E21

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1966	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

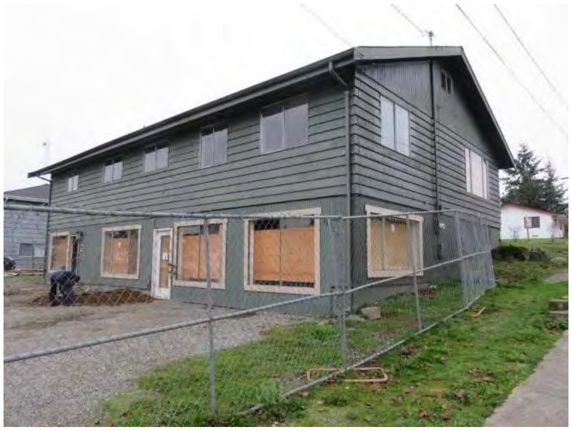
Local Registers and Districts

Name	Date Listed	Notes

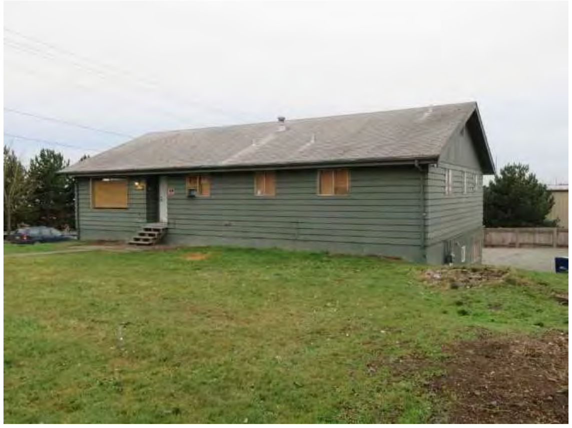
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00116, , Assessors Data Project: King County I	7/6/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



34259 18th Place S, view northwest.jpg



34259 18th Place S, view northeast.jpg

Historic Property Report

Resource Name: Commercial building

Property ID: 396301

Inventory Details - 7/6/2011

Common name:	
Date recorded:	7/6/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600045
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Form Type	Single Dwelling

Surveyor Opinion

Significance narrative:

Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description:

The house at 34259 18th Place S, Federal Way, is located in King County. According to the county assessor, the structure was built in 1966 and is a single family dwelling. The building has a single-family form with a basement garage.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Single Dwelling
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Cladding	Wood - Clapboard
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity
From its period of construction (1966), 34259 18th Place S retains poor integrity of materials, design, workmanship, setting, feeling, and association. While the building retains much of its original materials, including aluminum sash windows and siding on the upper floor, alterations to the rear face have resulted in a change of facade and use. The building retains integrity of location.
Evaluation
The building at 34259 18th Place S was constructed in 1966, likely as a residence, though its use appears to have been converted to commercial. The building does not appear, based on a review of historic maps or local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 34259 18th Place S does not retain integrity from its period of construction (1966) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1966, according to the King County Assessor, the building at 34259 18th Place S was vacant at the time of survey; the building historically fronted east, though the primary entrance appears to have been relocated to the rear (west) face (King County Assessor 2020). The one-story-on-basement, rectangular building sits on a poured-concrete foundation and is clad in horizontal wood clapboard siding. The building features a side-gabled roof clad in asphalt/composition roofing. The building was likely originally constructed as a residence, with the primary (east) facade featuring an off-center recessed door accessed via stairs. Windows on the main (upper) floor were aluminum-framed, both sliders and pictures. However, the building may have been most recently used for a commercial enterprise, as the rear (west) face featured a central glass-light door flanked by banks of commercial-style display or picture windows on the basement level. A second pedestrian entry was located on the north side of the west face.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Inventory Details - 3/12/2020

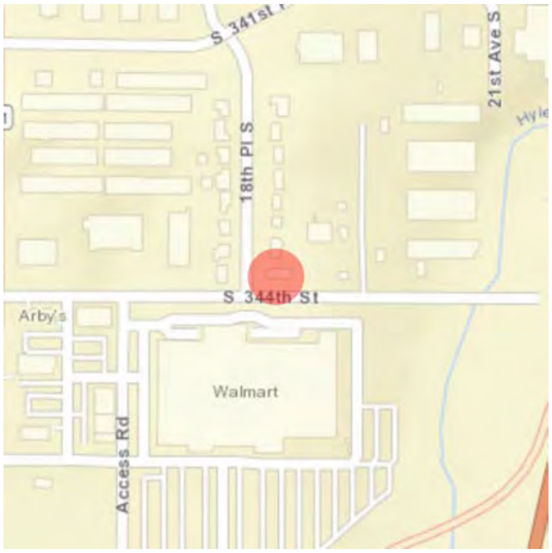
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

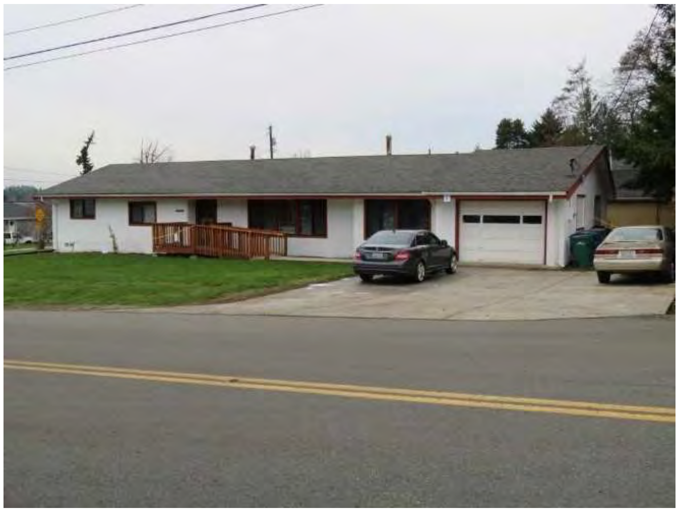
Historic Property Report

Resource Name: Residence

Property ID: 305628

Location


S 341st
21st Ave S
18th Pl S
Hyle
S 344th St
Arby's
Walmart
Access Rd



Address: 1824 S 344TH ST, FEDERAL WAY, WA

Tax No/Parcel No: 4129600040

Plat/Block/Lot: LAKEHAVEN # 2

Geographic Areas: King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1959	☑
Addition	1975	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

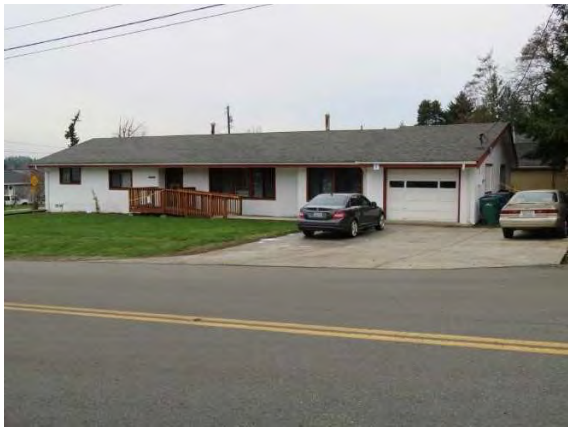
Local Registers and Districts

Name	Date Listed	Notes

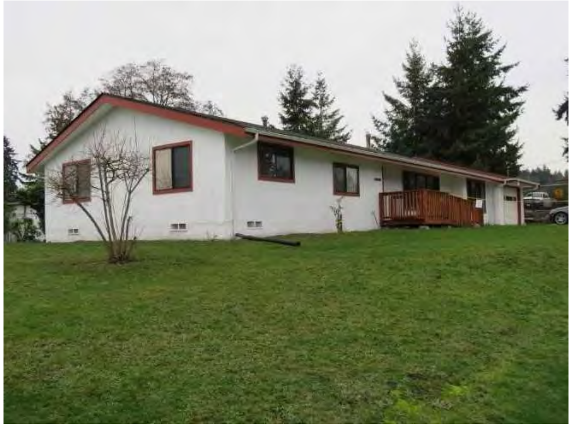
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/7/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



1824 S 344th Street, view northwest.jpg



1824 S 344th Street, view northeast.jpg

Inventory Details - 7/7/2011

Common name:	
Date recorded:	7/7/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	4129600040
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Databas (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1824 S 344th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1959 and is a single family dwelling. The building has a single-family form with an attached garage.

Historic Property Report

Resource Name: Residence

Property ID: 305628

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Stucco
Form Type	Single Dwelling - Ranch
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Plan	Rectangle
Structural System	Masonry - Concrete Block

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1959), 1824 S 344th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of windows, doors, cladding, and massing, and commercial construction of a Walmart due south. The building retains integrity of location.

Evaluation

The residential building at 1824 S 344th Street was constructed in 1959 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1824 S 344th Street does not retain integrity from its period of construction (1959) and is not eligible under any criteria for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1959, according to the King County Assessor, the residential building at 1824 S 344th Street fronts south (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in stucco. The building is topped by a side-gabled roof clad in asphalt/composition roofing. The building features an attached one-car garage on the west side, which appears to be an extension/addition adjacent to an original garage that was converted into living space. The building features modern anodized metal windows and what appear to be aluminum-framed windows, some in altered fenestration. The front door is accessed via a wooden ramp and appears to be a solid wood door protected by a metal screen door.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 305628

Inventory Details - 3/12/2020

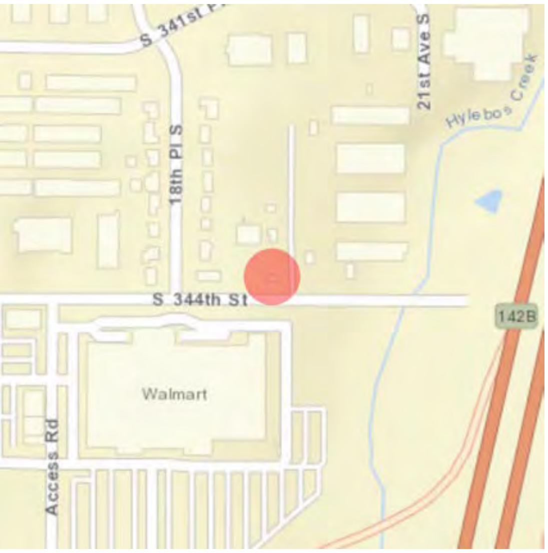
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

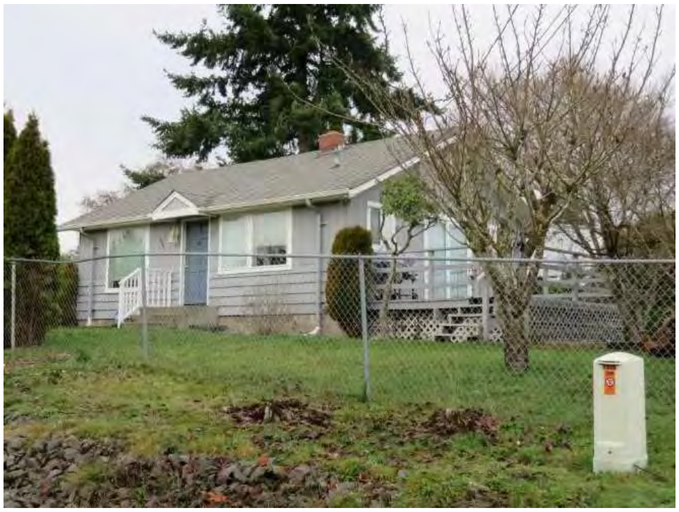
Historic Property Report

Resource Name: Residence

Property ID: 324720

Location


S 341st Pl
21st Ave S
Hylebos Creek
18th Pl S
S 344th St
142B
Walmart
Access Rd



Address:	1916 S 344TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049056
Plat/Block/Lot:	S 121.5 FT OF W 1/2 OF E 2/3OF E 1/2 OF SE 1/4 OF
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1947	☑
Addition	2003	☑

Historic Use:

Category	Subcategory
Domestic	Domestic - Single Family House
Domestic	Domestic - Single Family House

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

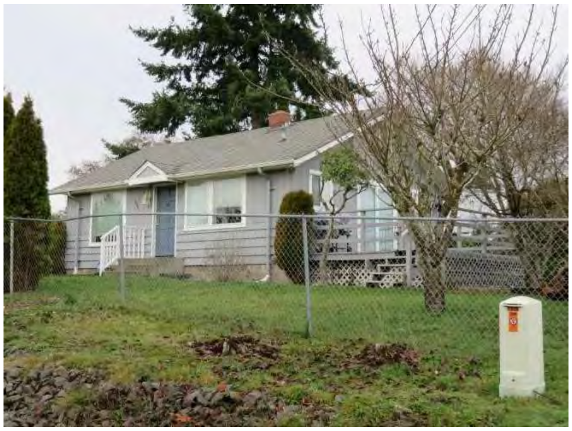
Local Registers and Districts

Name	Date Listed	Notes

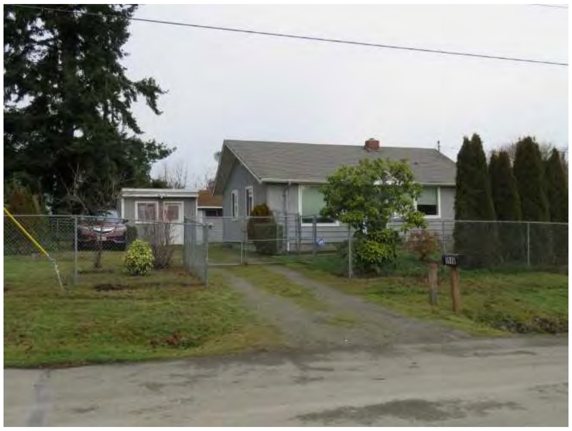
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/11/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos



1916 S 344th Street, view northeast.jpg



1916 S 344th Street, view northwest.jpg

Inventory Details - 7/11/2011

Common name:	
Date recorded:	7/11/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049056
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1916 S 344th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1947 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Block
Cladding	Wood
Cladding	Wood - T 1-11
Roof Type	Gable - Side
Roof Material	Asphalt/Composition - Shingle
Form Type	Single Dwelling - Side Gable
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Minimal Traditional

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1947), 1916 S 344th Street retains poor integrity of materials, design, workmanship, setting, feeling, and association, due to a loss of historic-period windows and fenestration patterns, doors, and cladding, the addition of the deck on the east face and associated entry, and the construction of the shed-roofed building to the west. The building retains integrity of location.

Evaluation

The residential building at 1916 S 344th Street was constructed in 1947 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building, as initially constructed, embodied the distinctive characteristics the Minimal Traditional style; however, the loss of integrity leaves the resource unable to convey significance as a representative example of the Minimal Traditional style (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1916 S 344th Street does not retain sufficient integrity from its period of construction (1947) and is not eligible for listing in the National Register of Historic Places (NRHP) or Washington Heritage Register (WHR) as a representative example of the Minimal Traditional style or under any other criteria for listing in the NRHP or WHR.

Physical description:

Built in 1947, according to the King County Assessor, the residential building at 1916 S 344th Street fronts south (King County Assessor 2020). The one-story, rectangular building sits on a concrete-block foundation and is clad in a combination of horizontal wood and vertical T1-11 siding. The building is topped by a side-gabled roof clad in asphalt/composition roofing. The building features aspects of the Minimal Traditional style, including the minimally ornamented side-gabled massing with a pediment awning over the concrete entrance stoop and stair on the (south) facade. All windows appear to be vinyl in altered fenestration. The entry door is a six-paneled door of unknown material. A deck, accessed via a vinyl sliding-glass door, is located on the east face.

Two associated resources are located on the parcel. The first is a detached shed-roofed building, likely originally constructed as a garage but which appears to have been altered for use as an office or possibly an accessory dwelling unit (ADU). The building features a side-by-side vinyl window and one-light pedestrian door on the south face. The second resource is located behind the shed-roofed building and is only minimally visible from the ROW. The building appears to be an original (ca. 1947) garage or outbuilding, and it features a three-light pedestrian door and at least one aluminum slider window. The building is clad in horizontal board siding, and the roof is clad in asphalt roofing.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Residence

Property ID: 324720

Inventory Details - 3/12/2020

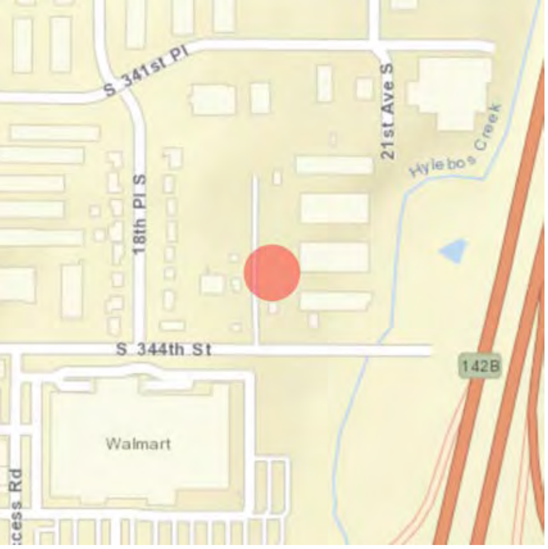
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

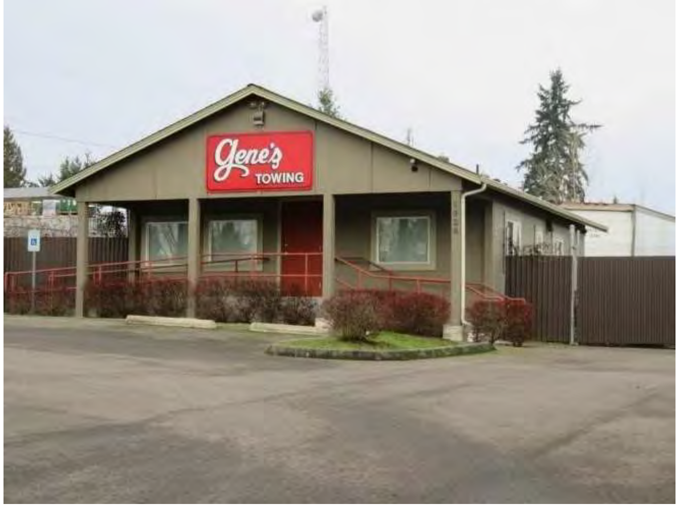
Historic Property Report

Resource Name: Gene's Towing

Property ID: 320678

Location


S 341st Pl
21st Ave S
Hylebos Creek
18th Pl S
S 344th St
142B
Walmart
Access Rd


Gene's
TOWING

Address:	1928 S 344TH ST, FEDERAL WAY, WA
Tax No/Parcel No:	2121049045
Plat/Block/Lot:	LOT 2 OF KC SHORT PLAT NO 385153 RECORDING NO 8608
Geographic Areas:	King County, POVERTY BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1948	☑

Historic Use:

Category	Subcategory
Commerce/Trade	Commerce/Trade - Business
Commerce/Trade	Commerce/Trade - Business

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

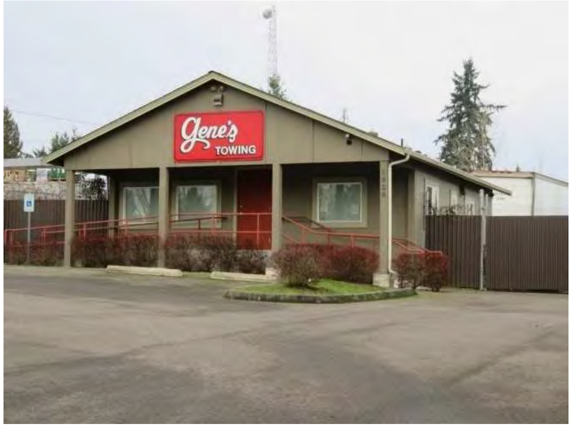
Local Registers and Districts

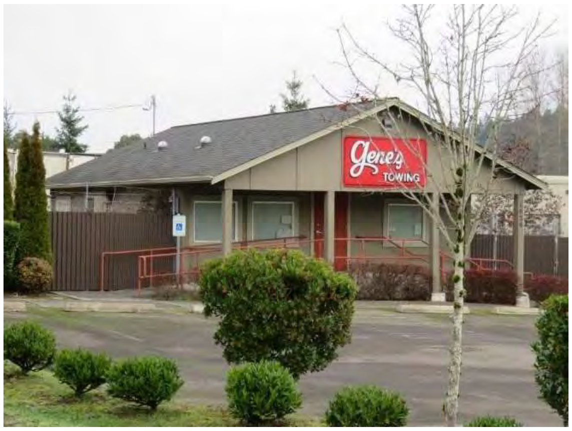
Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2011-07-00109, , Assessors Data Project: King County D	7/10/2011	Not Determined	
2018-02-01251, FTA, Tacoma Dome Link Extension	3/12/2020	Survey/Inventory	
2020-02-01045, , Sound Transit Operations and Maintenance Facility South (OMFS)	2/5/2020	Survey/Inventory	

Photos


1928 S 344th Street, view northwest.jpg


1928 S 344th Street, view northeast.jpg

Inventory Details - 7/10/2011

Common name:	
Date recorded:	7/10/2011
Field Recorder:	Artifacts Consulting, Inc.
Field Site number:	2121049045
SHPO Determination	

Detail Information

Surveyor Opinion

Significance narrative: Data included on this historic property inventory form (HPI) detail stemmed from County Assessor building records imported by the Washington State Department of Archaeology of Historic Preservation (DAHP) into WISAARD in 2011. This upload reduces data entry burden on community volunteers and historical societies participating in the survey and inventory of their communities. The intent of this project is directed specifically to facilitating community and public involvement in stewardship, increasing data accuracy, and providing a versatile planning tool to Certified Local Governments (CLGs).

Project methodology entailed use of the University of Washington's State Parcel Database (http://depts.washington.edu/wagis/projects/parcels/development.php) to provide the base parcel layer for CLGs. Filtering of building data collected from each county trimmed out all properties built after 1969, as well as all current, previously inventoried properties. Translation of building data descriptors to match fields in HPI allowed the data upload. Calculation of point locations utilized the center of each parcel. Data on this detail provides a snapshot of building information as of 2011. A detailed project methodology description resides with DAHP. Project team members: Historic Preservation Northwest, GeoEngineers, and Artifacts Consulting, Inc. (project lead).

Physical description: The house at 1928 S 344th Street, Federal Way, is located in King County. According to the county assessor, the structure was built in 1948 and is a single family dwelling. The building has a single-family form.

Inventory Details - 2/5/2020

Common name:	
Date recorded:	2/5/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Commercial
Roof Type	Gable - Front
Roof Material	Asphalt/Composition - Shingle
Cladding	Wood - Board & Batten
Cladding	Concrete - Block (cmu)
Plan	Rectangle
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Late 19th and Early 20th Century American Movements	Commercial

Surveyor Opinion

Significance narrative:

Integrity

From its period of construction (1948), 1928 S 344th Street retains poor integrity of materials, design, workmanship, association, and feeling, due to a loss of all historic-period windows, doors, and cladding, which have been either altered or covered. The building retains integrity of location and setting.

Evaluation

The commercial building at 1928 S 344th Street was constructed in 1948 and does not appear, based on a review of historic maps and local histories, to have any association with events that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not reveal any association of the resource with the lives of significant persons (Criterion B). The building does not embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., is part of a district) (Criterion C). Finally, the building was built of common construction methods and well-known materials and is unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Historical Research Associates, Inc. recommends 1928 S 344th Street does not retain integrity from its period of construction (1948) and is not eligible for listing in the National Register of Historic Places or Washington Heritage Register.

Physical description:

Built in 1948, according to the King County Assessor, the commercial building at 1928 S 344th Street fronts south (King County Assessor 2020). The one-story, rectangular building sits on a poured-concrete foundation and is clad in a combination of plywood with batten siding in the facade (south) gable and what appears to be parged or painted concrete masonry units or possibly brick. The building is topped by a front-gabled roof clad in asphalt/composition material. The building, which currently houses Gene’s Towing, features a recessed entry on the facade, supported by square posts. All visible windows are vinyl-framed; the one visible door appears to be steel.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October 10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January 31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Historic Property Report

Resource Name: Gene's Towing

Property ID: 320678

Inventory Details - 3/12/2020

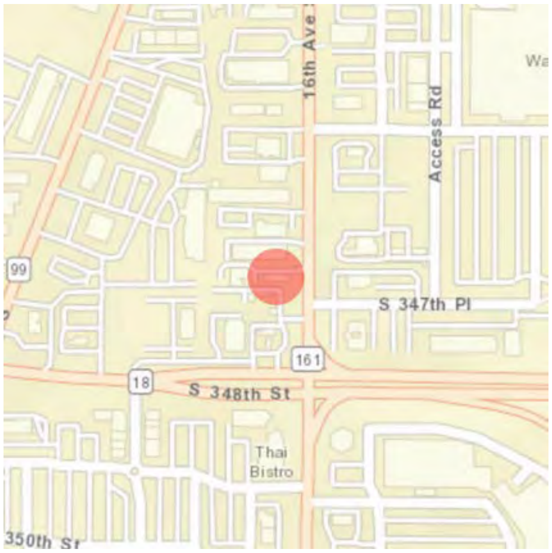
Common name:	
Date recorded:	3/12/2020
Field Recorder:	Lauren Waldroop
Field Site number:	
SHPO Determination	

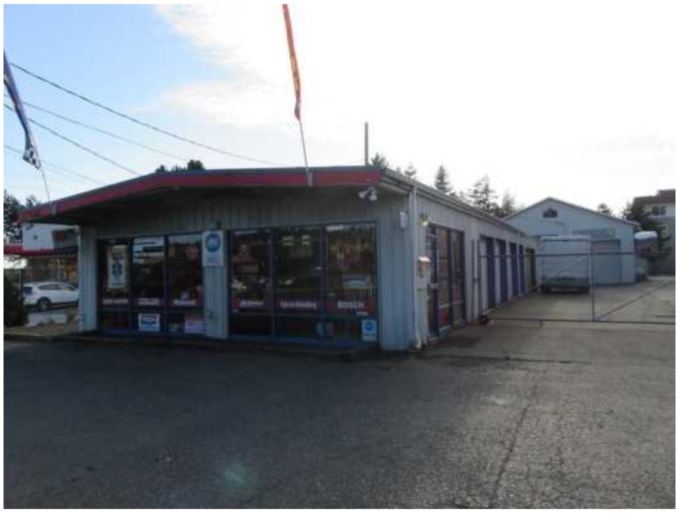
Historic Property Report

Resource Name: Commercial Building

Property ID: 721773

Location


16th Ave
Access Rd
Wa
99
S 347th Pl
161
18
S 348th St
Thai Bistro
350th St



Address:	34703 16th Ave S, Federal Way, Washington, 98003
Tax No/Parcel No:	8897000090
Geographic Areas:	King County, T21R04E20, POVERTY BAY Quadrangle

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1974	☑

Historic Use:

Category	Subcategory
Commerce/Trade	Commerce/Trade - Business
Commerce/Trade	Commerce/Trade - Business

Historic Context:

Category
Architecture

Architect/Engineer:

Category	Name or Company

Thematics:

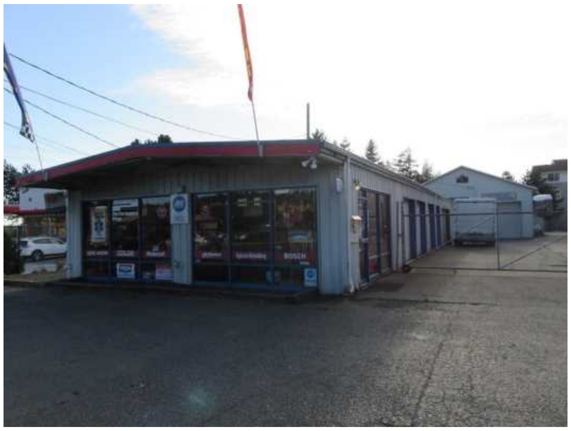
Local Registers and Districts

Name	Date Listed	Notes

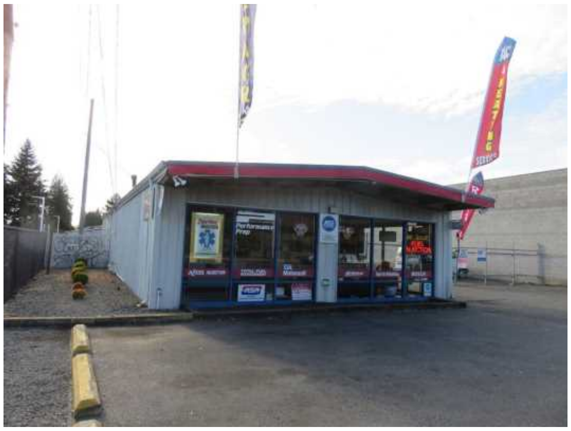
Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2018-02-01251, FTA, Tacoma Dome Link Extension	4/17/2020	Survey/Inventory	

Photos



34703 16th Ave S, view southwest



34703 16th Ave S, view northwest

Inventory Details - 4/17/2020

Common name:	
Date recorded:	4/17/2020
Field Recorder:	Chrisanne Beckner
Field Site number:	
SHPO Determination	

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Metal - Corrugated
Roof Type	Gable - Front
Roof Material	Metal
Plan	Rectangle
Form Type	Commercial - One-Part Block
Structural System	Wood - Platform Frame

Styles:

Period	Style Details
Modern Movement	Modern

Surveyor Opinion

Significance narrative: Integrity

From its period of construction (1974), the commercial building and outbuilding at 34703 16th Avenue S retain integrity of location, setting, feeling, and association, although alterations, including window replacement and altered fenestration, have diminished the primary building's integrity of design, materials, and workmanship.

Evaluation

The commercial buildings at 34703 16th Avenue S were constructed in 1974. They do not appear, based on a review of historic maps and local histories, to hold any historic-period associations with important events or trends that made a significant contribution to the broad patterns of local, state, or national history (Criterion A). Background research did not suggest that the building held a strong association with the lives of significant persons (Criterion B). The buildings are common prefabricated metal warehouses, utilitarian in style, with no architectural significance (Criterion C). They do not embody the distinctive characteristics of a particular type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., contribute to an existing or potential historic district). Finally, the buildings were constructed of common methods and well-known materials and are unlikely to answer important research questions or yield information about human history that can only be answered by the actual physical material, design, construction methods, or interrelation of these resources (Criterion D).

Due to a lack of significance and integrity, Historical Research Associates, Inc. recommends that the commercial building and associated warehouse at 34703 16th Avenue S are not eligible for listing in the National Register of Historic Places under any criteria.

Physical description: Built in 1974, the commercial building at 34703 16th Avenue S fronts north (King County Assessor 2020). The one-story building sits on a poured-concrete foundation, is clad in ribbed metal panels, and is topped by a front-gabled metal roof with a shallow peak. Full-height, metal-framed storefront windows appear in banks of three in altered fenestration on the east elevation and on the north facade where the main entrance consists of a commercial glass door flanked by full-height windows. Five garage bays are located on the north facade west of a chain-link property gate. A secondary detached warehouse building sits west of the main building. It is one-and-one-half stories tall, sits on a poured-concrete foundation, is clad in corrugated metal, and is topped by a front-gabled metal roof.

Bibliography:

Givens, Linda. 2017. Federal Way 320th Library, King County Library System. HistoryLink.org essay 20376. Electronic document: https://www.historylink.org/File/20376, accessed May 28, 2020.

Historical Society of Federal Way. 2015. Historical Society of Federal Way Timeline. Prepared for 4Culture and the City of Federal Way. Electronic document, http://www.federalwayhistory.org/federal-way-timeline.php, accessed October10, 2019.

King County Tax Assessor
2020 eReal Property Database. Electronic document, https://blue.kingcounty.com/Assessor/eRealProperty/default.aspx, accessed January31, 2020.

Meador, Karen. 2014. Military Road: A Lasting Legacy. Pamphlet in the Civil War History in Washington Territory series. Published by 4 Culture King County and United Daughters of the Confederacy.

NETROnline. 2020. Historic Aerials, Federal Way, King County Washington. Electronic document, https://www.historicaerials.com/, accessed May 28, 2020.

Stein, Alan. 2003. Federal Way—Thumbnail History. HistoryLink.org essay 4215. Electronic document: https://www.historylink.org/File/4215, accessed May 28, 2020.

Operations and Maintenance Facility: South

ATTACHMENT G4-6

Tribal and Agency Correspondence

Federal Transit Administration

SOUNDTRANSIT

From: Stevenson, Alex
To: Laura Murphy
Cc: Kennedy, Steven; Rehmat, Hussein
Subject: Sound Transit"s OMF South - cultural resource survey plan
Date: Monday, January 13, 2020 12:43:00 PM
Attachments: AE 0030-17 9.5.7 Historic and Cultural Technical Report Final.pdf
image001.jpg

Good morning –

Attached is a cultural resources survey plan for Sound Transit’s proposed Operations and Maintenance Facility – South (OMFS) Project. This project is currently in environmental review and Sound Transit is preparing a SEPA EIS. No federal funding is planned. If a federal approval or permit is determined to be needed later, appropriate NEPA and Section 106 documentation will be completed. The OMFS facility will support expanded light rail service resulting from the entire ST3 program in King and Pierce counties.

Currently, there are three alternative locations for the facility with associated rail guideway: the Midway Landfill in the City of Kent, and two sites in the City of Federal Way. There is no preferred alternative at this time. With the two Federal Way site alternatives, about a mile of future guideway track from the terminus of Federal Way Link Extension southward to connect the two sites would also function as a portion of the future guideway for the Tacoma Dome Link Extension project (TDLE), which extends light rail from Federal Way to Tacoma. Sound Transit coordinated with the Federal Transit Administration (FTA), which is the lead federal agency for TDLE, to confirm OMFS and TDLE have independent utility. As a result, they are being evaluated in separate EISs. It is important that the OMFS and TDLE projects be considered separate for environmental review and permitting purposes because of their differing regulatory frameworks and associated environmental requirements.

We are sending this document to you for your review and kindly request comments on the document within 30 days of its receipt. We anticipate starting cultural resources fieldwork described in this document on February 10, 2019. We will notify you of our official start date for fieldwork and invite you to visit or monitor the work at that time.

We appreciate your review and look forward to answering any comments or questions you may have on this project. Please email Alex Stevenson, Sound Transit’s Cultural Resources Program Manager at alex.stevenson@soundtransit.org or contact Alex by phone at 206-553-3655.

Thank you,

Alex E. Stevenson
Cultural Resources Program Manager
Sound Transit
Desk: 206-553-3655
Mobile: 206-419-5315
Pronouns: He/Him/His
Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit

From: Stevenson, Alex
To: bullchild.annette@nisqually-nsn.gov
Cc: Kennedy, Steven; Rehmat, Hussein; Hayes, Dezerae
Subject: Sound Transit"s OMF South - cultural resource survey plan
Date: Monday, January 13, 2020 12:45:00 PM
Attachments: AE 0030-17 9.5.7 Historic and Cultural Technical Report Final.pdf
image001.jpg

Good morning –

Attached is a cultural resources survey plan for Sound Transit’s proposed Operations and Maintenance Facility – South (OMFS) Project. This project is currently in environmental review and Sound Transit is preparing a SEPA EIS. No federal funding is planned. If a federal approval or permit is determined to be needed later, appropriate NEPA and Section 106 documentation will be completed. The OMFS facility will support expanded light rail service resulting from the entire ST3 program in King and Pierce counties.

Currently, there are three alternative locations for the facility with associated rail guideway: the Midway Landfill in the City of Kent, and two sites in the City of Federal Way. There is no preferred alternative at this time. With the two Federal Way site alternatives, about a mile of future guideway track from the terminus of Federal Way Link Extension southward to connect the two sites would also function as a portion of the future guideway for the Tacoma Dome Link Extension project (TDLE), which extends light rail from Federal Way to Tacoma. Sound Transit coordinated with the Federal Transit Administration (FTA), which is the lead federal agency for TDLE, to confirm OMFS and TDLE have independent utility. As a result, they are being evaluated in separate EISs. It is important that the OMFS and TDLE projects be considered separate for environmental review and permitting purposes because of their differing regulatory frameworks and associated environmental requirements.

We are sending this document to you for your review and kindly request comments on the document within 30 days of its receipt. We anticipate starting cultural resources fieldwork described in this document on February 10, 2019. We will notify you of our official start date for fieldwork and invite you to visit or monitor the work at that time.

We appreciate your review and look forward to answering any comments or questions you may have on this project. Please email Alex Stevenson, Sound Transit’s Cultural Resources Program Manager at alex.stevenson@soundtransit.org or contact Alex by phone at 206-553-3655.

Thank you,

Alex E. Stevenson
Cultural Resources Program Manager
Sound Transit
Desk: 206-553-3655
Mobile: 206-419-5315
Pronouns: He/Him/His
Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit

From: Stevenson, Alex
To: Brandon Reynon
Cc: Kennedy, Steven; Rehmat, Hussein; Hayes, Dezerae
Subject: Sound Transit"s OMF South - cultural resource survey plan
Date: Monday, January 13, 2020 12:44:00 PM
Attachments: AE 0030-17 9.5.7 Historic and Cultural Technical Report Final.pdf
image001.jpg

Good morning –

Attached is a cultural resources survey plan for Sound Transit’s proposed Operations and Maintenance Facility – South (OMFS) Project. This project is currently in environmental review and Sound Transit is preparing a SEPA EIS. No federal funding is planned. If a federal approval or permit is determined to be needed later, appropriate NEPA and Section 106 documentation will be completed. The OMFS facility will support expanded light rail service resulting from the entire ST3 program in King and Pierce counties.

Currently, there are three alternative locations for the facility with associated rail guideway: the Midway Landfill in the City of Kent, and two sites in the City of Federal Way. There is no preferred alternative at this time. With the two Federal Way site alternatives, about a mile of future guideway track from the terminus of Federal Way Link Extension southward to connect the two sites would also function as a portion of the future guideway for the Tacoma Dome Link Extension project (TDLE), which extends light rail from Federal Way to Tacoma. Sound Transit coordinated with the Federal Transit Administration (FTA), which is the lead federal agency for TDLE, to confirm OMFS and TDLE have independent utility. As a result, they are being evaluated in separate EISs. It is important that the OMFS and TDLE projects be considered separate for environmental review and permitting purposes because of their differing regulatory frameworks and associated environmental requirements.

We are sending this document to you for your review and kindly request comments on the document within 30 days of its receipt. We anticipate starting cultural resources fieldwork described in this document on February 10, 2019. We will notify you of our official start date for fieldwork and invite you to visit or monitor the work at that time.

We appreciate your review and look forward to answering any comments or questions you may have on this project. Please email Alex Stevenson, Sound Transit’s Cultural Resources Program Manager at alex.stevenson@soundtransit.org or contact Alex by phone at 206-553-3655.

Thank you,

Alex E. Stevenson
Cultural Resources Program Manager
Sound Transit
Desk: 206-553-3655
Mobile: 206-419-5315
Pronouns: He/Him/His
Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit

From: Stevenson, Alex
To: kate@yakama.com
Cc: Kennedy, Steven; Rehmat, Hussein; Hayes, Dezerae
Subject: Sound Transit"s OMF South - cultural resource survey plan
Date: Monday, January 13, 2020 12:47:00 PM
Attachments: AE 0030-17 9.5.7 Historic and Cultural Technical Report Final.pdf
image001.jpg

Good afternoon –

Attached is a cultural resources survey plan for Sound Transit's proposed Operations and Maintenance Facility – South (OMFS) Project. This project is currently in environmental review and Sound Transit is preparing a SEPA EIS. No federal funding is planned. If a federal approval or permit is determined to be needed later, appropriate NEPA and Section 106 documentation will be completed. The OMFS facility will support expanded light rail service resulting from the entire ST3 program in King and Pierce counties.

Currently, there are three alternative locations for the facility with associated rail guideway: the Midway Landfill in the City of Kent, and two sites in the City of Federal Way. There is no preferred alternative at this time. With the two Federal Way site alternatives, about a mile of future guideway track from the terminus of Federal Way Link Extension southward to connect the two sites would also function as a portion of the future guideway for the Tacoma Dome Link Extension project (TDLE), which extends light rail from Federal Way to Tacoma. Sound Transit coordinated with the Federal Transit Administration (FTA), which is the lead federal agency for TDLE, to confirm OMFS and TDLE have independent utility. As a result, they are being evaluated in separate EISs. It is important that the OMFS and TDLE projects be considered separate for environmental review and permitting purposes because of their differing regulatory frameworks and associated environmental requirements.

We are sending this document to you for your review and kindly request comments on the document within 30 days of its receipt. We anticipate starting cultural resources fieldwork described in this document on February 10, 2019. We will notify you of our official start date for fieldwork and invite you to visit or monitor the work at that time.

We appreciate your review and look forward to answering any comments or questions you may have on this project. Please email Alex Stevenson, Sound Transit's Cultural Resources Program Manager at alex.stevenson@soundtransit.org or contact Alex by phone at 206-553-3655.

Thank you,

Alex E. Stevenson
Cultural Resources Program Manager
Sound Transit
Desk: 206-553-3655
Mobile: 206-419-5315
Pronouns: He/Him/His
Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit

Stevenson, Alex

From: Stevenson, Alex
Sent: Tuesday, January 12, 2021 9:18 AM
To: Wardlaw, Dennis
Cc: Borth, Holly; Kennedy, Steven; Rehmat, Hussein; Mark Mazzola
Subject: Project 2020-02-01045 (OMFS) - FINAL submitted

Good morning Dennis –
I have submitted the FINAL technical report for project 2020-02-01045. The site forms have been updated and resubmitted as well. Thank you for your help with that.

Please let us know if you have any questions or comments.

Alex

Alex E. Stevenson
Cultural Resources Program Manager
Sound Transit
Desk: 206-553-3655
Mobile: 206-419-5315

Pronouns: He/Him/His

Connect with us
facebook.com/SoundTransit
twitter.com/SoundTransit
SOUNDTRANSIT

dahp
protect the past, shape the future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

January 20, 2021

Mr. Alexander Stevenson
Cultural Resource Program Manager
Sound Transit

In future correspondence please refer to:
Project Tracking Code: 2020-02-01045
Property: Sound Transit Operations and Maintenance Facility South (OMFS)
Re: No Effect to Historic Properties

Dear Mr. Stevenson:

Thank you for contacting the Department of Archaeology and Historic Preservation (DAHP) and providing a copy of the cultural resources survey report for the above referenced project. First, we agree that Sites 45KI1542 and 45KI1543 are NOT ELIGIBLE for inclusion in the National Register of Historic Places (NRHP). We also agree that the 60 properties identified and recorded for this project are NOT ELIGIBLE for inclusion in the NRHP. Finally, we agree with the recommendations made in the report and your finding of No Effect to Historic Properties. As a result of our agreement, further contact with DAHP on this matter is not necessary.

However, if information becomes available and/or the scope of work changes, please resume consultation with DAHP and all consulting parties. In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and contact made with concerned tribes and DAHP for further consultation.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Washington State law.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov

State of Washington • Department of Archaeology & Historic Preservation
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

1889

dahp
protect the past, shape the future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

August 19, 2021

Ms. Sunshine Clark Schmidt
Bonneville Power Administration
PO Box 3621
Portland, OR. 97208

In future correspondence please refer to:
Project Tracking Code: 2020-12-07557
Property: King County_ Sound Transit Line Raises Project
Re: NO Adverse Effect

Dear Ms. Clark Schmidt:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced proposal. This action has been reviewed on behalf of the SHPO under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. Our review is based upon documentation contained in your communication.

We concur that the current project as proposed will have "NO ADVERSE EFFECT" on historic properties within the APE that are listed in, or determined eligible for listing in, the National Register of Historic Places. As a result of our concurrence, further contact with DAHP on this proposal is not necessary.

However, if new information about affected resources becomes available and/or the project scope of work changes significantly, please resume consultation as our assessment may be revised. Also, if any archaeological resources are uncovered during construction, please halt work immediately in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov

State of Washington • Department of Archaeology & Historic Preservation
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Jaison Elkins
Chairman
Muckleshoot Indian Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman Elkins:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit’s regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER

Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:57:43 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Laura Murphy, Cultural Resources, Muckleshoot Indian Tribe
Madrienne White, Public and Government Relations Manager, Muckleshoot Indian Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department
of Transportation
Federal Transit
Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Willie Frank III
Chairman
Nisqually Tribe
4820 She-Nah-Num Drive SE
Olympia, Washington 98513

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman Frank III:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit’s regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER
Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:58:01 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Jackie Wall, THPO, Nisqually Tribe
Brad Beach, THPO, Nisqually Tribe
Annette Bullchild, THPO, Nisqually Tribe
Jeremy Perkuhn, THPO, Nisqually Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department
of Transportation
Federal Transit
Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Bill Sterud
Chairman
Puyallup Tribe of the Puyallup Reservation
3009 Portland Avenue
Tacoma, Washington 98404

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman Sterud:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER

Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:58:19 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Brandon Reynon, Cultural Resources, Puyallup Tribe of the Puyallup Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Robert de los Angeles
Chairman
Snoqualmie Indian Tribe
PO Box 969
Snoqualmie, Washington 98065

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman de los Angeles:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit’s regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.07.20 15:58:36 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Steven Moses, Cultural Resources, Snoqualmie Indian Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Kristopher Peters
Chairman
Squaxin Island Tribe of the Squaxin Island Reservation
10 SE Squaxin Lane
Shelton, Washington 98584

**Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation**

Dear Chairman Peters:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER

Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:58:52 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Rhonda Foster, THPO, Squaxin Island Tribe of the Squaxin Island Reservation
Shaun Dinubilo, Cultural Resources, Squaxin Island Tribe of the Squaxin Island Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Leonard Forsman
Chairman
Suquamish Indian Tribe of the Port Madison Reservation
PO Box 498
Suquamish, Washington 98392

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman Forsman:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit’s regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.07.20 15:59:10 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Dennis Lewarch, THPO, Suquamish Indian Tribe of the Port Madison Reservation
Stephanie Trudel, Cultural Resources, Suquamish Indian Tribe of the Port Madison Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

The Honorable Gerald Lewis
Chairman
Confederated Tribes and Bands of the Yakama Nation
401 Fort Road
Toppenish, Washington 98948

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Chairman Lewis:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with your tribe, and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER
Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:57:24 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Jerry Meninick, Deputy Director of Cultural Resources, Confederated Tribes and Bands of the Yakama Nation
Kate Valdez, Cultural Resources, Confederated Tribes and Bands of the Yakama Nation
Casey Barney, Cultural Resources, Confederated Tribes and Bands of the Yakama Nation
Holly Shea Barrick, Archaeologist, Confederated Tribes and Bands of the Yakama Nation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

July 20, 2023

Allyson Brooks, Ph.D.
State Historic Preservation Officer
Washington Department of Archaeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Subject: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Consultation Initiation

Dear Dr. Brooks:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is proposing the Operations and Maintenance Facility (OMF) South Project (the Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. This letter initiates Section 106 consultation with the Washington State Historic Preservation Officer (SHPO), and requests feedback on the proposed Area of Potential Effects (APE).

The Project would provide a facility in the South Corridor of Sound Transit 3 (ST3), Sound Transit’s regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. Alternatives being evaluated include a No-Build alternative, the South 336th Street alternative (Preferred Alternative), the South 344th Street alternative, and the Midway Landfill alternative. The Preferred and South 344th Street alternatives are in Sections 16 and 21 of Township 21 North, Range 4 East. The Midway Landfill alternative is in Sections 21 and 22 of Township 22 North, Range 4 East.

The build alternatives range in size from approximately 65 to 70 acres in the cities of Federal Way and Kent. Each alternative includes tracks connecting the OMF to the Federal Way Link Extension light rail line that will be operating when the OMF South is planned to open. The length and location of these connecting tracks varies by alternative.

The proposed APE is shown in the enclosed map set. The proposed APE generally extends from elements of the Project alternatives (e.g., guideway, station locations, and construction staging areas) to the nearest tax parcel or a maximum of 200 feet where large tax parcels are adjacent to Project elements. Prior to federalizing the Project, Sound Transit consulted with your office on the project, built environment resources, and archaeological resources (**DAHP Log # 2020-02-01045**). The proposed APE is consistent with the area of impacts identified through that earlier consultation. However, the Project will now comply with the relevant federal statutes and regulations required for NEPA, including Section 106.

FTA will contact the following tribes to notify them of the undertaking, initiate Section 106 consultation, and request their comments: Confederated Tribes and Bands of the Yakama Nation; Muckleshoot Indian Tribe; Nisqually Indian Tribe; Puyallup Tribe of Indians; Snoqualmie Indian Tribe; Squaxin Island Tribe of the Squaxin Island Reservation; and the Suquamish Indian Tribe of the Port Madison Reservation. FTA looks forward to responding to any concerns these tribes may identify and will notify you of any such concerns.

Pursuant to 36 CFR Part 800, FTA respectfully requests your comments on the APE within 30 days of receipt of this letter. Should you require additional information or have questions, please contact Justin Zweifel at (206) 220-7538 or justin.zweifel@dot.gov.

FTA has also sent you a separate letter inviting you to participate in the environmental review process under the National Environmental Policy Act (NEPA) as participating agency.

Thank you for your consultation on the Project.

Sincerely,

SUSAN KAY
FLETCHER

Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.07.20
15:56:59 -07'00'

Susan Fletcher
Acting Regional Administrator

cc: Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian – Transportation Project Reviewer, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit

Enclosure: Proposed Area of Potential Effects

dahp
protect the past, shape the future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

July 24, 2023

Susan Kay Fletcher
Acting Regional Administrator
US Department of Transportation
Federal Transit Administration, Region X

In future correspondence please refer to:
Project Tracking Code: 2020-02-01045
Property: Sound Transit Operations and Maintenance Facility South (OMFS)
Re: Archaeology - APE Concur

Dear Susan Kay Fletcher:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced project. In response, we have reviewed your description and map of the area of potential effect (APE).

We concur with your definition of the APE. Please provide us with your survey methodology before proceeding with any inventories. Along with the results of the inventory we will need to review your consultation with the concerned tribes, and other interested/affected parties. Please provide any correspondence or comments from concerned tribes and/or other parties that you receive as you consult under the requirements of 36 CFR 800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800. Should additional information about the project become available, our assessment may be revised.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Maureen Elenga, M.A.
Transportation Reviewer
(360) 972-4539
Maureen.Elenga@dahp.wa.gov

State of Washington • Department of Archaeology & Historic Preservation
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

From:	Stephanie Trudel
To:	Zweifel, Justin (FTA)
Cc:	Dennis Lewarch
Subject:	RE: [EXTERNAL] Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Consultation Initiation
Date:	Wednesday, July 26, 2023 1:44:04 PM

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hi Justin,

I will be the point of contact for Section 106.

Thank you,
Stephanie

Stephanie Trudel
Archaeologist
Suquamish Tribe
PO Box 498
Suquamish, WA 98392-0498
360-394-8533
strudel@suquamish.nsn.us

From: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>
Sent: Thursday, July 20, 2023 4:33 PM
To: Leonard Forsman <lforsman@suquamish.nsn.us>
Cc: Dennis Lewarch <dlewarch@Suquamish.nsn.us>; Stephanie Trudel <strudel@Suquamish.nsn.us>; Wardlaw, Dennis (DAHP) <dennis.wardlaw@dahp.wa.gov>; Elenga, Maureen (DAHP) <maureen.elenga@dahp.wa.gov>; Stevenson, Alex <alex.stevenson@soundtransit.org>
Subject: [EXTERNAL] Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Consultation Initiation

Dear Chairman Forsman:

Please see the attached Section 106 Consultation Initiation letter for the Sound Transit Operations and Maintenance Facility South Project.

Thank you,

Justin Zweifel
Region 10 Environmental Protection Specialist
Federal Transit Administration

U.S. Department of Transportation
justin.zweifel@dot.gov | www.transit.dot.gov

NISQUALLY INDIAN TRIBE
Tribal Historic Preservation Office
4820 She-Nah-Num Drive S.E.
Olympia, Washington 98513
360.456.5221 (main)
877.768.8886 (toll free)
www.nisqually-nsn.gov

July 31, 2023

To: Justin Zweifel
Region 10 Environmental Protection Specialist
Federal Transit Administration
U.S. Department of Transportation

Re: Sound Transit Operations and Maintenance Facility South Project

The Nisqually Indian Tribe's THPO has reviewed the Section 106 consultation letter and supplemental materials that you provided for the above-named project and has no specific comments or concerns regarding the four build options. Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Although the Nisqually Indian Tribe doesn't have any specific concerns at this time, we respect the traditional cultural knowledge of affected tribes and support their opinions on this matter as well.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-528-1084
360-456-5221 ext 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

Stevenson, Alex

From: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>
Sent: Tuesday, August 1, 2023 8:30 AM
To: Stevenson, Alex
Subject: FW: Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Consultation Initiation

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Fyi

Thank you,

Justin Zweifel
Region 10 Environmental Protection Specialist
Federal Transit Administration
U.S. Department of Transportation
justin.zweifel@dot.gov | www.transit.dot.gov

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Tuesday, August 1, 2023 8:13 AM
To: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>
Subject: RE: Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Consultation Initiation

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hello Justin,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project for our review and comment. After reviewing the attached documents, we concur on the APE and are interested in this undertaking.

Shaun Dinubilo
Archaeologist
FAA Certified (Section 107) sUAS Remote Pilot
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Phone: 360-432-3998

Email: sdinubilo@squaxin.us

Email is my perferred method of communication.

As per 43 CFR 7.18[a][1]) of the Archaeological Resource Protection Act, Section 304 of the National Historic Preservation Act, and RCW 42.56.300 of the Washington State Public Records Act-Archaeological Sites, all information concerning the location, character, and ownership of any cultural resource must be withheld from public disclosure.

From: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>
Sent: Thursday, July 20, 2023 4:33 PM
To: Kris Peters <kpeters@squaxin.us>
Cc: Rhonda Foster <rfoster@squaxin.us>; Shaun Dinubilo <sdinubilo@squaxin.us>; Wardlaw, Dennis (DAHP) <dennis.wardlaw@dahp.wa.gov>; Elenga, Maureen (DAHP) <maureen.elenga@dahp.wa.gov>; Stevenson, Alex <alex.stevenson@soundtransit.org>
Subject: Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Consultation Initiation

Dear Chairman Peters:

Please see the attached Section 106 Consultation Initiation letter for the Sound Transit Operations and Maintenance Facility South Project.

Thank you,

Justin Zweifel
Region 10 Environmental Protection Specialist
Federal Transit Administration
U.S. Department of Transportation
justin.zweifel@dot.gov | www.transit.dot.gov

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Jaison Elkins
Chairman
Muckleshoot Indian Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

SUBJECT: **Sound Transit**
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Elkins:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:18:59 -07'00'

Susan Fletcher
Regional Administrator

cc: Laura Murphy, Cultural Resources, Muckleshoot Indian Tribe
Madrienne White, Public and Government Relations Manager, Muckleshoot Indian Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report,* dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Willie Frank III
Chairman
Nisqually Indian Tribe
4820 She-Nah-Num Drive SE
Olympia, Washington 98513

SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Frank III:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY
FLETCHER
Digitally signed by
SUSAN KAY FLETCHER
Date: 2023.10.27
15:19:46 -07'00'

Susan Fletcher
Regional Administrator

cc: Brad Beach, Tribal Historic Preservation Officer, Nisqually Indian Tribe
Annette Bullchild, Director, Nisqually Indian Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report,* dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department
of Transportation
Federal Transit
Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Bill Sterud
Chairman
Puyallup Tribe of the Puyallup Reservation
3009 Portland Avenue
Tacoma, Washington 98404

SUBJECT: **Sound Transit**
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Sterud:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:13:04 -07'00'

Susan Fletcher
Regional Administrator

cc: Brandon Reynon, Cultural Resources, Puyallup Tribe of the Puyallup Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report*, dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon, Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Robert de los Angeles
Chairman
Snoqualmie Indian Tribe
PO Box 969
Snoqualmie, Washington 98065

**SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination**

Dear Chairman de los Angeles:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:14:56 -07'00'

Susan Fletcher
Regional Administrator

cc: Steven Moses, Cultural Resources, Snoqualmie Indian Tribe
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report,* dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department
of Transportation
Federal Transit
Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Kristopher Peters
Chairman
Squaxin Island Tribe of the Squaxin Island Reservation
10 SE Squaxin Lane
Shelton, Washington 98584

SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Peters:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:15:47 -07'00'

Susan Fletcher
Regional Administrator

cc: Shaun Dinubilo, Archaeologist, Squaxin Island Tribe of the Squaxin Island Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report*, dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon, Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Leonard Forsman
Chairman
Suquamish Indian Tribe of the Port Madison Reservation
PO Box 498
Suquamish, Washington 98392

SUBJECT: **Sound Transit**
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Forsman:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:16:37 -07'00'

Susan Fletcher
Regional Administrator

cc: Stephanie Trudel, Archaeologist, Suquamish Indian Tribe of the Port Madison Reservation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report*, dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.
[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

The Honorable Gerald Lewis
Chairman
Confederated Tribes and Bands of the Yakama Nation
401 Fort Road
Toppenish, Washington 98948

SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Chairman Lewis:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. This letter requests your feedback on the proposed Eligibility and Effects Determinations for the Project.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. On July 20, 2023, FTA initiated consultation with your tribe and defined the area of potential effects (APE) for the Project. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed.
In summary, there are three archaeological resources within the APE – each of these has been previously determined by the SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the

APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence with SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project*.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have on these determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:17:24 -07'00'

Susan Fletcher
Regional Administrator

cc: Casey Barney, Interim Program Manager, Confederated Tribes and Bands of the Yakama Nation
Jessica Lally, Cultural Resources Program Archaeologist, Confederated Tribes and Bands of the Yakama Nation
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report*, dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.
[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

Sunshine Clark Schmidt
Federal Preservation Officer and Cultural Resources Program Director
Bonneville Power Administration
PO Box 3621
Portland, OR 97208

SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination

Dear Ms. Schmidt:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is preparing an Environmental Impact Statement (EIS) for the Operations and Maintenance Facility (OMF) South Project (Project). Sound Transit intends to apply for federal funds administered by FTA for the Project, making it an undertaking subject to the provisions of Section 106 of the National Historic Preservation Act (Section 106), and its implementing regulations at 36 CFR Part 800. This letter identifies BPA as a Section 106 consulting party and requests your feedback on the area of potential effects (APE) and eligibility and effects determinations for the Project. This letter also notifies BPA of FTA's intent to make a *de minimis* impact determination under Section 4(f) of the U.S. Department of Transportation Act, as described in detail below.

Consulting Party

FTA has determined that BPA meets the criteria outlined in 36 CFR Part 800 to be defined as a consulting party with "interest in the effects of the undertaking on historic properties" because portions of transmission lines owned and operated by BPA are located within the APE. As a consulting party, you are receiving information about historic properties within the APE, including potential effects to properties in which you may have an interest.

Cultural Resources Evaluation

In 2020, prior to federalizing the project, Sound Transit consulted with the Washington State Historic Preservation Officer (SHPO) on the project, area of impact, built environment resources, and archaeological resources. Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties. The FTA-defined APE (enclosed) is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with the SHPO on in 2020.

In summary, there are three archaeological resources within the APE – each of these has been previously determined by SHPO to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence from SHPO to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by BPA and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, SHPO concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project* (DAHP Log No. 2020-12-07557).

Section 4(f) Coordination

In the case of historic properties subject to Section 4(f), pursuant to the implementing regulations at 23 CFR Part 774, the SHPO is an official with jurisdiction. Accordingly, FTA is contacting SHPO separately to coordinate on the Project's use of BPA's double circuit transmission lines, a historic resource protected by Section 4(f). FTA is considering making a determination that the Project's use of BPA's double circuit transmission lines meets the Section 4(f) *de minimis* Impact provision.

Under 23 CFR § 774.5(b), prior to making a *de minimis* impact determination, FTA must obtain SHPO's concurrence in a finding of "no adverse effect" under 36 CFR Part 800. Accordingly, FTA is requesting SHPO concurrence with the Section 106 no adverse effect determination so FTA can make a d*e minimis* impact determination under Section 4(f) for the use of BPA's double circuit transmission lines.

This letter notifies BPA of FTA's intent to use SHPO's written concurrence with the Section 106 no adverse effect determination for BPA's double circuit transmission lines to reach a Section 4(f) *de minimis* use determination.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.
- The Project's use of BPA's double circuit transmission lines meets the Section 4(f) *de minimis* Impact provision.

Request for Comments

Pursuant to 36 CFR Part 800, FTA respectfully requests any comments you may have with the Section 106 determinations within 30 days of receipt of this letter. If you have any questions, please contact Justin Zweifel at justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:18:08 -07'00'

Susan Fletcher
Regional Administrator

cc: Chris Furey, Bonneville Power Administration
Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: Area of Potential Effects
OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project.

U.S. Department of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3192
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

October 27, 2023

Allyson Brooks, Ph.D.
State Historic Preservation Officer
Washington Department of Archaeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504

SUBJECT: Sound Transit
Operations and Maintenance Facility South Project
National Historic Preservation Act, Section 106
Eligibility and Effects Determination
Project Tracking Code: 2020-02-01045

Dear Dr. Brooks:

The Federal Transit Administration (FTA), in cooperation with Sound Transit, is continuing consultation under Section 106 of the National Historic Preservation Act (Section 106) and its implementing regulations at 36 CFR Part 800 for the Sound Transit Operations and Maintenance Facility (OMF) South Project (the Project). FTA is also coordinating with SHPO under Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)). The Project would provide a facility in the South Corridor of Sound Transit 3, Sound Transit's regional system plan, to receive, test, commission, store, maintain, and deploy vehicles for the system-wide light rail expansion. **This letter requests your concurrence with the proposed Eligibility and Effects Determinations for the Project.**

On July 20, 2023, in consultation with your office, the FTA defined the area of potential effects (APE) for the Project. In correspondence dated July 24, 2023, your office agreed with the defined APE and requested survey methodology and review of FTA's consultation with concerned Tribes and other interested/affected parties. To support the evaluation of the Project, Sound Transit's consultant, Historical Research Associates Inc. (HRA) prepared *OMF South Appendix G4: Historic and Archaeological Resources Technical Report, dated September 2023* (Cultural Resources Report). The Cultural Resources Report is enclosed for your review.

Survey Methodology and Consultation Record

We appreciate your interest in the Project survey methodology. The Cultural Resources Report includes the archaeological and built environment survey methods in Section 5, pages G4-43 through G4-46. Additionally, we have enclosed responses received from affected Tribes. Your office was carbon copied, via email, on all initial correspondence with Tribes, which included the Confederated Tribes and Bands of the Yakama Nation, Muckleshoot Indian Tribe, Nisqually Indian Tribe, Puyallup Tribe of Indians, Snoqualmie Indian Tribe, Squaxin Island Tribe of the Squaxin Island Reservation, and the Suquamish Indian Tribe of the Port Madison Reservation. We received responses from the Nisqually Indian Tribe, Squaxin Island Tribe of the Squaxin Island Reservation, and the Suquamish Indian Tribe of the Port Madison Reservation.

Cultural Resources Evaluation

As noted in our July 20, 2023 consultation, prior to federalizing the Project, Sound Transit consulted with your office on the Project, built environment resources, and archaeological resources. The FTA-defined APE is consistent with the area of impacts analyzed by Sound Transit during their initial Washington State Environmental Policy Act environmental review, and includes the same archaeological sites, buildings, structures, and objects that Sound Transit consulted with your office on in 2020 (DAHP Log # 2020-02-01045). Through that analysis and consultation, on January 20, 2021, it was determined no buildings, structures, or objects were eligible for listing in the National Register of Historic Places (NRHP) and that the Project would result in no adverse effects to historic properties.

In summary, there are three archaeological resources within the APE – each of these has been previously determined by your office to be not eligible for listing in the NRHP. There are 60 buildings, structures, and objects that meet the minimum age criteria for listing in the National Register of Historic Places within the APE[1]. Sound Transit's consultant, HRA, surveyed 58 of these resources and in correspondence from your office to Sound Transit, dated January 20, 2021, these resources were determined not eligible for listing in the NRHP[2].

The remaining two historic-era structures consist of double circuit transmission lines: Tacoma-Covington No. 2, 3, 4 and Tacoma-Raver No. 1. These structures are owned and operated by Bonneville Power Administration (BPA) and cross the APE. To accommodate elevated track associated with the Project's Preferred and South 344th Street alternatives, BPA would need to relocate and rebuild the following structures: structures 6/5 and 6/6 on the Tacoma-Raver No. 1 and the Tacoma-Covington No 2. Transmission Line, and structures 6/5 and 6/6 on the Tacoma-Covington No. 3 and No. 4 Transmission Line. On August 9, 2021, BPA determined that these structures are eligible for listing in the NRHP under Criterion A but that the modifications discussed above result in no adverse effect to historic properties. On August 19, 2021, your office concurred with this determination of no adverse effect to historic properties. This correspondence is enclosed for your records, titled *Cultural Resources Letter Report for the Sound Transit Line Raises Project* (DAHP Log No. 2020-12-07557).

Section 4(f) Coordination

In the case of historic properties subject to Section 4(f), pursuant to the implementing regulations at 23 CFR Part 774, the SHPO is an official with jurisdiction. Accordingly, FTA is also contacting SHPO to coordinate on the Project's use of BPA's double circuit transmission lines, a historic resource protected by Section 4(f). FTA is considering making a determination that the Project's use of BPA's double circuit transmission lines meets the Section 4(f) *de minimis* Impact provision.

Under 23 CFR § 774.5(b), prior to making a *de minimis* impact determination, FTA must obtain SHPO's concurrence in a finding of "no adverse effect" under 36 CFR Part 800. Accordingly, FTA requests SHPO concurrence with the Section 106 no adverse effect determination so FTA can make a d*e minimis* impact determination under Section 4(f) for the use of BPA's double circuit transmission lines.

---

[1] Minimum age for NRHP eligibility is defined in this consultation as 50 years from the anticipated start of construction, 2025. These resources are included in Table G4.6-1 of the enclosed Cultural Resources Report.

[2] *Sound Transit SEPA Eligibility and Effects Consultation Materials* is enclosed for your records.

This letter serves as the required notification of FTA's intent to use SHPO's written concurrence with the Section 106 no adverse effect determination for BPA's double circuit transmission lines to reach a Section 4(f) *de minimis* use determination.

Determinations

Based on the aforementioned documentation, FTA has made the following determinations:

- There are two resources – BPA's historic-era double circuit transmission lines – that are listed on, or eligible for the NRHP within the APE.
- The Project would have **no adverse effect** on resources listed on, or eligible for, the NRHP.
- The Project's use of BPA's double circuit transmission lines meets the Section 4(f) *de minimis* Impact provision.

Request for Concurrence

Pursuant to 36 CFR Part 800, FTA requests your concurrence with the Section 106 determinations within 30 days of receipt of this letter.

If FTA can provide assistance or additional information which would aid in your prompt reply, please contact Justin Zweifel at FTA (206) 220-7538 or justin.zweifel@dot.gov.

Sincerely,

SUSAN KAY FLETCHER
Digitally signed by SUSAN KAY FLETCHER
Date: 2023.10.27 15:14:08 -07'00'

Susan Fletcher
Regional Administrator

cc: Dennis Wardlaw, Transportation Archaeologist, Washington Department of Archaeology and Historic Preservation
Maureen Elenga, Architectural Historian – Transportation Project Reviewer, Washington Department of Archaeology and Historic Preservation
Alex Stevenson, Cultural Resources Manager, Sound Transit
Erin Green, Environmental Manager – South Corridor, Sound Transit

Enclosures: *OMF South Appendix G4: Historic and Archaeological Resources Technical Report,* dated September 2023.
Tribal Consultation - responses on APE definition.
Sound Transit SEPA Eligibility and Effects Consultation Materials.
Cultural Resources Letter Report for the Sound Transit Line Raises Project (DAHP Log No. 2020-12-07557).

dahp
protect the past, shape the future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

October 31, 2023

Ms. Susan Kay Fletcher
Regional Administrator
Federal Transit Administration
915 Second Avenue
Suite 3142
Seattle, WA. 98174-1002

In future correspondence please refer to:
Project Tracking Code: 2020-02-01045
Property: Sound Transit Operations and Maintenance Facility South (OMFS)
Re: No Adverse Effect

Dear Ms. Fletcher:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced proposal. This action has been reviewed on behalf of the State Historic Preservation Officer (SHPO) under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. Our review is based upon documentation contained in your communication.

We concur that the project as proposed will have no adverse effect on resources listed in, or eligible for listing in, the National Register of Historic Places. As a result of our concurrence, further contact with DAHP on this proposal is not necessary. We also acknowledge your Section 4(f) *de minimis* determination.

If new information about affected resources becomes available and/or the project scope of work changes significantly, please resume consultation as our assessment may be revised. Also, if any archaeological resources are uncovered during construction, please halt work immediately in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov

From:	Stephanie Trudel
To:	Zweifel, Justin (FTA); Leonard Forsman
Cc:	Wardlaw, Dennis (DAHP); Elenga, Maureen (DAHP); Stevenson, Alex; Green, Erin
Subject:	RE: [EXTERNAL] Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Eligibility and Effects Consultation
Date:	Monday, November 6, 2023 10:06:44 AM

You don't often get email from strudel@suquamish.nsn.us. Learn why this is important

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Dear Justin,

Thank you for consulting with the Suquamish Tribe. I reviewed the information provided regarding FTA’s Eligibility and Effects Determination for the Operations and Maintenance Facility South Project and concur with the determination that the project will have no adverse effect on the two resources listed in, or eligible for listing in, the National Register of Historic Places.

Sincerely,
Stephanie

Stephanie Trudel
Tribal Historic Preservation Officer
Suquamish Tribe
PO Box 498
Suquamish, WA 98392-0498
360-394-8533
strudel@suquamish.nsn.us

From: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>
Sent: Monday, October 30, 2023 3:06 PM
To: Leonard Forsman <lforsman@suquamish.nsn.us>
Cc: Stephanie Trudel <strudel@Suquamish.nsn.us>; Wardlaw, Dennis (DAHP) <dennis.wardlaw@dahp.wa.gov>; Elenga, Maureen (DAHP) <maureen.elenga@dahp.wa.gov>; Stevenson, Alex <alex.stevenson@soundtransit.org>; Green, Erin <erin.green@soundtransit.org>
Subject: [EXTERNAL] Sound Transit Operations and Maintenance Facility South Project - NHPA Section 106 Eligibility and Effects Consultation

Dear Chairman Forsman:

Please see the attached Section 106 Eligibility and Effects Consultation letter for the Sound Transit Operations and Maintenance Facility South Project.

I will send you, separately, a secure link to download the cultural resources report (Enclosure 1) because it is too large to email. Please let me know if you have any issues or questions.

Thank you,

Justin Zweifel (he/him)
Acting Director, Office of Planning and Program Development
USDOT | Federal Transit Administration | Region 10 (Seattle)
justin.zweifel@dot.gov | www.transit.dot.gov

Operations and Maintenance Facility: South

ATTACHMENT G4-7

Inadvertent Discovery Plan

Federal Transit Administration

SOUNDTRANSIT

Operations and Maintenance Facility South

Inadvertent Discovery Plan

May, 2023

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies. Grantees should refer to applicable regulations and statutes referenced in this document

Table of Contents

1 Introduction....1
  1.1 Project Description....1
  1.2 Regulatory Environment....2
2 Archaeological Resources....3
  2.1 On-Site Staff Responsibilities....4
  2.2 Project Manager Responsibilities....4
3 Human Remains....6
  3.1 On-Site Staff Responsibilities....6
  3.2 Project Manager Responsibilities....7
4 Construction Team Training, Communication, and Reporting....8
  4.1 Preconstruction Meeting....8
  4.2 Crew Member Orientation....9
  4.3 Ongoing Communication....9
  4.4 Reporting of Inadvertent Discoveries....9
5 Archaeological Resources and Collection Curation....10
6 Contact Information....11

Figures

Figure 1: Standard Inadvertent Discovery Process for Archaeological Resources on FTA Region 10 Projects....3
Figure 2: Process for Discovery of Possible Human Remains for FTA Region 10 Projects in Washington....6

Appendices

Appendix A: On-Site Inadvertent Discovery Guide
Appendix B: Sound Transit Forms

Inadvertent Discovery Plan

Operation and Maintenance Facility South

1 Introduction

This Inadvertent Discovery Plan (IDP) has been developed by Sound Transit (ST) for use during ground-disturbing activities for the Operation and Maintenance Facility (OMF) South. This IDP describes the protocols to be followed by personnel working on the OMF South project if archaeological resources are discovered during ground-disturbing activities.

1.1 Project Description

Sound Transit proposes to construct and operate an operations and maintenance facility in its South Corridor (OMF South) to meet agency needs for an expanded fleet of light rail vehicles (LRVs). The need to expand LRV maintenance capacity was identified in Sound Transit 3: The Regional Transit System Plan for Central Puget Sound (Sound Transit 3). OMF South would be used to store, maintain, and deploy a minimum of 160 LRVs for daily service. It would provide facilities for vehicle storage, inspections, maintenance and repair, interior vehicle cleaning, and exterior vehicle washing. Additionally, the facility would receive, test, and commission new LRVs for the entire light rail system.

OMF South would also be used to accommodate administrative and operational functions, such as serving as a report base for LRV operators. Included is a Maintenance of Way (MOW) building for maintenance and storage of spare parts for tracks, vehicle propulsion equipment, train signals, and other infrastructure, in addition to storage facilities for the entire Link system. Other facility elements would include employee and visitor parking, operations staff offices, maintenance staff offices, dispatcher work stations, an employee report room, and areas with lockers, showers, and restrooms for both operators and maintenance personnel.

1.2 Regulatory Environment

OMF South must comply with multiple federal, state, and local environmental laws, regulations, and policies for environmental review. A brief discussion of these and their consideration of cultural resources is presented below.

FTA is the lead agency under the National Environmental Policy Act (NEPA). Under NEPA, cultural resources encompass a wide range of resources including, but not limited to, sacred sites, archaeological and built environment resources not eligible for the NRHP, archaeological and built environment resources eligible for the NRHP, and archaeological collections.

As federal funding is anticipated and the project is defined as a federal undertaking, it is subject to compliance with Section 106 of the NHPA, as amended, and its implementing regulations described in 36 Code of Federal Regulations (CFR) Part 800. Section 106 requires that federal agencies account for the effects of their undertakings on historic properties. A historic property is typically aged 50 years or older and is defined in 36 CFR Part 800.16(l)(1) as follows:

> … any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Regulations at 36 CFR Part 800 require the federal agency involved in the undertaking to identify the APE, conduct an inventory of historic properties that may be located within the APE, determine whether any of the historic properties identified are eligible for listing in the National Register of Historic Places (NRHP), and determine whether NRHP-eligible properties will be affected by the undertaking. An APE is defined in 36 CFR 800.16(d) as follows:

> … the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking …

In addition to Section 106, Section 4(f) of the U.S. Department of Transportation Act of 1966 is triggered by funding or approval from a federal agency for a project that proposes “use” of historic property. A determination of adverse effect under Section 106 generally constitutes a use under Section 4(f).

The project must also comply with Washington State Environmental Policy Act (SEPA). Sound Transit is the lead agency for SEPA compliance. The project is subject to other Washington state laws that address the protection of archaeological sites and Native American burials. For example, the Archaeological Sites and Resources Protection Act (Revised Code of Washington [RCW] 27.53), prohibits disturbance of known precontact and historic archaeological sites on public or private lands. The Indian Graves and Records Act (RCW 27.44) prohibits disturbance of Native American graves and provides that inadvertent disturbance through construction or other activity requires reinternment under supervision of the appropriate tribes.

Certified Local Governments (CLGs) are considered the experts on whether resources meet the criteria for local listing in city or county registers of historic places. Consulting parties, including SHPO, provide expert opinions on whether a proposed project has the potential to adversely impact cultural resources.

2 Archaeological Resources

On-site staff will follow the procedures described below and illustrated in the flowchart on Figure 1 - Standard Inadvertent Discovery Process for Archaeological Resources on FTA Region 10 Projects. The contact phone tree and examples of archaeological resources are provided in Appendix A - On-Site Inadvertent Discovery Guide.

An archaeological resource could be prehistoric or historic. When in doubt, assume the material is an archaeological resource.

Examples of prehistoric archaeological materials include:

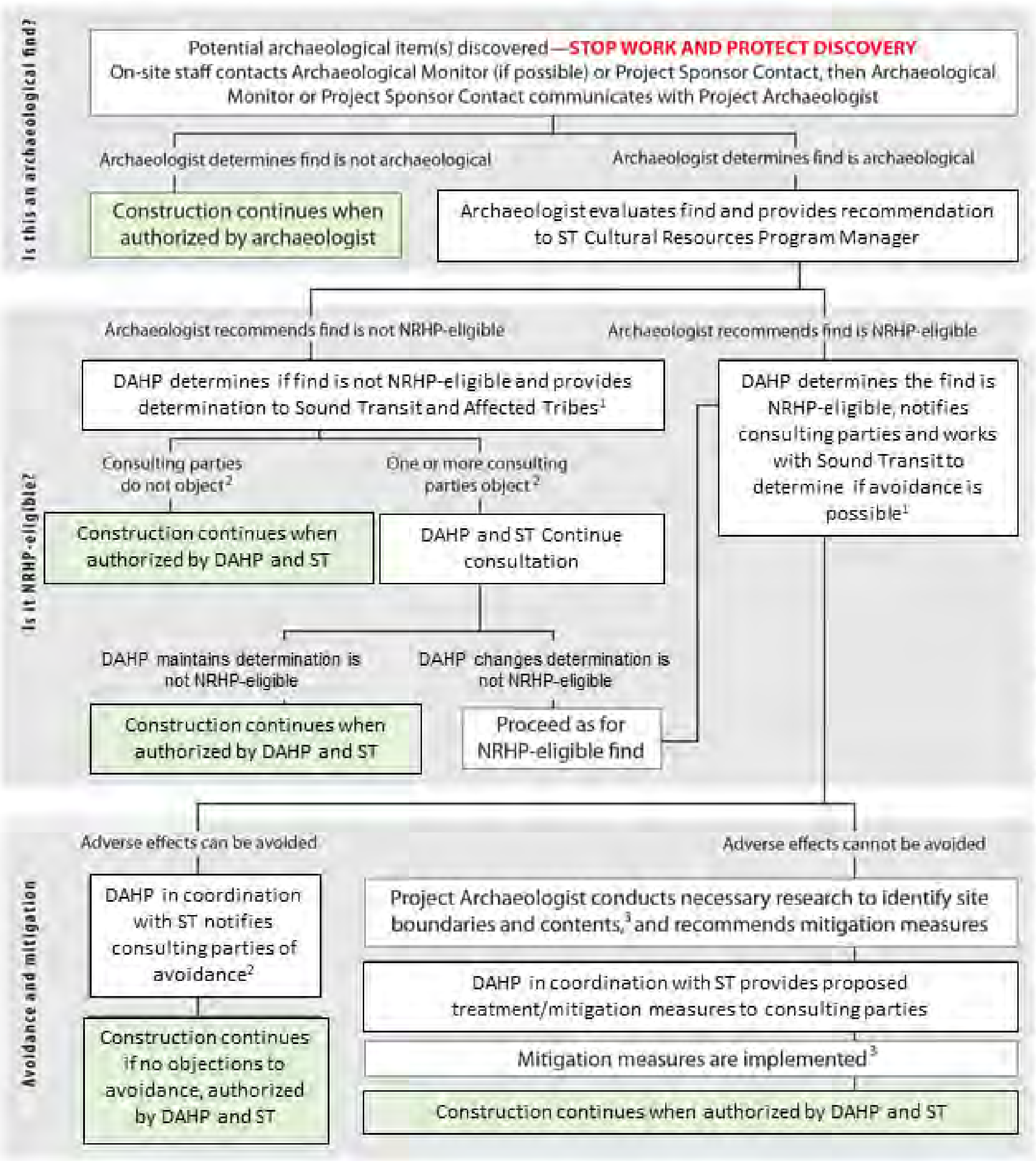
- An accumulation of shell, burnt rocks, or other food-related materials
- Bones or small pieces of bone
- An area of charcoal or very dark stained soil with artifacts
- Stone tools or waste flakes (i.e., an arrowhead or stone chips)
- Basketry, cordage, or rope
- Wooden posts or stakes

Examples of potentially historic archaeological materials include:

- Domestic ceramics (such as tableware, crockery, etc.) and industrial ceramics (such as insulators, tile, etc.)
- Glass, including bottles, tableware, window glass, wire glass, or multiple glass fragments
- Metal items, including equipment, vehicle parts, agricultural items, enameled ironware, etc.
- Bakelite, celluloid, glass, and shell buttons
- Punch-opened and solder-sealed beverage cans, solder-sealed food tins, general lack of thin-walled aluminum and welded steel cans
- Residential structural remains, such as historic building foundations or privies

NOTE: Items made of plastic, polystyrene, nylon, or Styrofoam, or those with modern markings (e.g., candy wrappers, or bottles and cans recognizable as modern) are not archaeological resources and do not constitute an inadvertent discovery.

Figure 1: Standard Inadvertent Discovery Process for Archaeological Resources on FTA Region 10 Projects


Is this an archaeological find?
Potential archaeological item(s) discovered—STOP WORK AND PROTECT DISCOVERY
On-site staff contacts Archaeological Monitor (if possible) or Project Sponsor Contact, then Archaeological Monitor or Project Sponsor Contact communicates with Project Archaeologist
Archaeologist determines find is not archaeological
Archaeologist determines find is archaeological
Construction continues when authorized by archaeologist
Archaeologist evaluates find and provides recommendation to ST Cultural Resources Program Manager
Is it NRHP-eligible?
Archaeologist recommends find is not NRHP-eligible
Archaeologist recommends find is NRHP-eligible
DAHP determines if find is not NRHP-eligible and provides determination to Sound Transit and Affected Tribes1
DAHP determines the find is NRHP-eligible, notifies consulting parties and works with Sound Transit to determine if avoidance is possible1
Consulting parties do not object2
One or more consulting parties object2
Construction continues when authorized by DAHP and ST
DAHP and ST Continue consultation
DAHP maintains determination is not NRHP-eligible
DAHP changes determination is not NRHP-eligible
Construction continues when authorized by DAHP and ST
Proceed as for NRHP-eligible find
Avoidance and mitigation
Adverse effects can be avoided
Adverse effects cannot be avoided
DAHP in coordination with ST notifies consulting parties of avoidance2
Project Archaeologist conducts necessary research to identify site boundaries and contents,3 and recommends mitigation measures
DAHP in coordination with ST provides proposed treatment/mitigation measures to consulting parties
Construction continues if no objections to avoidance, authorized by DAHP and ST
Mitigation measures are implemented3
Construction continues when authorized by DAHP and ST

1 Consulting parties must be notified within 48 hours of an archaeological discovery
2 Consulting parties have 48 hours to respond to agency determinations regarding discoveries
3 Under Washington State Law, an excavation permit may be required prior to completion of this step

2.1 On-Site Staff Responsibilities

The following section describes the steps to follow if an on-site Sound Transit employee, contractor, or subcontractor believes that they have uncovered a potential archaeological resource (a find) at any point in the project.

IDP Terminology

A **find** is a discovery during construction that could potentially be an archaeological resource.

An **archaeological resource** is an artifact or feature (or group of artifacts or features) older than 50 years.

An **NRHP-eligible archaeological resource** is one that has been evaluated and meets the criteria for listing in the National Register of Historic Places. (NRHP).

1. **Stop Work:** All work on site and in areas adjacent to the find will stop. The area of work stoppage will be adequate to protect the find from any further disturbance; this is expected to be 30 feet in any direction, unless site conditions indicate otherwise. The location of the find will be secured at all times. The find will not be handled, removed, reburied, or covered. The Contractor will install a physical barrier (e.g., exclusionary fencing) and prevent all machinery, other vehicles, and unauthorized individuals from crossing the barrier until the Project Archaeologist examines and verifies the find. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery area. Spoils piles or vehicles (such as dump trucks) with the potential to contain archaeological resources will remain on site. Work at the location of the find will not resume until authorized by DAHP in coordination with ST.

2. **Notify the Archaeological Monitor:** If there is an archaeological monitor on site, notify that person. The monitor will contact Alex Stevenson, Cultural Resources Program Manager, Sound Transit, unless there is a monitoring plan in place that directs the monitor to do otherwise. If Alex Stevenson is not available, the monitor will contact Hussein Rehmat, Environmental Planner, Sound Transit.

3. **Notify Project Management:** If there is no archaeological monitor on site, contact Alex Stevenson. If they are not available, contact Hussein Rehmat. The Sound Transit representative will make all other contacts.

4. **Avoid Any Other Communication:** Do not call 911, the media, or members of the public about the find.

2.2 Project Manager Responsibilities

1. **Contact the Project Archaeologist:** Alex Stevenson of Sound Transit or designee will contact the Project Archaeologist, Ron Adams (or, if there is not one, designate a qualified archaeologist), to evaluate whether the find is an archaeological resource as defined by state or federal law. If the Project Archaeologist recommends that the find is not an archaeological resource, the Project Archaeologist can authorize work to continue.

2. **Determine Area Adequate for Protection:** If the Project Archaeologist recommends that the find is an archaeological resource, the Project Archaeologist will determine the area and the means adequate for protection and instruct the Contractor to maintain or adjust the protected area accordingly.

3. **Notify Consulting Parties:** The Project Archaeologist will notify DAHP in coordination with ST of the discovery of an archaeological resource. DAHP in coordination with ST shall notify consulting parties (SHPO, tribes, and any other identified interested parties) of the find within 48 hours, per 36 CFR Part 800.13.

4. **Research to evaluate NRHP-Eligibility:** The Project Archaeologist will conduct any additional research necessary to evaluate National Register of Historic Places (NRHP) eligibility of the archaeological resource. Based on this research, the Project Archaeologist will recommend to ST and DAHP whether the archaeological resource is NRHP-eligible. This additional research may include preparation of an archaeological excavation permit which will be prepared by ST and reviewed by DAHP in consultation with consulting parties. DAHP will authorize this permit and allow research to continue as appropriate.

5. **Formally Determine NRHP-Eligibility and Continue Consultation:** DAHP in coordination with ST shall determine whether the archaeological resource is NRHP-eligible and shall provide the determination to consulting parties. Consulting parties shall respond within 48 hours, per 36 CFR Part 800.13.

   If DAHP in coordination with ST determines that the archaeological resource is not NRHP-eligible and consulting parties do not object within 48 hours, construction may continue when authorized by DAHP in coordination with ST. If any consulting party objects, DAHP in coordination with ST shall continue consultation with all consulting parties in good faith to resolve the lack of agreement.

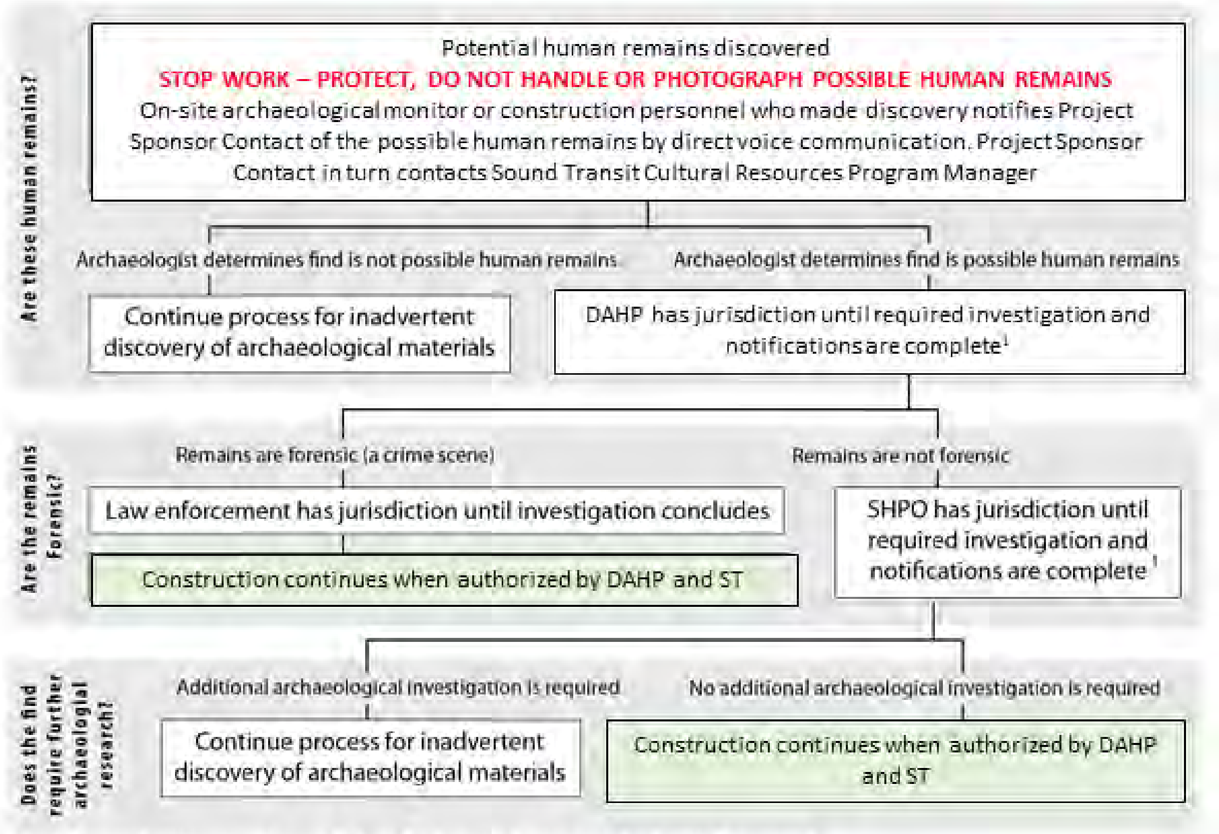
6. **Avoid or Mitigate Adverse Effects:** If DAHP in coordination with ST determines that the archaeological resource is NRHP-eligible, DAHP will work with ST to determine whether adverse effects can be avoided. If adverse effects can be avoided, DAHP in coordination with ST shall provide documentation of avoidance and a determination of No Adverse Effect to consulting parties. If consulting parties do not object within 48 hours, construction may continue when authorized by DAHP in coordination with ST. If any consulting party objects, DAHP in coordination with ST shall continue consultation with all consulting parties in good faith to resolve the lack of agreement.

   If DAHP in coordination with ST determines that adverse effects cannot be avoided, DAHP will work with ST and consulting parties to implement mitigation measures outlined in an excavation permit. This permit may be the same as the initial excavation permit from Step 5 or preparation of an additional excavation permit may be required.

3 Human Remains

Uncovered human remains on project construction site require special treatment under RCW 68.50.645. Any potential remains that are encountered during project work should be assumed to be human until determined otherwise by the Project Archaeologist or the applicable County Medical Examiner. Procedures for the discovery of possible human remains are shown in Figure 2 and described below.

Figure 2: Process for Discovery of Possible Human Remains


Are these human remains?
Potential human remains discovered
STOP WORK – PROTECT, DO NOT HANDLE OR PHOTOGRAPH POSSIBLE HUMAN REMAINS
On-site archaeological monitor or construction personnel who made discovery notifies Project Sponsor Contact of the possible human remains by direct voice communication. Project Sponsor Contact in turn contacts Sound Transit Cultural Resources Program Manager
Archaeologist determines find is not possible human remains
Archaeologist determines find is possible human remains
Continue process for inadvertent discovery of archaeological materials
DAHP has jurisdiction until required investigation and notifications are complete1
Are the remains Forensic?
Remains are forensic (a crime scene)
Remains are not forensic
Law enforcement has jurisdiction until investigation concludes
Construction continues when authorized by DAHP and ST
SHPO has jurisdiction until required investigation and notifications are complete1
Does the find require further archaeologial research?
Additional archaeological investigation is required
No additional archaeological investigation is required
Continue process for inadvertent discovery of archaeological materials
Construction continues when authorized by DAHP and ST

1 Notification requirements depend, in part, on whether the remains are Native American.

3.1 On-Site Staff Responsibilities

On-site staff will follow the procedures described below. The contact phone tree is shown in Appendix A - On-Site Inadvertent Discovery Guide.

1. **Stop Work:** If any Sound Transit employee, contractor, or subcontractor believes that he or she has uncovered possible human remains at any point in the project, all work on site and in areas adjacent to the discovery will stop. The area of work stoppage will be adequate to

protect the discovery, which is expected to be a minimum of 30 feet in all directions, unless the Project Archaeologist or law enforcement personnel indicate otherwise.

2. **Do Not Handle Human Remains:** Possible human remains shall not be handled, removed, reburied, or covered.
3. **Flag and Secure the Area:** The area of discovery will be flagged and secured. The location of the discovery will be secured at all times. Construction equipment and personnel will not enter the area. Spoils piles or vehicles from the area that have the potential to contain human remains, such as dump trucks, will remain on site. No persons other than the proper law enforcement personnel, the applicable County Medical Examiner, and professional archaeologists will be authorized to access the discovery location after the area is secured.
4. **Notify the Archaeological Monitor:** If there is an archaeological monitor on site, notify that person. The monitor will contact Alex Stevenson, Cultural Resources Program Manager, Sound Transit, unless there is a monitoring plan in place that directs the monitor to do otherwise. If Alex Stevenson is not available, the monitor will contact Hussein Rehmat, Environmental Planner, Sound Transit.
5. **Notify Project Management:** If there is no archaeological monitor on site, contact Alex Stevenson. If they are not available, contact Hussein Rehmat. The Sound Transit representative will make all other contacts.
6. **Avoid Any Other Communication:** Do not call 911, the media, or members of the public about the find.

3.2 Project Manager Responsibilities

1. **Preliminary Observation:** The Sound Transit Cultural Resources Program Manager of Sound Transit will notify DAHP (via phone) of the discovery, and will coordinate with the Project Archaeologist to assess whether the discovery may be human remains (without disturbing the discovery further). If the discovery can be definitively identified as nonhuman, procedures for archaeological resources will be followed.
2. **Notify Local Law Enforcement:** If the discovery could possibly be human remains, Sound Transit Cultural Resources Program Manager or the Project Archaeologist shall call the Federal Way Police Department nonemergency number and report that potential human remains have been discovered. The Federal Way Police Department will control the discovery site until it is either determined to be non-forensic (not a crime scene) or the investigation is complete.
3. **Participate in Consultation:** FTA and the Sound Transit Cultural Resources Program Manager will participate in consultation. If there are also archaeological materials at the

human remains discovery location, there may be a parallel archaeological resources process led by DAHP. Construction can resume when authorized by DAHP and ST.

4 Construction Team Training, Communication, and Reporting

4.1 Preconstruction Meeting

A preconstruction meeting will be held for the Project Archaeologist, Construction Management Lead, Resident Engineer, Contractor's project manager, Project Superintendent, and other personnel responsible for overseeing ground-disturbing field operations to:

- Review IDP procedures
- Provide introductions of the Sound Transit representatives, the Project Archaeologist, and other personnel
- Describe the role of the Project Archaeologist
- Establish a chain of command for communication and decision-making among the Project Archaeologist and Sound Transit and Contractor personnel
- Clarify questions about stop-work and notification procedures
- Provide a copy of the On-Site Inadvertent Discovery Guide (Appendix A) to field staff providing oversight of ground-disturbing work.

The preconstruction meeting will occur prior to any ground-disturbing activity. Additional meetings will be scheduled if there is substantial staff turnover, concern about staff understanding the protocols, a long break in construction, or a desire for refresher training on policy. The Project Archaeologist will remain in contact with Sound Transit Cultural Resources Program Manager and Sound Transit throughout the project to determine if site visits, additional meetings, or orientations are needed.

4.2 Construction Crew Member Orientation

The Project Archaeologist may provide on-site cultural resources orientation for all construction crew members leading ground-disturbing construction work. Orientation will inform and familiarize construction personnel with the IDP protocols and their responsibility to call attention to any archaeological materials they observe. The Sound Transit Cultural Resources Program Manager will coordinate with the Project Archaeologist to provide a brief orientation to construction crew members, as appropriate.

4.3 Ongoing Communication

The Sound Transit staff, contractor, and its agents will abide by established communication protocols described in the inadvertent discovery processes in Sections 2 and 3 regarding any archaeological resource matters that arise during construction. The Project Archaeologist will remain in communication with the Sound Transit Cultural Resources Program Manager (or designee), as appropriate, throughout project construction, via email and phone. If any member of the Project team feels communication is inadequate to ensure that the archaeologist is on site when it is prudent, the Project team member can contact DAHP. DAHP will coordinate with Sound Transit on how to improve communication.

4.4 Reporting of Inadvertent Discoveries

The responsibilities of the Project team include assessments of any inadvertent discoveries and a summary of results at the conclusion of construction. Reports regarding assessments of any inadvertent discoveries will be provided by Sound Transit to DAHP for review before submission to consulting parties. For all reporting, sensitive information regarding archaeological resources, human remains, funerary objects, or traditional practices shall not be released except as authorized by DAHP under applicable state.

Assessment of Inadvertent Discoveries

The Project Archaeologist will be responsible for preparing an assessment of all inadvertent discoveries during construction. The assessment will be used by DAHP to determine Section 106 eligibility and effects determinations and inform any additional coordination or investigation that may be necessary. The assessment will be prepared within 24 hours of an inadvertent discovery and can be provided to FTA in a memorandum or email. It will include the following information:

1) A description of the find, in enough detail to characterize its features and age. The description should include at least one photograph of the find.

2) A description and map of where the find occurred, including its context with adjacent features. The location of the find should be identified on a map that also identifies other known historic properties, if relevant.

3) Whether or not the find is an archaeological resource.

4) For archaeological resources, a recommendation of NRHP-eligibility that includes a statement of the age of the find, evaluation of find against each NRHP criterion, and a description of the integrity of the find.

5 Archaeological Resources and Collection Curation

No artifact shall be removed or taken by any construction crew member, regardless of archaeological significance or the disposition of the artifact. If a NRHP-eligible resource is encountered and the Archaeological Treatment Plan includes excavation or removal of the archaeological materials, the plan will specify collection and curation requirements. If artifacts are removed from the site for analysis and determined ineligible, the Project Archaeologist will dispose of the material.

6 Contact Information

Sound Transit Primary Contact: Alex E. Stevenson Title: Cultural Resources Program Manager Office Phone: 206-553-3655 Cell Phone: 206-419-5315 Email address: alex.stevenson@soundtransit.org Alternate Contact: Hussein Rehmat Title: Environmental Planner Office Phone: 206-689-4828 Cell Phone: 425-591-2472 Email address: hussein.rehmat@soundtransit.org	**Federal Way Police Department** Non-Emergency Number: 253-835-2121
	Puyallup Tribe of Indians Primary Contact: Brandon Reynon Title: Tribal Historic Preservation Officer Office Phone: 253-573-7986 Email address: brandon.reynon@puyalluptribe-nsn.gov
	Nisqually Indian Tribe Primary Contact: Brad Beach Title: Tribal Historic Preservation Officer Office Phone: 360-456-5221, ext. 1277 Cell Phone: 360-528-0680 Email address: beach.brad@nisqually-nsn.gov
Project Archaeologist Ron Adams, Archaeologist, Historical Research Associates, Inc. Office Phone: 206-343-0226, ext. 329 Cell Phone: 503-860-1693 Email address: ron.l.adams73@gmail.com	**Confederated Tribes and Bands of the Yakama Nation** Primary Contact: Kate Valdez Title: Tribal Historic Preservation Officer Office Phone: 509-865-1068 Email address: kate@yakama.com
Washington State Department of Archaeology and Historic Preservation Transportation Archaeologist Name: Dennis Wardlaw Office Phone: 360-485-5014 Email address: dennis.wardlaw@dahp.wa.gov	**Muckleshoot Indian Tribe** Primary Contact: Laura Murphy Title: Archaeologist, Cultural Resources Office Phone: 253-876-3272 Email address: laura.murphy@muckleshoot.nsn.us

Appendix A:
On-Site Inadvertent Discovery Guide

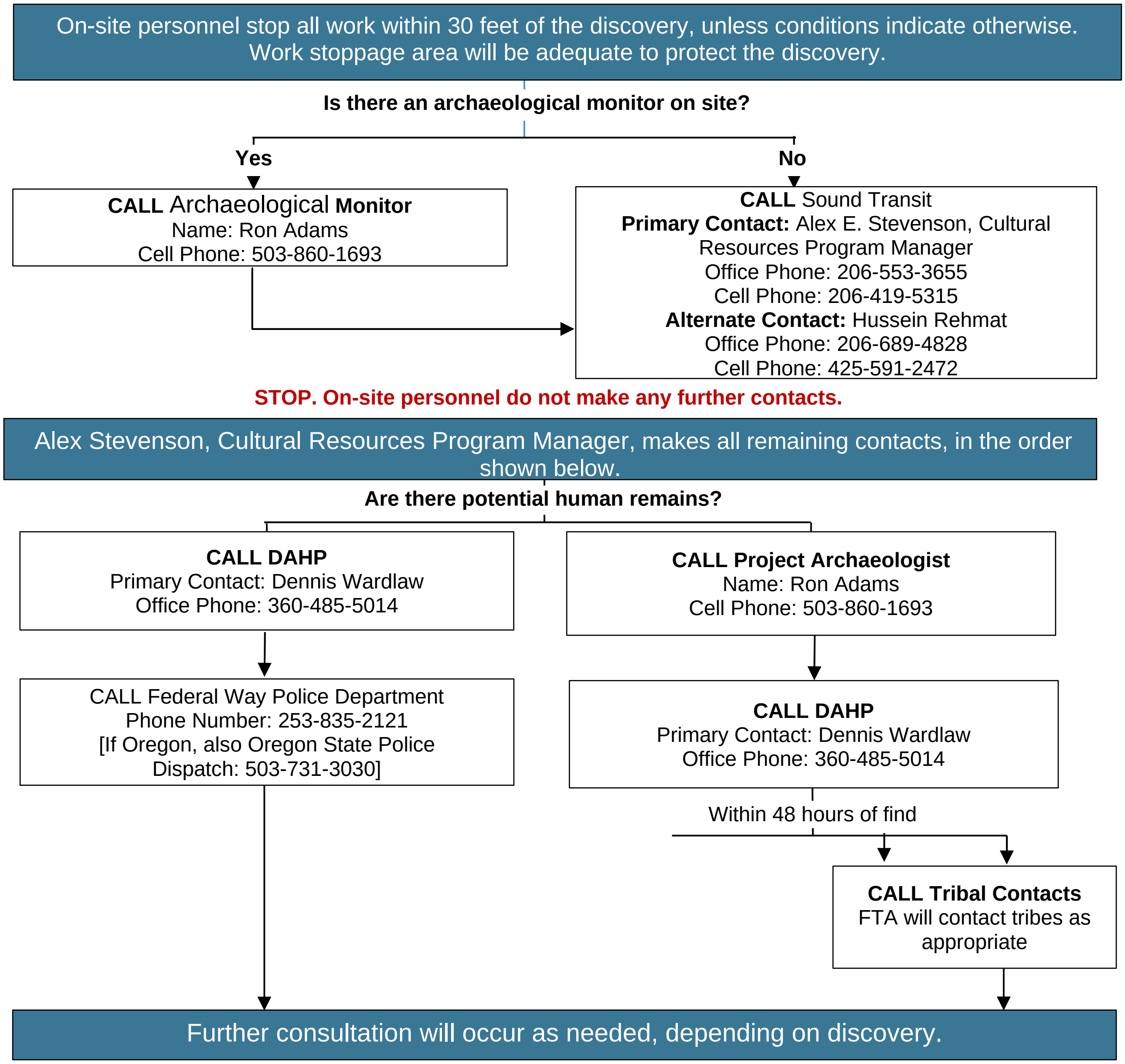
Project Construction Managers are encouraged to make copies of this information and provide it to members of the construction team.

PROJECT NAME

On-Site Inadvertent Discovery Protocols for Archaeological Materials and Human Remains

This information assists on-site personnel in implementing procedures described in the Inadvertent Discovery Plan, in compliance with applicable state and federal laws.

Contact Phone Tree—Potential archaeological resources encountered



On-site personnel stop all work within 30 feet of the discovery, unless conditions indicate otherwise. Work stoppage area will be adequate to protect the discovery.

Is there an archaeological monitor on site?

Yes

CALL Archaeological **Monitor**
Name: Ron Adams
Cell Phone: 503-860-1693

No

CALL Sound Transit
Primary Contact: Alex E. Stevenson, Cultural Resources Program Manager
Office Phone: 206-553-3655
Cell Phone: 206-419-5315
Alternate Contact: Hussein Rehmat
Office Phone: 206-689-4828
Cell Phone: 425-591-2472

STOP. On-site personnel do not make any further contacts.

Alex Stevenson, Cultural Resources Program Manager, makes all remaining contacts, in the order shown below.

Are there potential human remains?

CALL DAHP
Primary Contact: Dennis Wardlaw
Office Phone: 360-485-5014

CALL Federal Way Police Department
Phone Number: 253-835-2121
[If Oregon, also Oregon State Police Dispatch: 503-731-3030]

CALL Project Archaeologist
Name: Ron Adams
Cell Phone: 503-860-1693

CALL DAHP
Primary Contact: Dennis Wardlaw
Office Phone: 360-485-5014

Within 48 hours of find

CALL Tribal Contacts
FTA will contact tribes as appropriate

Further consultation will occur as needed, depending on discovery.

Examples of Archaeological Resources

The Project Archaeologist can change photos to provide examples that are more representative of the project, as needed.

Layers of Shell

Burnt Soil (Hearth)

Burnt Rock Feature (Hearth)

Bone

Basketry

Flaked Stone Tool

Flaked Stone Tool

Stone Tool-Making Debris

Historic Cellar

Historic Utility Feature

Historic Artifact Scatter

Historic Artifacts

Appendix B:
Sound Transit Forms

If the Project Sponsor has agency-specific forms, include them here. For example, Sound Transit uses an Unanticipated Archaeological Discoveries Response Form to standardize information gathered. Delete this box before finalizing this document.

Operations and Maintenance Facility South

Final Environmental Impact Statement

Appendix L: Draft EIS Comments and Responses

Federal Transit Administration

SoundTransit

June 2024

Acronyms and Abbreviations

AADT	Average Annual Daily Trips
ADA	Americans with Disabilities Act
APE	Area of Potential Effects
Belmor	Belmor Mobile Home Park
BMP	best management practice
Board	Sound Transit Board of Directors
BPA	Bonneville Power Administration
Btu	British thermal unit
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalents
Corps	U.S. Army Corps of Engineers
DAHP	Washington State Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibels
Ecology	Washington State Department of Ecology
EA	environmental assessment
EDNA	Environmental Designation for Noise Abatement
EDR	Environmental Data Resources, Inc.
EIS	environmental impact statement
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAZ	Forecast Analysis Zone
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FWLE	Federal Way Link Extension
GHG	greenhouse gas
GIS	geographic information system
HB	House Bill
Hz	hertz
I-5	Interstate 5
in/sec	inches per second

KCRHP	King County Register of Historic Places
kV	kilovolt
Ldn	day-night sound level
LEED	Leadership in Energy and Environmental Design
Leq	equivalent sound level
LID	low-impact development
LiDAR	light detection and ranging
LOS	level of service
LRV	light rail vehicle
Metro	King County Metro Transit
MOW	Maintenance of Way
mph	miles per hour
$MTCO_2e$	metric ton carbon of dioxide equivalents
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OMF	operations and maintenance facility
OMF South	Operations and Maintenance Facility South
PCE	passenger car equivalent
PM	particulate matter
PPCD	Prospective Purchaser Consent Decree
PSE	Puget Sound Energy
PSRC	Puget Sound Regional Council
Puyallup Tribe of Indians	Puyallup Tribe of the Puyallup Reservation
PVC	polyvinyl chloride
RCA	Resource Conservation Area
RCW	Revised Code of Washington
RMS	root mean square
ROD	Record of Decision
SEPA	State Environmental Policy Act
Sound Transit	Central Puget Sound Regional Transit Authority
Sound Transit 3	Sound Transit 3: The Regional Transit System Plan for Central Puget Sound

SOV	single occupant vehicle
SPU	Seattle Public Utilities
SR	State Route
ST3	Sound Transit 3
TCE	temporary construction easements
TDLE	Tacoma Dome Link Extension
TPSS	traction power substations
TWSC	two-way stop controlled
v/c	volume-to-capacity
VdB	vibration decibels
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WHR	Washington Heritage Register
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WSDOT	Washington State Department of Transportation
WSLE	West Seattle Link Extension

1 INTRODUCTION

Sound Transit received 272 communications providing comments on the State Environmental Policy Act (SEPA) Draft Environmental Impact Statement (EIS) published in 2021(herein referred to as the 2021 Draft EIS) and 58 communications on the National Environmental Policy Act (NEPA) Draft/SEPA Supplemental Draft EIS published in 2023 (herein referred to as the 2023 Draft EIS). Copies of the letters are attached along with Sound Transit's responses to specific, substantive comments. Communications are grouped by Tribes, agencies, businesses and community organizations, and individuals.

1.1 Responses to Common Comments

Sound Transit reviewed all comments submitted during both comment periods. Many of the comments expressed similar themes, such as support for a particular alternative or concern about a specific issue. Table L.1-1 below provides responses to the most common comments. These responses are also referenced in the response to comments in Appendices L1 and L2, using the common comment number found in the first column of the table.

Table L.1-1 Responses to Common Comments

Number	Common Comment	Response
1	Sound Transit underestimated the impacts associated with business and employee displacements. The EIS should report an accurate number of employee displacements, or the total number of jobs gained or lost. Specifically, neither Ellenos Yogurt nor GarageTown could be easily relocated, and the impacts to those properties are not characterized adequately. GarageTown comprises multiple owners.	The number of displaced employees is based on the business building size (taken from King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers. While not an actual survey of businesses, it allows an equal comparison among alternatives without having to access confidential or proprietary business information. The Final EIS does not calculate a net job gain or loss because relocation decisions are determined by individual business owners. Some displaced businesses may choose to relocate, while others may choose to permanently close when their property is purchased. As described in Section 3.3, Acquisitions, Displacements, and Relocations, Sound Transit provides relocation assistance to displaced businesses and, on past projects, has successfully helped many businesses that chose to relocate within the project area. To estimate the number of GarageTown owners, Sound Transit used GarageTown's website to count the number of displaced units. The Final EIS acknowledges that both Ellenos Yogurt and GarageTown are unique facilities that would be challenging to relocate. This is described in Section 3.3, Acquisitions, Displacements, and Relocations.
2	There would be too many residential displacements with either of the alternatives in Federal Way. Many of these displacements would affect lower income and/or elderly residents. Relocation of residents of Belmor Mobile Home Park is of particular concern.	The Preferred Alternative would displace up to 97 residences, mostly concentrated in the Belmor residential area. Section 3.3, Acquisitions, Displacements, and Relocations, describes the relocation benefits for displaced residents (both owners and tenants); it also provides specific information about relocation of mobile homes. Displacements from all alternatives would occur in areas with concentrations of minority and low-income populations. Appendix E, Environmental Justice Assessment, discusses how displacements would affect low-income and minority populations and how Sound Transit would provide advisory

Table L.1-1 Responses to Common Comments (continued)

Number	Common Comment	Response
		services to help find comparable housing for these residents. For properties that require relocation, Sound Transit's policies and procedures comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Washington State's relocation and property acquisitions requirements. In some cases, Sound Transit provides advisory services to property owners above the minimum requirements of federal and state law. Sound Transit would compensate affected property owners in accordance with Sound Transit's Real Estate Property Acquisition and Relocation Policy, Procedures, and Guidelines (Sound Transit 2017). Benefits would depend on the level of impact, available relocation options, and other factors. Sound Transit would offer relocation assistance that includes compensation and supporting services that consider the needs of those being relocated in order to help reduce inconveniences or hardships. Sound Transit would also satisfy federal and state requirements for residential relocation, which define a "comparable replacement dwelling" as having the following attributes: • Decent, safe, and sanitary • Adequate in size to accommodate the occupants • Within the financial means of the displaced person • Functionally equivalent • In an area not subject to unreasonable adverse environmental conditions • In a location generally not less desirable than the location of the displaced person's dwelling with respect to public utilities, facilities, services, and the displaced person's place of employment To meet these requirements, Sound Transit may identify relocation properties that are in better condition and of higher value than the properties being acquired. If so, tenants may be eligible for a down payment or rent supplement.
3	Hylebos Creek and associated wetlands are important and need to be protected.	Section 3.10, Ecosystem Resources, of the Final EIS discusses the project's anticipated impacts (and proposed mitigation) to two tributaries to Hylebos Creek and associated wetlands. In addition, the Final EIS recognizes that the project would impact existing vegetation, including mature forested buffer areas. Impacts to the two tributaries to Hylebos Creek and wetlands have been avoided and minimized, where possible, during conceptual design. After publication of the 2021 SEPA Draft EIS, Sound Transit modified the design of the Preferred Alternative to reduce impacts to streams and wetlands. Further avoidance and minimization of wetland impacts would occur during future design and permitting of the project. Native vegetation would be restored in wetlands and buffers temporarily affected by construction. Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. As part of the Section 404 and Section 401 permitting process under the Clean Water Act, Sound Transit would work with Tribes

Table L.1-1 Responses to Common Comments (continued)

Number	Common Comment	Response
		and resource agencies to develop a mitigation approach. As part of this approach, Sound Transit would develop plans for compensatory mitigation for the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis. Potential mitigation areas downstream of the preferred alternative would enhance and restore wetlands and streams that contribute to the overall health of salmonids in the West Fork Hylebos Creek drainage. To the extent possible, off-site compensatory mitigation sites would be identified and would compensate for lost values in kind.
4	Comments limited to expressing a preference or objection to one or more alternatives, including preferences or objections supported by non-substantive comments or analysis already provided in the EIS. In particular, many commenters expressed a preference for the Midway Landfill Alternative, based on the following reasons: • Large, mostly vacant site • Relatively few natural environment impacts • Relatively few business displacements • No residential displacements • Brownfield redevelopment potential Commenters opposed the South 344th Street Alternative because: • Greatest number of business and employee displacements • Impacts to GarageTown and Ellenos Yogurt • Ecosystem impacts • Residential displacements due to the mainline alignment Reasons commenters gave for opposing the Preferred Alternative included: • Ecosystem impacts • Displacement of Christian Faith Center • Residential displacements due to the mainline alignment	Sound Transit reviewed all comments submitted during the 2021 SEPA Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS comment periods. NEPA and SEPA require Sound Transit to respond to substantive comments related to the content of the Draft EIS, but not to questions or comments limited to public policy decisions (e.g., general statements of support or opposition). Before identifying the Preferred Alternative, the Sound Transit Board received a comment summary report that included a copy of all comments submitted on the 2021 SEPA Draft EIS in November 2021. Appendix L of the Final EIS includes copies of the comments and responses to substantive comments made on both the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS. The Midway Landfill Alternative was initially identified for study largely due to attributes that many commenters found appealing. While the Board did not identify the Midway Landfill Alternative as the Preferred Alternative for evaluation in the Final EIS, it is being carried forward as an alternative for consideration. After considering the Draft EIS comments, analysis in the Final EIS, and other factors, the Sound Transit Board will select the project to be built.
5	Sound Transit should identify sources of federal funding for the project. Specifically, there are funds related to Superfund site redevelopment that could lower the costs of developing the Midway Landfill Alternative.	Sound Transit executed a grant agreement with the FTA in December 2023 for $4.9M in 5307 funds for OMF South. Sound Transit will continue pursuing applicable federal funding sources to help fund the project including, but not limited to FTA's Capital Investments Grants programs (e.g., Expedited Project Delivery, Full Funding Grant Agreement), a U.S. DOT Build America Bureau Transportation Infrastructure Finance and Innovation Agreement (TIFIA) loan, and other federal sources such as EPA programs (e.g., Brownfields and Climate Pollution Reduction).

Operations and Maintenance Facility South

Appendix L1:
2021 SEPA Draft EIS Comments and Responses

Federal Transit Administration

SOUNDTRANSIT

Table of Contents

Tribes and Agencies L1-1

- Puyallup Tribe Fisheries Department (Communication ID 473825) L1-2
- Ecology (Communication ID 473719) L1-6
- WSDOT (Communication ID 473686) L1-13
- King County Metro (Communication ID 473803) L1-19
- City of Des Moines (Communication ID 473484) L1-23
- City of Kent (Communications ID 473482) L1-27
- City of Federal Way (Communication ID 472867) L1-43
- Seattle Public Utilities (Communications ID 473810) L1-112
- Washington State Representative, 30th Legislative District, Jesse E. Johnson (Communicaton ID 471610) L1-122

Businesses and Community Groups L1-124

- Christian Faith Center (Communication ID 473746) L1-125
- Pacific Christian Academy (Communication ID 473613) L1-237
- Schindler Family Limited Partnership, Owner of the Ellenos Yogurt Building (Communication ID 473816) L1-239
- Ellenos Yogurt: Con Apostolopoulos, Alex Apostolopoulos, Yvonne Klein, Bob Klein, John Tucker (Communication ID 471974) L1-243
- Brad Thorson – Garage Town (Communication ID 473733) L1-247
- Rod Snyder Red Canoe Credit Union (Communication ID 474301) L1-250
- Brandon Moak, Federal Way Custom Jewelers (Communication ID 474310) L1-252
- Russ Hibbard, Northwest Equipment Sales, and Rentals (Communication ID 474314) L1-254
- Scott Halverson, Race King LLC (Communication ID 473485) L1-256
- Federal Way Chamber of Commerce (Communication ID 479627) L1-258
- Protect Federal Way Brian Nash (Communication ID 473676) L1-260

Public Commenters L1-265

- Public Communication: Public Comments to Sound Transit Against the Garage Town Site, Submitted by 5 Commenters L1-266
- Public Communication: Concerning the OMF South & S 344th St Federal Way, Submitted by 29 Commenters L1-271
- Public Communication: Sound Transit Operations and Maintenance Facility South, Submitted by 23 Commenters L1-273

Public Communication: Opposing Federal Way Operations and Maintenance Facility Site, Submitted by 22 Commenters L1-277
Public Communication: Light Rail Maintenance Yard, Submitted by 6 Commenters..... L1-283
Greg Olson, Donna Olson, owners of 1910 and 1934 S 344th Street (Communication ID 471152) L1-286
Eric Callahan (Communication ID 471147) L1-289
John Thompson (Communication ID 471148)........ L1-291
Scott Candler Communication ID 471149) L1-293
Brian Mendia, Michele Mendia-Gonzalez (Communication ID 471150)........ L1-295
Dale Menchhofer (Communication ID 471151) L1-297
Teresa Wagner (Communication ID 471153)........ L1-299
Cole Wagner (Communication ID 471154)........ L1-301
Tony (Communication ID 471157)........ L1-303
Steven Lander (Communication ID 471164) L1-305
Linda Sims (Communication ID 471304)........ L1-307
Diana Haines (Communications ID 471306) L1-309
Frederick Cardenas (Communications ID 471611) L1-311
Jutta Josionek (Communications ID 471613)........ L1-313
Steve Wilson (Communications ID 471620)........ L1-315
Anonymous (Communications ID 471621)........ L1-317
Jack Sharlock, Julie Sharlock (Communications ID 471626) L1-319
Darren McDonald (Communications ID 471629)........ L1-321
Ken Broyles (Communications ID 471733) L1-323
Rod Smith (Communications ID 471789)........ L1-326
Vicky Price (Communications ID 471791) L1-328
Tamara Vince (Communications ID 471796) L1-330
Lois Kutscha, Norm Kutscha (Communications ID 471844) L1-332
James Hennessey, Kathi Hennessey (Communications ID 471982) L1-334
Edward Miller (Communications ID 471983 and 471984) L1-336
Patricia Pugnetti (Communications ID 472033)........ L1-339
Greg Greenstreet (Communications ID 472034)........ L1-346
Bjorn Hansen (Communication ID 472037)........ L1-348
Darla Magnuson (Communications ID 472223) L1-350
Mary Von Horn (Communications ID 472224)........ L1-352
Anonymous (Communications ID 472286)........ L1-354

Anonymous (Communications ID 472287)....................L1-356
Anonymous (Communications ID 472288)....................L1-358
Anonymous (Communications ID 472289)....................L1-360
Ray Stewart (Communications ID 472290)....................L1-362
Aaron Boyd (Communications ID 472291)....................L1-364
Anonymous (Communications ID 472292)....................L1-366
Scott O'Dell (Communications ID 472293)....................L1-368
Krista Scott (Communications ID 472294)....................L1-370
Kimberly Oconnor (Communications ID 472295)....................L1-372
Bob Strong (Communications ID 472296)....................L1-374
Mike Juguilon (Communications ID 472298)....................L1-376
Dane Bergman (Communications ID 472299)....................L1-378
Anonymous (Communications ID 472300)....................L1-380
Anonymous (Communications ID 472301)....................L1-382
Tad Doviak (Communications ID 472302)....................L1-384
Doran Luce (Communications ID 472303)....................L1-386
Anonymous (Communications ID 472304)....................L1-388
Michael Sprague (Communications ID 472305)....................L1-390
Tony Gringle (Communications ID 472306)....................L1-392
Robert Wheeler (Communications ID 472307)....................L1-394
Maire Dhu Lemley (Communications ID 472308)....................L1-396
Anonymous (Communications ID 472309)....................L1-398
Anonymous (Communications ID 472310)....................L1-400
Cheryl Lyons (Communications ID 472311)....................L1-402
Anonymous (Communications ID 472312)....................L1-404
Anonymous (Communications ID 472313)....................L1-406
Anonymous (Communications ID 472314)....................L1-408
Anonymous (Communications ID 472315)....................L1-410
Dennis Higgins (Communications ID 472316)....................L1-412
Anonymous (Communications ID 472317)....................L1-414
Anonymous (Communications ID 472318)....................L1-416
Anonymous (Communications ID 472320)....................L1-418
Danyel Lyons (Communications ID 472321)....................L1-420
Anonymous (Communications ID 472322)....................L1-422

Jason Little (Communications ID 472323)....L1-424
Richard Tackett (Communications ID 472324)....L1-426
Lydia Long (Communications ID 472325) L1-428
Anonymous (Communications ID 472326)....L1-430
Kyle Kooy (Communications ID 472327)....L1-432
Anonymous (Communications ID 472328)....L1-434
Jeannie VanVleet (Communications ID 472329)....L1-436
Anonymous (Communications ID 472330)....L1-438
Laura Arnold (Communications ID 472331) L1-440
Barbara Sperling (Communications ID 472332)....L1-443
Anonymous (Communications ID 472333)....L1-445
SE JONG KIM (Communications ID 472334)....L1-447
David Lind (Communications ID 472335)....L1-449
Thomas Smiley (Communications ID 472336) L1-451
Christopher Ensor (Communications ID 472337)....L1-453
Anonymous (Communications ID 472338)....L1-455
Daryl Wendt (Communications ID 472339) L1-457
Ruth Strawser (Communications ID 472340) L1-459
Dave Hackman (Communications ID 472341) L1-461
Greg Greenstreet (Communications ID 472435)....L1-465
Tim (Communications ID 472437)....L1-466
Suzanne Vargo (Communications ID 472438)....L1-467
Margaret (Communications ID 472440) L1-468
Susan Honda (Communications ID 472441) L1-470
Vic (Communications ID 472442)....L1-471
Bill (Communications ID 472443) L1-472
Arnold Dewalt (Communication ID 472444) L1-485
Jeanne Burbidge (Communications ID 472445)....L1-486
T Newberry (Communications ID 472446) L1-487
Diana Mac (Communications ID 472536)....L1-492
Cynthia Phillips (Communications ID 472537) L1-494
Cindy Broyles (Communications ID 472538)....L1-496
Deborah McGarry (Communications ID 472726) L1-498
Sheryl DeTray (Communications ID 472727)....L1-500

Terri Tollie (Communications ID 472732) L1-502
Becky Tougher (Communications ID 472735) L1-504
Arthur McIrvin (Communications ID 472737) L1-506
Bruce Honda (Communications ID 472738) L1-508
Susan Johnson (Communications ID 472739) L1-510
Denali Pavlich-Wheeler (Communications ID 472740) L1-512
AnnMichelle Hart (Communications ID 472741) L1-514
Robert Dockstader (Communications ID 472818) L1-516
Michael Brugato (Communications ID 472819) L1-518
Sandy Shinbo (Communications ID 472820) L1-520
Ken Broyles (Communications ID 472853) L1-522
Edward Etheridge (Communications ID 472854) L1-524
Bruce Findt,Toni Findt (Communications ID 472933) L1-526
Edward Miller (Communications ID 472935) L1-528
Yvonne Fors (Communications ID 472936) L1-530
Scott Carson (Communication ID 473487) L1-532
Ron Anderson (Communications ID 473489) L1-534
Suzanne Vargo (Communication ID 473494) L1-536
Ben Gearheard (Communication ID 473522) L1-540
Barry Warner (Communication ID 473534) L1-542
Bill Pugnetti (Communication ID 473625) L1-544
Peter Barbin (Communication ID 473639) L1-551
Malcom Klug (Communication ID 473642) L1-554
James Haigh (Communications ID 473671) L1-556
Gia Haigh (Communications ID 473685) L1-558
Alex Bruski (Communication ID 473725) L1-560
Milana Michalek (Communications ID 473814) L1-562
Arnold Dewalt (Communication ID 473818) L1-566
Paula Baerenwald (Communications ID 473820) L1-570
Ken Broyles (Communications ID 473888) L1-573
Tyler Broyles (Communications ID 473891) L1-575
Deidre Daly (Communications ID 474296) L1-577
Anonymous (Communications ID 474297) L1-579
Anna Patrick (Communications ID 474298) L1-581

Charae Ashcraft (Communications ID 474299)..........L1-583
Carol Qually (Communications ID 474300)..........L1-585
James Kostohris (Communications ID 474302)..........L1-587
Kimberly Conner (Communications ID 474304)..........L1-589
S. Sheridan (Communications ID 474305)..........L1-591
Cynthia Jones (Communications ID 474306)..........L1-593
Shannan StClair (Communications ID 474307)..........L1-595
Julie Aulava (Communications ID 474308)..........L1-597
Katie Lee (Communications ID 474309)..........L1-599
Glenn Chouinard (Communications ID 474311)..........L1-601
Marlys Dupleich (Communications ID 474312)..........L1-603
Anonymous (Communications ID 474313)..........L1-605
Lisa Gardiner (Communications ID 474315)..........L1-607
Al Levine (Communications ID 474316)..........L1-609
Steven Dent (Communications ID 474317)..........L1-611
Leonard Barrett (Communications ID 474318)..........L1-613
Anonymous (Communications ID 474319)..........L1-615
Anonymous (Communications ID 474320)..........L1-617
Greg Luke (Communications ID 474321)..........L1-619
Clark Ressler (Communications ID 474322)..........L1-621
Anonymous (Communications ID 474323)..........L1-623
Michael Andrews (Communications ID 474324)..........L1-625
Greg Moak (Communications ID 474325)..........L1-627
Anonymous (Communications ID 474326)..........L1-629
David Kingstone (Communications ID 474327)..........L1-631
Karen Brugato (Communications ID 474908)..........L1-633

Tribes and Agencies

OMF South Draft Environmental Statement (EIS)

Sound Transit Review Board

The Puyallup Tribe Fisheries Department offers the following comments concerning the proposed Operations and Maintenance Facility South site alternatives. The South 336th St. and South 344th St alternatives would each require that significant portions of Hylebos Creek be tight lined to varying degrees. While each of the Alternatives identified likely has its merits, we wish to remind Sound Transit that the Puyallup Tribe, the Natural Resource Damage Trustees, the City of Tacoma and the Port of Tacoma as well as WSDOT have collectively spent tens of millions of dollar on property acquisition, habitat restoration, contaminants cleanup and stream enhancement projects throughout the Hylebos Creek watershed over the past 20 years.

In addition, WSDOT will be expanding the wetland and stream habitat complex as part of the Riparian Restoration Plan for the SR 167/SR 509 interchange known as the Gateway project. This entails enhancing over 153 acres of wetland, riparian and forested habitat forming a critical link to previously established mitigation sites located downstream of the two Federal Way OMF proposed alternative sites.

Fundamental to the success of these efforts is the protection and treatment of stormwater which originates throughout the Hylebos Creek basin including several of the sites submitted for consideration to host the OMF South complex. Placing any more of Hylebos Creek into a pipe/culvert runs counter to years of planning and restoration work that has already been achieved. Pipelines and underground drainage conveyances offer no means of water treatment or groundwater recharge whatsoever and are therefore viewed as incompatible with fish recovery.

Summer base flow conditions within Hylebos Creek are a limiting factor for salmonid production. Many reaches of Hylebos Creek that were formerly wetted year around are now ephemeral. Reduced flow conditions are more susceptible to thermal inputs and rapid heating which places additional stress on fish populations. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribe.

3.1.1.3 Appendix G3 - Distribution of Fish

Chinook salmon have been documented upstream of the Montessori School to 356th St on the West Fork. This fact is continuously ignored and the tribe's data is not referenced anywhere in the DEIS.

3.10.1.1 Aquatic Species and Habitat

While it is true, fish are not present in any of the proposed alternative sites, water quality and quantity impacts can and will affect downstream fish populations. Pink, coho, chinook, steelhead and cutthroat occupy Hylebos Creek downstream of the project impact area.

The Midway Land fill site remains the Tribes preferred alternative as it has the least impacts to forests, no stream impacts and no wetland impacts.

Thank you for your consideration of these comments!

Sincerely,

Russ Ladley, Director
Puyallup Tribal Fisheries

These comments were sent to Hussein Rehmat at (206) 689-4828 or email Hussein.Rehmat@soundtransit.org, OMFSouth@soundtransit.org on April 19, 2021.

Puyallup Tribe Fisheries Department (Communication ID 473825)		
Comment ID	**Comment Text**	**Response**
1	The Puyallup Tribe Fisheries Department offers the following comments concerning the proposed Operations and Maintenance Facility South site alternatives. The South 336th St. and South 344th St alternatives would each require that significant portions of Hylebos Creek be tight lined to varying degrees. While each of the Alternatives identified likely has its merits, we wish to remind Sound Transit that the Puyallup Tribe, the Natural Resource Damage Trustees, the City of Tacoma and the Port of Tacoma as well as WSDOT have collectively spent tens of millions of dollar on property acquisition, habitat restoration, contaminants cleanup and stream enhancement projects throughout the Hylebos Creek watershed over the past 20 years.	Sound Transit appreciates the continued coordination with the Puyallup Tribe of Indians. Sound Transit understands the long-term effort and investment that has been made over the past many years to restore stream and wetland habitat within the Hylebos Creek watershed through a collective effort of that has included the Puyallup Tribe of Indians, the cities, and others. The OMF South project is striving to avoid new tightlining or piping of open channel tributaries to Hylebos Creek and is committed to working with the Tribe through the duration of the project.
2	In addition, WSDOT will be expanding the wetland and stream habitat complex as part of the Riparian Restoration Plan for the SR 167/SR 509 interchange known as the Gateway project. This entails enhancing over 153 acres of wetland, riparian and forested habitat forming a critical link to previously established mitigation sites located downstream of the two Federal Way OMF proposed alternative sites.	Section 4.4.9, Ecosystems, in Chapter 4, Cumulative Effects Analysis, has been updated in the Final EIS to describe WSDOT's Riparian Restoration Plan for the Gateway project. Sound Transit acknowledges that the Puyallup Tribe of Indians and WSDOT have put considerable effort and planning into the Riparian Restoration Plan for the Puget Sound Gateway Program's SR 167 and SR 509 Completion projects to provide a large mitigation site in the lower Hylebos Creek area.
3	Fundamental to the success of these efforts is the protection and treatment of stormwater which originates throughout the Hylebos Creek basin including several of the sites submitted for consideration to host the OMF South complex. Placing any more of Hylebos Creek into a pipe/culvert runs counter to years of planning and restoration work that has already been achieved. Pipelines and underground drainage conveyances offer no means of water treatment or groundwater recharge whatsoever and are therefore viewed as incompatible with fish recovery. Summer base flow conditions within Hylebos Creek are a limiting factor for salmonid production. Many reaches of Hylebos Creek that were formerly wetted year around are now ephemeral. Reduced flow conditions are more susceptible to thermal inputs and rapid heating which places additional stress on fish populations. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribe.	Stormwater management and groundwater are discussed in Section 3.11, Water Resources, in the 2023 Draft EIS and this Final EIS. The project would include stormwater flow control measures and enhanced stormwater treatment to protect water quality after the project is constructed. Sound Transit is striving to avoid the placement of new pipes or new culverts into Hylebos Creek tributaries. As the design progresses, Sound Transit is committed to working with the Tribe through project design on methods to implement water treatment and avoid and minimize impacts to groundwater recharge.
4	3.1.1.3 Appendix G3 - Distribution of Fish Chinook salmon have been documented upstream of the Montessori School to 356th St on the West Fork. This fact is continuously ignored and the tribe's data is not referenced anywhere in the DEIS.	Section 3.10, Ecosystems Resources, and Appendix G3, Ecosystems Resources Technical Report, was revised in the 2023 Draft EIS to reference the Tribe's annual fisheries reports (from 2017 to 2023). The presence of Chinook up to S 356th Street is included in the document. This update is reflected in this Final EIS.

Puyallup Tribe Fisheries Department (Communication ID 473825)		
Comment ID	**Comment Text**	**Response**
5	3.10.1.1 Aquatic Species and Habitat While it is true, fish are not present in any of the proposed alternative sites, water quality and quantity impacts can and will affect downstream fish populations. Pink, coho, chinook, steelhead and cutthroat occupy Hylebos Creek downstream of the project impact area.	Section 3.10, Ecosystem Resources, of the 2023 Draft EIS and this Final EIS discusses effects to downstream aquatic habitat that could occur due to changes in water quality or quantity.
6	The Midway Land fill site remains the Tribes preferred alternative as it has the least impacts to forests, no stream impacts and no wetland impacts.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Operations and Maintenance Facility South, Sound Transit
MARCH 2021 DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
Review Comments

Organization:	WASHINGTON STATE DEPARTMENT OF ECOLOGY, TOXICS CLEANUP PROGRAM, NORTHWEST REGIONAL OFFICE
Date:	MARCH 5 - APRIL 19, 2021

ID	Section	Page	Paragraph/Table/Figure	Lin	Comment	Column1	Commenter's Name
1	Executive Summary, 3.13, Appendix D3 Section 2.6.2.3	ES-14, ES-24, 3.13-11, App D3 p. 30			What is the differential excavation volume of "full excavation of the entire landfill" compared to "full landfill excavation needed to develop the OMF"? Was an alternative considered for full excavation and replacement with clean fill? Replacement with clean fill would realize the full benefit of landfill excavation. Returning potentially impacted soil to the landfill excavaton may result in placing contaminant source material back on the property. What would the differential construction and operating costs be for reused fill and clean fill? Appendix D3 Section 2.6.2.3 states "Environmental regulators may require any exhumed refuse to be disposed of at a permitted facility meeting current standards without the option to reuse on site." Would the decision on this requirement affect the OMF South location selection? Therefore, would a determination on soil reuse need to be made prior to site selection?	ECY	Mark Adams/Tanner Bushnell/Alan Noell
2	Executive Summary, Section 3.10.2.2, Section 3.11.2.2, App G3, Sect 4.1.2.1	ES-19, 3.10-13, 3.11-12, G3-73	Table ES-1		The Midway Landfill was completed with an impermeable 50-mil geomembrane cover. The overlying soil cap (12-inch sand, 12-inch topsoil) has limited storage potential for reducing peak drainage, so development of the OMF would have limited increase of impervious surfaces.	ECY	Alan Noell/ECY
3	3.11	3.11-12, 13	4-5		Is the platform description here current? Based on current design would all three Midway designs have similar access limitations to landfill management?	ECY	Tanner Bushnell
4	Appendix D1	34			A concern was expressed with mobilizing contamination though deep dynamic compaction. Areas of the landfill potentially containing liquid waste are a concern with regards to deep dynamic compaction.	ECY	Tanner Bushnell
5	Appendix D.2, Appendix D.3	p. 13 (pdf p 66), pp. 21-23 (pdf pp 126-128)	Section 2.1 (2/14/2020), Figures 2-1 to 2-3 (9/2020)		FWLE assumed 70% of screened landfill material would be reused (Interim Midway Landfill Preparation Memorandum, Draft 2, 2/14/2020). What was the actual reuse percentage? Was all material screened through 2-inch trommel reused? Was(Will) all 4-inch screen landfill material also (be) fed through a 2-inch trommel screen? What is the geotechnical criteria for reuse (e.g., percent organic matter). In the 2/14/2020 section, 50% reuse is assumed, but in the 9/2020 document, 40% reuse is assumed. What reuse percentage was assumed in the cost estimates? Was a sensitivity analysis performed? How significant of a driver is reuse percentage to the OMF costs?	ECY	Alan Noell/ECY
6	Appendix D.2	pp. 15 to 17 (pdf pp. 68-7	Section 2.3		"The FWLE project has been allowed to reuse refuse material onsite; however, the quality of that material is better understood and the scale of that work is significantly smaller than that proposed for OMF South." How is the FWLE and OMF project landfill material expected to be different? Would older waste contain less daily cover? Did the FWLE contain more soil because it's located along the edge of the landfill and the vertical and horizontal limits of the landfill were variable? How much dangerous waste was disposed during FWLE? Is all OMF waste assumed to be Subtitle D waste? Would older waste potentially contain more hazardous waste? Would older waste be more compacted, moist, and dense?	ECY	Alan Noell/ECY
7	Appendix D.3	p. 3 (pdf p 108)	Section 1.3		The 9/2020 Conceptual Landfill Site Reuse Plan refers to 9 acres of refuse on WSDOT property in the ROW. Was this waste removed as part of the FWLE project, or is this waste outside of the FWLE that will be conveyed to SPU?	ECY	Alan Noell/ECY
8	Appendix D.3	p. 10 (pdf p 115)	Section 2.2		"If EPA approves the project under Superfund, the development process for Midway Landfill may be exempt from.....NEPA." Also the project may be subject to NEPA by FHWA if airspace crosses WSDOT land. Would an additional NEPA or SEPA EIS be required once the OMF South location is selected?	ECY	Alan Noell/ECY

Operations and Maintenance Facility South, Sound Transit
MARCH 2021 DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
Review Comments

Organization:	WASHINGTON STATE DEPARTMENT OF ECOLOGY, TOXICS CLEANUP PROGRAM, NORTHWEST REGIONAL OFFICE
Date:	MARCH 5 - APRIL 19, 2021

ID	Section	Page	Paragraph/Table/Figure	Lin	Comment	Column1	Commenter's Name
9	Appendix D.3	p. 10 (pdf p 115)	Section 2.2		"the existing ROD may not need to be reopended, if during the course of OMF South construction, the integrity of the existing, in-place remedies are maintained." ST and SPU would need to negotiate new legal agreements with Ecology. The existing legal agreements would need to be amended to allow construction and to maintain environmental controls after construction. Work plans would need to be developed to maintain environmental controls during construction.	ECY	Alan Noell/ECY
10	Appendix D.3	p. 11 (pdf p. 116)	Section 2.2		The document states the Seattle-King County Department of Public Health will need to be provided the opportunity to review requested operational changes at the site. Public Health - Seattle and King County (PHSKC) does not permit the Midway Landfill. PHSKC informed Ecology on 3/15/2005 that they would no longer perform periodic inspections of the CERCLA site due to changes in program funding in King County Board of Health Code, Title 10, effective 12/21/2003. Ecology has primacy, and intends to coordinate with other regulatory agencies for future changes to the landfill.	ECY	Alan Noell/ECY
11	Appendix D.3	p. 24 (pdf p. 129)	Section 2.6.2		How do the predicted and actual observed densities and reuse percentages vary for the FWLE project at Midway. If these are carried forward to the OMF facility, how would they impact the costs?	ECY	Alan Noell/ECY
12	Appendix D.3	p 47 (pdf p. 152)	Section 3.4		How do risks to schedule in the September 2020 compare with FWLE project experience?	ECY	Alan Noell/ECY
13	Appendix D.4	pp. 13-15 (pdf pp. 174-176)	Sections 2.3.1 and 2.3.2		The site geology and hydrogeology sections reference the 2000 ROD and 2015 Five-Year Review, and provide no maps and cross-sections for interpretations. The ROD and Five-Year Review don't provide this detail. The document also includes a minor reference to the 1988 Remedial Investigation prepared by Parametrix. Please reference subsequent geology and hydrogeology interpretations for the site (July 2020 Parametrix report).	ECY	Alan Noell/ECY
14	Appendix D3, 2.6.1	22-23	Figure 2-2 and 2-3		Do the figures of the Hybrid and Full Excavation options depict reuse soil volumes accounting for the volume of mix-in soil (assuming the reused soil will require added soil to improve quality)?	ECY	Tanner Bushnell
15	Appendix D3, 2.6.2.2	28-29	Drilled Shaft and Slab Installation		This paragraph suggests for Hybrid 2, full excavation of soil beneath the building would remove the need for drilled shafts to support the building. Was the cost of Hybrid 2 with this arrangement calculated?	ECY	Tanner Bushnell
16	Appendix D3, 2.6.2.3	29			The acreage of exposed landfill for excavation purposes may be determined based on performance. Without an example project with similar infiltration restrictions, it would be difficult for Ecology to specify an acceptable uncapped landfill area.	ECY	Tanner Bushnell
17	HHRA Addendum	9			Ambient temperature typo.	ECY	Tanner Bushnell

Ecology (Communication ID 473719)		
Comment ID	**Comment Text**	**Response**
1	What is the differential excavation volume of "full excavation of the entire landfill" compared to "full landfill excavation needed to develop the OMF"? Was an alternative considered for full excavation and replacement with clean fill? Replacement with clean fill would realize the full benefit of landfill excavation. Returning potentially impacted soil to the landfill excavation may result in placing contaminant source material back on the property. What would the differential construction and operating costs be for reused fill and clean fill? Appendix D3 Section 2.6.2.3 states "Environmental regulators may require any exhumed refuse to be disposed of at a permitted facility meeting current standards without the option to reuse on site." Would the decision on this requirement affect the OMF South location selection? Therefore, would a determination on soil reuse need to be made prior to site selection?	Sound Transit included the evaluation of a full excavation option that includes the reuse of some contaminated material to reduce cost, as opposed to using only clean fill. Complete backfill with clean material would require haul and disposal of an additional approximately 2,000,000 cubic yards of material, which would then require replacement with import material. This could result in up to $360M in additional costs. Previous meetings with Ecology and the fact that reuse was approved for FWLE indicate that it is an acceptable option. However, the acceptability of the soil for reuse would be largely determined by the degree of contamination. Based on the information available at the time, Sound Transit made a conservative assumption regarding how much soil would be suitable for reuse and how much would need to be removed from the site. The ability to reuse exhumed soil for the Midway Landfill Alternative factored into the overall construction cost and schedule estimates. The assumptions on soil reuse in Appendix D and construction cost and schedule estimates were available for the Board to consider in identifying the preferred alternative and will also be available when the Board selects the project to be built. A determination of soil reuse would be made if the Sound Transit Board selects the Midway Landfill Alternative to be built.
2	The Midway Landfill was completed with an impermeable 50-mil geomembrane cover. The overlying soil cap (12-inch sand, 12-inch topsoil) has limited storage potential for reducing peak drainage, so development of the OMF would have limited increase of impervious surfaces.	The text of the 2023 Draft EIS was revised to describe the nature of the landfill cap more accurately. Please see Section 3.11, Water Resources. This update is reflected in this Final EIS.
3	Is the platform description here current? Based on current design would all three Midway designs have similar access limitations to landfill management?	Section 3.11, Water Resources, in the 2023 Draft EIS was updated to include a discussion of the need to be able to continue landfill monitoring during construction activities. This update is reflected in this Final EIS.
4	A concern was expressed with mobilizing contamination though deep dynamic compaction. Areas of the landfill potentially containing liquid waste are a concern with regards to deep dynamic compaction.	Sound Transit updated Section 3.13, Hazardous Materials, of the 2023 Draft EIS to identify the concern of mobilizing contamination through deep dynamic compaction. This update is reflected in this Final EIS. If the Sound Transit Board selects to build the Midway Landfill Alternative, Sound Transit would coordinate with Ecology on the potential for mobilizing contamination with different construction methods.

Ecology (Communication ID 473719)		
Comment ID	**Comment Text**	**Response**
5	FWLE assumed 70% of screened landfill material would be reused (Interim Midway Landfill Preparation Memorandum, Draft 2, 2/14/2020). What was the actual reuse percentage? Was all material screened through 2-inch trommel reused? Was (Will) all 4-inch screen landfill material also (be) fed through a 2-inch trommel screen? What is the geotechnical criteria for reuse (e.g., percent organic matter). In the 2/14/2020 section, 50% reuse is assumed, but in the 9/2020 document, 40% reuse is assumed. What reuse percentage was assumed in the cost estimates? Was a sensitivity analysis performed? How significant of a driver is reuse percentage to the OMF costs?	Previous meetings with Ecology and the approval of reuse for FWLE indicate that it is a potential option. However, the actual level of contamination would determine the acceptability of the material for reuse. Without knowing the level of contamination, Sound Transit estimated that most of the soil would need to be removed. Forty percent of material was assumed to be reusable based on the range of 30 to 50 percent recommended by the OMF South Preliminary Geotechnical Recommendations prepared for Sound Transit by Shannon & Wilson in June 2020. FWLE reused approximately 19,000 cubic yards of material. All material that was reused was run through both 4-inch and 2-inch screens. The reused material was allowed to contain up to 8 percent organic content, in specific areas noted in the construction drawings. A sensitivity analysis was performed by Kiewit, the design-builder, after they were awarded the contract. They used an upper bound of 10 percent organic matter to assess 100-year long-term settlement rates. Based on the analysis, Kiewit was allowed to use material with 10 percent organic matter at specific locations. All other locations with that reused screened material were required to follow WSDOT specifications that allow for no organic matter or deleterious material. Reuse of material has a lower cost than exporting contaminated soil and importing clean material. For example, a cubic yard of material that met the classification of a dangerous waste would cost a total of about $110 to dispose of and replace with clean backfill.

Ecology (Communication ID 473719)		
Comment ID	**Comment Text**	**Response**
6	“The FWLE project has been allowed to reuse refuse material onsite; however, the quality of that material is better understood and the scale of that work is significantly smaller than that proposed for OMF South.” How is the FWLE and OMF project landfill material expected to be different? Would older waste contain less daily cover? Did the FWLE contain more soil because it’s located along the edge of the landfill and the vertical and horizontal limits of the landfill were variable? How much dangerous waste was disposed during FWLE? Is all OMF waste assumed to be Subtitle D waste? Would older waste potentially contain more hazardous waste? Would older waste be more compacted, moist, and dense?	The waste material along the east edge of the landfill was not as deep as in other portions of the landfill, and the material was relatively clean. Therefore, a higher percentage of the sifted soil was reused for FWLE. However, OMF South would be located over a much larger volume of the landfill that accumulated across a longer era. There is a high risk that there would be contaminated soil and possible hazardous waste. Therefore, it is reasonable to assume a low level of soil reuse when costing the OMF South project. Older waste is typically more degraded and deeper and, therefore, denser. Older waste could potentially have higher levels of hazardous waste because of the relatively lax regulations that were in place at the time of disposal. The levels of hazardous waste also greatly depend on the operational practices used at the time. Of the landfill material that was unsuitable for reuse by FWLE, about 19,000 tons was considered municipal solid waste and about 40 tons was considered dangerous waste. As noted in Appendix D3, the analysis in the Conceptual Landfill Site Reuse Plan assumed that the majority of material would be accepted at a Subtitle D landfill while acknowledging the possibility that some waste could be considered hazardous and require disposal in a Subtitle C landfill.
7	The 9/2020 Conceptual Landfill Site Reuse Plan refers to 9 acres of refuse on WSDOT property in the ROW. Was this waste removed as part of the FWLE project, or is this waste outside of the FWLE that will be conveyed to SPU?	The refuse in the WSDOT ROW was removed as part of FWLE construction.
8	"If EPA approves the project under Superfund, the development process for Midway Landfill may be exempt from…..NEPA." Also the project may be subject to NEPA by FHWA if airspace crosses WSDOT land. Would an additional NEPA or SEPA EIS be required once the OMF South location is selected?	A NEPA Draft/SEPA Supplemental Draft EIS was published in September 2023 with FTA as the NEPA lead agency. To support future FHWA approvals, FHWA is a cooperating agency under NEPA.
9	"the existing ROD may not need to be reopened, if during the course of OMF South construction, the integrity of the existing, in-place remedies are maintained." ST and SPU would need to negotiate new legal agreements with Ecology. The existing legal agreements would need to be amended to allow construction and to maintain environmental controls after construction. Work plans would need to be developed to maintain environmental controls during construction.	If the Midway Landfill Alternative is selected as the project to be built, Sound Transit would coordinate with SPU and Ecology on necessary agreements and construction planning regarding the site.

Ecology (Communication ID 473719)		
Comment ID	**Comment Text**	**Response**
10	The document states the Seattle-King County Department of Public Health will need to be provided the opportunity to review requested operational changes at the site. Public Health - Seattle and King County (PHSKC) does not permit the Midway Landfill. PHSKC informed Ecology on 3/15/2005 that they would no longer perform periodic inspections of the CERCLA site due to changes in program funding in King County Board of Health Code, Title 10, effective 12/21/2003. Ecology has primacy, and intends to coordinate with other regulatory agencies for future changes to the landfill.	The reference to Public Health – Seattle & King County was an error in Appendix D3, the Conceptual Landfill Site Reuse Plan. The list of Anticipated or Potential Licenses, Permits, and Approvals in the 2021 Draft EIS Fact Sheet correctly lists Ecology as the reviewing agency.
11	How do the predicted and actual observed densities and reuse percentages vary for the FWLE project at Midway. If these are carried forward to the OMF facility, how would they impact the costs?	The waste material along the east edge of the landfill where the FWLE alignment is located was not as deep as other portions of the landfill and the material was relatively clean. Therefore, a higher percentage of the sifted soil was reused. However, with the OMF located across a much larger area and the volume of landfill accumulated over a longer timeframe, there is a high risk that there would be contaminated soil and possible hazardous waste. Therefore, it is prudent to assume a low level of soil reuse when costing the project.
12	How do risks to schedule in the September 2020 compare with FWLE project experience?	Section 3.4, Risks to Cost and Schedule, of Appendix D3, the Conceptual Landfill Site Reuse Plan, is a high-level analysis of the potential issues that could increase cost or delay schedule if the broad assumptions used in the plan turned out to be incorrect. The scope and extent of the two projects are so different that comparing them is not useful.
13	The site geology and hydrogeology sections reference the 2000 ROD and 2015 Five-Year Review, and provide no maps and cross-sections for interpretations. The ROD and Five-Year Review don't provide this detail. The document also includes a minor reference to the 1988 Remedial Investigation prepared by Parametrix. Please reference subsequent geology and hydrogeology interpretations for the site (July 2020 Parametrix report).	Documents included in Appendix D, Midway Landfill Support Documents, were used to develop potential construction design options to evaluate in the Draft and Final EISs. If the Midway Landfill Alternative is selected to be built, Sound Transit would advance the design and update the memo in coordination with Ecology.
14	Do the figures of the Hybrid and Full Excavation options depict reuse soil volumes accounting for the volume of mix-in soil (assuming the reused soil will require added soil to improve quality)?	The figures are simplified, showing proportions of reused and import material. In actual implementation, mixing of material to improve placement quality is likely.
15	This paragraph suggests for Hybrid 2, full excavation of soil beneath the building would remove the need for drilled shafts to support the building. Was the cost of Hybrid 2 with this arrangement calculated?	Further investigation and design would be needed to confirm that drilled shafts are not required under buildings when deep dynamic compaction is used on the remaining refuse material. The preliminary design used for the 2021 Draft EIS, the 2023 Draft EIS, and the Final EIS could not make that assumption, and the cost estimate included drilled shafts under the buildings only. Differential settlement between the track and the building is a risk as the track also runs through the buildings.

Ecology (Communication ID 473719)		
Comment ID	**Comment Text**	**Response**
16	The acreage of exposed landfill for excavation purposes may be determined based on performance. Without an example project with similar infiltration restrictions, it would be difficult for Ecology to specify an acceptable uncapped landfill area.	The assumed 5-acre open working area of exposed landfill was used to develop construction and schedule assumptions for conceptual design. If the Midway Landfill alternative is selected as the project to be built, Sound Transit would coordinate with Ecology to determine an acceptable area of uncapped landfill.
17	Ambient temperature typo.	Documents included in Appendix D, Midway Landfill Support Documents, were used to develop potential construction design options to evaluate in the Draft and Final EIS. If the Midway Landfill Alternative is selected to be built, Sound Transit would advance the design and update the documents accordingly.

WSDOT ENVIRONMENTAL DOCUMENT REVIEW COMMENT & RESPONSE FORM
WITH INSTRUCTIONS

Washington State Department of Transportation

<insert name of project>

FOR INTERNAL USE ONLY	Task Order #		
QA Reviewer:	___	Date:	___
Comments:			
☐ Pass		☐ Resubmit	

Title of Document	**Type of Document**	**Version of Document**	**Date Released for Review**
OMF South DEIS	Draft EIS		03/05/2021

Name and Affiliation of Document Author & Contact Information	<insert name of author>	<enter phone number>
	<insert name of secondary contact>	<enter email address>
Name and Initials of Reviewer(s) & Agency Represented	Jim Laughlin – JL, Ashley Carle = AC, Lindsey Jungbluth = JL, John Kleinkopf = JHK, Thomas A. Collins, P.E. (TAC) - WSDOT	
Date of Request	March 8,2021	**COMMENTS DUE BY** <end of review cycle>

No.	Chapter	Resource Section	Page*	Line No.	Exhibit No.	Priority **	Reviewer Comment	Reviewer Initials	Author Response	Status Code***	Responder Initials	QC Back-check	QA Check
1	3	Water Quality	3	22	n/a	1	<insert your comment that relates to critical issues that require immediate attention>	xxx	<insert how the issue was resolved>				
-	-	Noise and Vibration	-	-	-	-	No Comments	JL					
1	ES	Visual & Aesthetic	21			2	ST also needs to address impacts to existing vegetation outside RCAs and restore according to the WSDOT Roadside Policy Manual.	JHK					
2	ES	Ecosystem	27			2	ST should evaluate impact to fish passage projects upstream of this project to ensure that this project doesn't negatively impact the restoration of access to spawning habitat upstream.	JHK					
3	1 and 2					4	It appears that parts 1 and 2 are repeated throughout this document	JHK					
4	3	Visual and Aesthetic	3.7-2 and 3.7-3	5	Table 3.7-1	3	Throughout section 3.7 there is no mention of the high awareness and high sensitivity viewer group that are persons driving for pleasure or tourists visiting an area to enjoy scenic features. They are instead just referred to as "I-5 and SR 99 Drivers", with no differentiation. This higher sensitivity viewer group needs to be considered in the EIS.	JHK					
5	3	Visual and Aesthetic	3.7-16		Figure 3.7-10	3	Description of figure in following paragraph omits high-sensitivity viewers such as tourists and sight-seers.	JHK					

Use Codes:

* Page No. or "G" for general comment about the section/chapter

** An explanation of the priority levels follows:

1. Critical issues requiring discussion/resolution
2. Substantive comment (including issues pertaining to Agency policy or precedent setting conclusions)
3. Factual or substantive issue (regarding legal principles or regulatory error that should be corrected prior to publication)
4. Editorial comment (suggestions to improve readability of the document/report or typographical error)

*** **Status Codes:** A = Incorporated; B = Alternate Revision Proposed; C = Evaluated/Not Incorporated; D = Response to Question

WSDOT ENVIRONMENTAL DOCUMENT REVIEW COMMENT & RESPONSE FORM
WITH INSTRUCTIONS

No.	Chapter	Resource Section	Page*	Line No.	Exhibit No.	Priority **	Reviewer Comment	Reviewer Initials	Author Response	Status Code***	Responder Initials	QC Back-check	QA Check
6	3	Visual and Aesthetic	3.7-17		Figure 3.7-11	3	Description of figure in following paragraph omits high-sensitivity viewers such as tourists and sight-seers.	JHK					
7	3	Visual and Aesthetic	3.7-17	17		3	Please address the impact to high-sensitivity viewers such as tourists and sight-seers.	JHK					
8	3	Visual and Aesthetic	3.7-23	14		4	The phrase ", or other features to help screen views…" should be spelled out more specifically or examples of what "other features" could be.	JHK					
9	3	Visual and Aesthetic	3.7-23	17 – 25		2	This paragraph is implying that RCA mitigation requirements are synonymous with vegetation replacement requirements per the WSDOT Roadside Policy Manual. They are not the same thing. Impact to RCAs cannot be mitigated in the same way as roadside vegetation is. The primary mitigation method for RCAs is avoidance of that impact. Restoration of roadside vegetation should be addressed separately from RCAs.	JHK					
10	3	Visual and Aesthetic	G			4	It seems that section 3.73 should have more description of the mitigation measures that are described in the visualizations. One thing that muddies the assessment of the long-term impact analysis is the assumption that the visualizations' shown mitigation measures will be pursued. I think it makes more sense to show the before impact, the impact visualization and thein in the Potential Mitigation measures show the impact visualization with the mitigation measures.	JHK					
11	3	Visual and Aesthetic	3.7				The mitigation measures should be spelled out in more detail to align with the visualizations. The pubic will view this and think this is exactly how it will look. If the visualizations are just approximate, this needs to be spelled out in the document.	LJ					
12	ES	Executive Summary	iii	n/a	n/a	3	Add Land Acquisition per FWLE Land Exchange Agreement, by WSDOT	TAC					
13	Multiple	All	G	n/a	n/a	3	Multiple figures in document show Midway Landfill Alternative "Potential Construction Limits" to edge of I-5 lanes. The WSDOT SR 509 Completion Project will likely be constructing work in the area between 2024 and 2028, so it is not likely that WSDOT will allow Sound Transit temporary use of the area from I-5 to the WSDOT Compatibility Line that exists on the east side of the FWLE guideway.	TAC					
14	3.7	Visual and Aesthetic Resources	14	n/a	n/a	3	Figure 3.7-7 shows an aerial guideway at the Midway Landfill. Sound Transit is constructing a retained fill, at-grade guideway now, not an aerial guideway through the majority of the Midway Landfill.	TAC					

Use Codes:

* Page No. or "G" for general comment about the section/chapter

** An explanation of the priority levels follows:

1 Critical issues requiring discussion/resolution
2 Substantive comment (including issues pertaining to Agency policy or precedent setting conclusions)
3 Factual or substantive issue (regarding legal principles or regulatory error that should be corrected prior to publication)
4 Editorial comment (suggestions to improve readability of the document/report or typographical error)

*** **Status Codes:** A = Incorporated; B = Alternate Revision Proposed; C = Evaluated/Not Incorporated; D = Response to Question

WSDOT ENVIRONMENTAL DOCUMENT REVIEW COMMENT & RESPONSE FORM
WITH INSTRUCTIONS

No.	Chapter	Resource Section	Page*	Line No.	Exhibit No.	Priority **	Reviewer Comment	Reviewer Initials	Author Response	Status Code***	Responder Initials	QC Back-check	QA Check
15	Exec summary	Table ES-3	ES-32				Table states that NEPA Environmental Review would occur, if necessary. It is our understanding a NEPA *will* occur for the preferred alternative. What is the scenario in which NEPA may not occur?	AC					
16	3.6	Social					Given the upcoming state legislation, the HEAL Act, that will require consideration of impacts to EJ and vulnerable populations and the federal requirement through future NEPA, we urge the board to consider in their decision-making, the long term adverse impacts to historically disadvantaged groups. This seems like a difficult task given there is no analysis presented in this document. How will the board consider impacts to EJ communities in their decision-making? It appears that low-income mobile home residents who may be displaced in the Belmor development will not have comparable choices. As transportation professionals, we are seeking to do no further harm and begin to address past burdens on these groups – the S 336th and 344th alternatives do not seem to support this direction.	AC					

Use Codes:

* Page No. or “G” for general comment about the section/chapter

** An explanation of the priority levels follows:

1 Critical issues requiring discussion/resolution
2 Substantive comment (including issues pertaining to Agency policy or precedent setting conclusions)
3 Factual or substantive issue (regarding legal principles or regulatory error that should be corrected prior to publication)
4 Editorial comment (suggestions to improve readability of the document/report or typographical error)

*** **Status Codes:** A = Incorporated; B = Alternate Revision Proposed; C = Evaluated/Not Incorporated; D = Response to Question

WSDOT (Communication ID 473686)		
Comment ID	**Comment Text**	**Response**
1	ST also needs to address impacts to existing vegetation outside RCAs and restore according to the WSDOT Roadside Policy Manual.	Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS was revised to include a discussion of impacts to existing landscapes within the WSDOT right-of-way and to reference the restoration requirements of the WSDOT Roadside Policy Manual. This update is reflected in this Final EIS.
2	ST should evaluate impact to fish passage projects upstream of this project to ensure that this project doesn't negatively impact the restoration of access to spawning habitat upstream.	Sound Transit has evaluated potential impacts that could affect the availability and accessibility of stream habitats in the future if access is restored through the removal of downstream fish passage barriers. Additionally, OMF South would be designed to ensure that it would not preclude future culvert replacement(s) by WSDOT to provide fish passage. This is documented in sections 3.10, Ecosystems Resources, and 4.1.2 of Appendix G3, Ecosystems Resources Technical Report, of the 2023 Draft EIS and this Final EIS.
3	It appears that parts 1 and 2 are repeated throughout this document	There was an error in the PDF posted to Sound Transit's website that included a repeat of Chapters 1 and 2.
4	Throughout section 3.7 there is no mention of the high awareness and high sensitivity viewer group that are persons driving for pleasure or tourists visiting an area to enjoy scenic features. They are instead just referred to as "I-5 and SR 99 Drivers", with no differentiation. This higher sensitivity viewer group needs to be considered in the EIS. Description of figure in following paragraph omits high-sensitivity viewers such as tourists and sight-seers. Description of figure in following paragraph omits high-sensitivity viewers such as tourists and sight-seers. Please address the impact to high-sensitivity viewers such as tourists and sight-seers.	The text in Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS was revised to state that people sightseeing on highways or driving through their neighborhood are considered to have medium to high viewer sensitivity. This update is reflected in the Final EIS. Commuters and other drivers primarily passing through an area are considered to have lower viewer sensitivity because they often become accustomed (and indifferent) to the views along their travel routes because of repetition and short viewing duration.

WSDOT (Communication ID 473686)		
Comment ID	**Comment Text**	**Response**
5	The phrase “, or other features to help screen views…” should be spelled out more specifically or examples of what “other features” could be.	Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS was revised to state that views of the mainline and other project components would be screened through landscaping and aesthetic treatments. This update is reflected in the Final EIS. Aesthetic treatments may include, for example, concrete walls that have visually interesting elements, such as design treatments that incorporate textures, patterns, color, or climbing vines.
6	This paragraph is implying that RCA mitigation requirements are synonymous with vegetation replacement requirements per the WSDOT Roadside Policy Manual. They are not the same thing. Impact to RCAs cannot be mitigated in the same way as roadside vegetation is. The primary mitigation method for RCAs is avoidance of that impact. Restoration of roadside vegetation should be addressed separately from RCAs.	Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS clarifies the distinction between mitigation requirements for Resource Conservation Areas and other WSDOT roadside areas. This update is reflected in the Final EIS.
7	It seems that section 3.73 should have more description of the mitigation measures that are described in the visualizations. One thing that muddies the assessment of the long-term impact analysis is the assumption that the visualizations’ shown mitigation measures will be pursued. I think it makes more sense to show the before impact, the impact visualization and thein in the Potential Mitigation measures show the impact visualization with the mitigation measures.	Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS was revised to include a more detailed description of potential mitigation measures to distinguish elements of mitigation shown within each view. This update is reflected in this Final EIS.
8	The mitigation measures should be spelled out in more detail to align with the visualizations. The public will view this and think this is exactly how it will look. If the visualizations are just approximate, this needs to be spelled out in the document.	Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS and this Final EIS, explains that the simulations are conceptual, and the building, wall, and landscaping details would be determined in the final design phase. This section also includes a more detailed description of potential mitigation measures.
9	Add Land Acquisition per FWLE Land Exchange Agreement, by WSDOT	The suggested project approval has been added to the list of anticipated or potential licenses, permits, and approvals found in the Executive Summary of the 2023 Draft EIS. This update is reflected in the Final EIS.

WSDOT (Communication ID 473686)		
Comment ID	**Comment Text**	**Response**
10	Multiple figures in document show Midway Landfill Alternative "Potential Construction Limits" to edge of I-5 lanes. The WSDOT SR 509 Completion Project will likely be constructing work in the area between 2024 and 2028, so it is not likely that WSDOT will allow Sound Transit temporary use of the area from I-5 to the WSDOT Compatibility Line that exists on the east side of the FWLE guideway.	Sound Transit acknowledges the potential for overlapping construction schedules with the SR 509 Completion Project. If the Midway Landfill Alternative is selected to be built, Sound Transit would work with WSDOT regarding construction access and schedule coordination.
11	Figure 3.7-7 shows an aerial guideway at the Midway Landfill. Sound Transit is constructing a retained fill, at-grade guideway now, not an aerial guideway through the majority of the Midway Landfill.	The figure was revised in the 2023 Draft EIS to show the FWLE final design. This update is reflected in the Final EIS.
12	Table states that NEPA Environmental Review would occur, if necessary. It is our understanding a NEPA will occur for the preferred alternative. What is the scenario in which NEPA may not occur?	NEPA review is required for all the build alternatives, due in part to each alternative's location in the I-5 right-of-way. The Executive Summary of the 2023 Draft EIS was revised to explain this requirement. This update is reflected in the Final EIS
13	Given the upcoming state legislation, the HEAL Act, that will require consideration of impacts to EJ and vulnerable populations and the federal requirement through future NEPA, we urge the board to consider in their decision-making, the long term adverse impacts to historically disadvantaged groups. This seems like a difficult task given there is no analysis presented in this document. How will the board consider impacts to EJ communities in their decision-making? It appears that low-income mobile home residents who may be displaced in the Belmor development will not have comparable choices. As transportation professionals, we are seeking to do no further harm and begin to address past burdens on these groups – the S 336th and 344th alternatives do not seem to support this direction.	The legislation that enacted the HEAL Act does not apply to Sound Transit. However, Sound Transit conducted an environmental justice analysis, which is available in Final EIS Appendix E, Environmental Justice Assessment, and summarized in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods. Table E.5-1 in Appendix E summarizes potential impacts to environmental justice populations and the process through which Sound Transit would relocate displaced residents to comparable housing or better. The Sound Transit Board considered the analysis of alternatives, impacts, and potential mitigation measures contained in the 2021 SEPA Draft EIS; Tribal, agency, and public comments on the 2021 SEPA Draft EIS; and other information before identifying the Preferred Alternative. The Sound Transit Board will consider comments on the 2021 and 2023 Draft EISs, Final EIS analysis, and other factors before selecting the project to be built.

General Manager's Office
201 S. Jackson Street
KSC-TR-0415
Seattle, WA 98104-3856

4/19/2021

Hussein Rehmat
OMF South Project
Sound Transit
401 S. Jackson St. Seattle, WA 98104

(by electronic mail: OMFSouthDEIS@soundtransit.org.)

Re: King County Metro Transit's comments on the Sound Transit Operations and Maintenance Facility South Draft Environmental Impact Statement

Dear Mr. Rehmet:

Thank you for the opportunity to review and comment on the Sound Transit (ST) Operations and Maintenance Facility South (OMF-S) Draft Environmental Impact Statement (DEIS).

King County Metro (Metro) would like to thank Sound Transit for their continued leadership on providing regional transit service. As population growth and traffic congestion have continued to increase in the Puget Sound region, we recognize the need for transportation improvements that increase mobility options and support transit throughout the Puget Sound region.

Metro is primarily concerned with impacts to transit in the vicinity of the OMF-S project, regardless of alternative. All alternatives analyzed in the DEIS are near or adjacent to SR 99. Any use of SR 99 as a haul route during construction has the potential to impact Metro's operations along that corridor. The magnitude of work required for the Midway Landfill site alternative would likely have the greatest impact on Metro's operations.

Metro has the following comments on the ST OMF-S DEIS: Include transit specifically in the mitigation section under transportation and include transit in the construction transportation management plan.

The report should clarify how LOS is measured/defined for intersections under two-way stop control (TWSC). Since this is defined differently from signalized intersection LOS, the actual NB/SB thru traffic impacts at 246th should be noted in the DEIS to help fully understand why the Midway site alternative causes the delay/LOS at 246th to degrade.

The report should clarify potential construction truck traffic impacts at 272nd, Kent Des-Moines Rd, and the northbound HOV lane, as well as potential impacts of a truck acceleration/deceleration lane and/or any long-term mitigation at 246th (signalization, u-turns at 252nd, etc.) to the northbound HOV lane (pg. 3.2-42).

Going forward, Lori Burchett will continue to be the lead participant and main point of contact for Metro. John Greene will be responsible for Metro's internal coordination in support of its role as a Participating Agency during the SEPA environmental review process. Their contact information is as follows:

Lori Burchett
Transportation Planner
King County Metro Transit
King Street Center
201 S. Jackson St., KSC-TR-0413
Seattle, WA 98104-3836
P: (206) 263-3086
E: Lori.Burchett@kingcounty.gov

John Green
Senior Environmental Planner
King County Metro Transit
King Street Center
201 S. Jackson St., KSC-TR-0435
Seattle, WA 98104-3856
P: (206) 263-0506
E: JGreene@kingcounty.gov

Thank you for this opportunity to comment on the DEIS. The OMF-S will provide significant benefit to the regional transportation network and Metro will continue to work with Sound Transit in our role as a Consulted Agency. We believe that implementing the recommendations above will disclose important information needed to develop a balanced Preferred Alternative and to assist the public and decision-makers in selecting the best option.

We look forward to continuing our collaboration to achieve the best project for our shared customers across the region.

Sincerely,

DocuSigned by:
Terry White
03E4693EF97243F...

Terry White, General Manager
King County Metro Transit Department

cc: Lori Burchett, Transportation Planner, Metro Transit
John Greene, Environmental Planner, Metro Transit

King County Metro (Communication ID 473803)		
Comment ID	**Comment Text**	**Response**
1	Metro is primarily concerned with impacts to transit in the vicinity of the OMF-S project, regardless of alternative. All alternatives analyzed in the DEIS are near or adjacent to SR 99. Any use of SR 99 as a haul route during construction has the potential to impact Metro's operations along that corridor. The magnitude of work required for the Midway Landfill site alternative would likely have the greatest impact on Metro's operation.	Section 3.2.2.3, Construction Impacts (Transportation), of the Final EIS, discusses impacts to roadways, including SR 99, from haul routes.
2	Include transit specifically in the mitigation section under transportation and include transit in the construction transportation management plan.	Avoidance and minimization measures concerning impacts to transit were added to Section 3.2, Transportation, of the 2023 Draft EIS. There are no mitigation measures proposed for transit impacts as OMF South is not anticipated to result in long-term operational impacts to transit. Up to 50 parking spaces in the Federal Way/S 320th Street Park & Ride would be removed as part of the Preferred and South 344th Street alternatives to accommodate the elevated mainline tracks and a relocated BPA transmission line tower. This update is reflected in the Final EIS.
3	The report should clarify how LOS is measured/defined for intersections under two-way stop control (TWSC). Since this is defined differently from signalized intersection LOS, the actual NB/SB thru traffic impacts at 246th should be noted in the DEIS to help fully understand why the Midway site alternative causes the delay/LOS at 246th to degrade.	A description of the criteria used to analyze traffic operations is available in Appendix G1, Transportation Technical Report, of the 2023 Draft EIS and this Final EIS, as are traffic counts and turning movements at the SR 99 and S 246th Street intersection. The analysis provides an explanation for the factors that contribute to the increased delay at SR 99 and S 246th Street.
4	The report should clarify potential construction truck traffic impacts at 272nd, Kent-Des Moines Rd, and the northbound HOV lane, as well as potential impacts of a truck acceleration/deceleration lane and/or any long-term mitigation at 246th (signalization, u-turns at 252nd, etc.) to the northbound HOV lane (pg. 3.2-42).	Each OMF South alternative was analyzed using the same type of data and methodology to allow for an equal comparison of alternatives, including an assessment of future truck trip volumes. Impacts resulting from truck traffic are described in Section 3.2.2.3, Construction Impacts, of the 2023 Draft EIS and this Final EIS.

King County Metro (Communication ID 473803)		
Comment ID	**Comment Text**	**Response**
5	Going forward, Lori Burchett will continue to be the lead participant and main point of contact for Metro. John Greene will be responsible for Metro's internal coordination in support of its role as a Participating Agency during the SEPA environmental review process. Their contact information is as follows: Lori Burchett Transportation Planner King County Metro Transit King Street Center 201 S. Jackson St., KSC-TR-0413 Seattle, WA 98104-3836 P: 206-263-3986 E: Lori.Burchett@kingcounty.gov John Green Senior Environmental Planner King County Metro Transit King Street Center 201 S. Jackson St., KSC-RT-0435 Seattle, WA 98104-3856 P: 206-263-0506 E: JGreene@kingcounty.gov	This has been noted for future project coordination.

City of Des Moines

ADMINISTRATION
21630 11TH AVENUE SOUTH, SUITE A
DES MOINES, WASHINGTON 98198-6398
(206) 878-4595 T.D.D.: (206) 824-6024 FAX: (206) 870-6540

April 15, 2021

OMF South, c/o Hussein Rehmat
Sound Transit
401 S Jackson Street
Seattle WA 98104

Subject: DEIS Comments for the Operations and Maintenance Facility South Project

Dear Mr. Rehmat:

The City of Des Moines is pleased to provide our comments on the Draft Environmental Impact Statement (DEIS) for the Sound Transit Operations and Maintenance Facility South (OMFS) Project.

The City of Des Moines is committed to working with Sound Transit and the cities of Kent and Federal Way to ensure the OMFS supports Federal Way Link Extension and the expansion of light rail to Tacoma, balances local and regional interests, does not adversely affect Highline College or the neighborhoods in the South Des Moines/Midway area, does not compromise developing a vibrant KDM station area and business district along SR-99, minimizes impacts on existing businesses and residents, supports municipal services through maintenance and growth of sales and property taxes, and maintains the living, working and shopping convenience and livability of our respective Midway neighborhoods. Although estimated costs are highest for the Midway Landfill alternative, the City supports the productive reuse of the Midway Landfill site and that its use avoids impacts associated with the two Federal Way alternatives.

In summary, the comments on the DEIS for the OMFS at the Midway Landfill are as follows:

Transportation

- The traffic study to be developed should include LOS analysis during construction/hauling activities and post construction of the OMF for the following intersections along SR-99: Kent-Des Moines Road (KDM), College Way/S 236th, S 240th, S 260th and S 272nd.

- LOS analysis would identify any potential mitigation required at Des Moines intersections or affecting City of Des Moines streets.

The Waterland City

- Haul routes will need to be reviewed for potential mitigation and restoration.

- The traffic study should identify if any new PM peak hour trips are added to the Des Moines Street system.

Ecosystem and Water Resources

- If the Midway Landfill site is selected, include the City of Des Moines in the review of the Drainage Site Plan, Technical Information Report, and SWPPP.

- The City of Des Moines should also be identified as an affected agency for compliance review of the NPDES Stormwater Discharge Requirements.

- Reevaluate impacts from increased impervious surface to streams and stream buffers. The City does not understand the “0” for Stream and Stream Buffer impacts (pp. ES-18 and ES-27) for the Midway site given the amount of impervious surface being added.

Construction Impacts
The following impacts will need to be more fully developed or identified in the FEIS for the Midway site if it is selected as the preferred alternative:

- Construction timeline.

- Community/business impacts due to the estimated 570 truck trips/day over 4.5-5.5 year site preparation period.

- Potential human health risks to both construction workers, employees and community from potential release of contaminated air, soil or water.

- Unknown risks associated with the landfill/superfund site that could add additional time, and construction and O & M costs.

We look forward to our continued collaboration with Sound Transit. Please feel free to contact me or City staff if you have questions about our comments.

Sincerely,

Susan M. Cez

Susan Cezar LEG, Chief Strategic Officer
SEPA Official

City of Des Moines (Communication ID 473484)		
Comment ID	**Comment Text**	**Response**
1	Although estimated costs are highest for the Midway Landfill alternative, the City supports the productive reuse of the Midway Landfill site and that its use avoids impacts associated with the two Federal Way alternatives.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	In summary, the comments on the DEIS for the OMFS at the Midway Landfill are as follows: **Transportation** • The traffic study to be developed should include LOS analysis during construction/hauling activities and post construction of the OMF for the following intersections along SR-99: Kent-Des Moines Road (KDM), College Way/S 236th, S 240th, S 260th and S 272nd. • LOS analysis would identify any potential mitigation required at Des Moines intersections or affecting City of Des Moines streets. • Haul routes will need to be reviewed for potential mitigation and restoration. • The traffic study should identify if any new PM peak hour trips are added to the Des Moines Street system.	The LOS analysis for arterial and local streets included in Section 3.2, Transportation, of the 2023 Draft EIS and this Final EIS focused on locations assumed to be most likely affected in the long term by the project alternatives. The intersections that were analyzed are those directly affected, such as by a change in channelization or signal control resulting from new roadway configurations or those that would be affected by OMF South traffic volumes near each site. The intersections of SR 99 with S 240th Street and S 260th Street were included in the LOS analysis; the rest of the intersections listed in this comment fell outside the study area. Section 3.2, Transportation, identifies the potential haul routes and evaluates the potential impacts from anticipated construction traffic qualitatively against existing traffic volumes. As stated, the contractor would develop a construction transportation management plan to identify site access and hauling routes in coordination with the appropriate jurisdictions. Traffic volumes are forecast to increase throughout the study area during both the 2042 AM and PM peak hours because of planned population and employment growth by local jurisdictions. If OMF South were to be constructed at the Midway Landfill site, it could add additional trips to the Des Moines street system; however, the additional trips would be very minor in relation to background traffic growth and would not be anticipated to result in LOS impacts.
3	**Ecosystem and Water Resources** • If the Midway Landfill site is selected, include the City of Des Moines in the review of the Drainage Site Plan, Technical Information Report, and SWPPP. • The City of Des Moines should also be identified as an affected agency for compliance review of the NPDES Stormwater Discharge Requirements.	If the Midway Landfill Alternative is selected as the project to be built, Sound Transit would coordinate with the city of Des Moines for reviews of stormwater management documentation, such as the Drainage Site Plan, SWPPP, and NPDES compliance documentation.
4	• Reevaluate impacts from increased impervious surface to streams and stream buffers. The City does not understand the “0” for Stream and Stream Buffer impacts (pp. ES-18 and ES-27) for the Midway site given the amount of impervious surface being added.	The stream and stream buffer impacts reported in the Executive Summary refer to direct impacts to streams and buffer areas and not to indirect impacts, such as potential downstream effects through changes to impervious surfaces. Section 3.11, Water Resources, in the 2023 Draft EIS and this Final EIS discusses impacts related to impervious surfaces.

City of Des Moines (Communication ID 473484)		
Comment ID	**Comment Text**	**Response**
5	**Construction Impacts** The following impacts will need to be more fully developed or identified in the FEIS for the Midway site if it is selected as the preferred alternative: - Construction timeline. - Community/business impacts due to the estimated 570 truck trips/day over 4.5-5.5 year site preparation period.	The Sound Transit Board identified the South 336th Street Alternative as the Preferred Alternative. The Final EIS addresses construction impacts related to the Midway Landfill Alternative throughout the document. Impacts associated with construction are discussed for each element of the environment. Specifically, construction impacts to communities are discussed in the 2023 Draft EIS and this Final EIS in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods. Construction impacts to businesses are discussed in Section 3.3, Acquisitions, Displacements, and Relocations, and Section 3.5, Economics.
6	- Potential human health risks to both construction workers, employees and community from potential release of contaminated air, soil or water. - Unknown risks associated with the landfill/superfund site that could add additional time, and construction and O & M costs.	Possible risks from potential release of contaminated air, soil, or water are described in the 2023 Draft EIS and this Final EIS in Section 3.13, Hazardous Materials. Additionally, in the Executive Summary, under Areas of Controversy and Issues to be Revolved, potential risks associated with developing the Midway Landfill are described.

KENT
WASHINGTON

ECONOMIC & COMMUNITY DEVELOPMENT
Kurt Hanson, Director

220 Fourth Avenue South
Kent, WA 98032-5895
Fax: 253-856-6454

Phone: 253-856-5454

April 15, 2021

OMF South, c/o Hussein Rehmat
Sound Transit
401 S. Jackson Street
Seattle, WA 98104

RE: Sound Transit Light Rail Operations and Maintenance Facility – South Draft Environmental Impact Statement Comments

Dear Mr. Rehmat:

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement (DEIS) for the Sound Transit (ST) Light Rail Operations and Maintenance Facility – South (OMF-S) and applicable appendices.

As previously stated by the City of Kent, the City of Kent does not object to the OMF-S facility being located within the city provided the OMF-S is constructed on the Midway Landfill site. The city provides the comments below on the three alternatives being analyzed in the DEIS.

Figure ES-8 – Illustrated Metrics: Preliminary Capital and Operating Costs Estimates - Why the increased annual cost annual operation at the Midway Landfill compared to the other two sites? A 10% increase in costs at the Midway Landfill site should be explained. This has not been identified in the DEIS and the public should be provided an opportunity to comment the increased maintenance cost.

Sec. 1.1 – Purpose of the Project - The purpose and need should identify which ST expansion projects requires the construction of the OMF-S facility. Is the OMF-S facility needed for the Federal Way Link Extension (FWLE) project? A portion of the FWLE project is funded with ST3 funds.

Sec. 2.6 – Funding and Conceptual Cost Estimates - The DEIS identifies conceptual cost estimates that that vary greatly between the Midway Landfill site and the other sites being considered. A detailed breakdown of the assumed costs associated with each alternative should be included in the DEIS to fully understand the alternatives being considered.

Sec. 2.7.2 – Next Steps and Schedule: Benefits and Disadvantages of Delaying Project Implementation - The FWLE project was extended as a part of ST3. Would the delay of the OMF-S impact the level of service anticipated once the FWLE project was completed?

Sec 3.2.1.2 – Transportation: Impact Thresholds– The City of Kent does not agree with the mitigation threshold of +10 seconds. Mitigation may be required based on a lower delay threshold.

Sec 3.2.1.2 – Transportation: Impact Thresholds– The second paragraph needs to be clarified. Is the mitigation threshold LOS E for SR 99 and LOS F for the other streets that are not HSS or state highways?

Sec 3.2.1.2 – Transportation: Impact Thresholds– The City of Kent's current (2021) Transportation Master Plan LOS for SR 99 is LOS D or better.

Sec 3.2.1.4 – Transportation: Transit – Metro Route 166 was eliminated in September 2020. Portions of the route are now served by Route 165.

Sec 3.2.2.1 – Transportation: Environmental Impacts - Kent's future transportation projects have changed with the adoption of the new Transportation Master Plan located at https://www.kentwa.gov/city-hall/public-works/transportation-and-streets/transportation-planning. Please review and revise as necessary.

Sec. 3.2.2.1 – Transportation: Environmental Impacts - Due to the impacts of construction on local streets, if the Midway Landfill site is selected for the OMF-S, South 259th Street will require a full width overlay.

Sec. 3.2.2.1. – Transportation: Environmental Impacts, Non-Motorized Network - The updated Transportation Master Plan (TMP), adopted in March 2021, details bicycle and pedestrian standards for Kent's transportation network. Below bicycle and pedestrian standards for the roadways in the Midway Landfill Study Area. For the more details on these standards, please see chapter 5 of the TMP located at https://www.kentwa.gov/home/showpublisheddocument?id=16632.

- SR 99 – S 240th St to 1st driveway south of 244th St
    - Bicycle – LOS 1
    - Pedestrian – Downtown/TOD Standard
- SR 99 – 1st driveway south of 244th St to S 259th St
    - Bicycle – LOS 1
    - Pedestrian – Areas of High Pedestrian Activity
- S 259th St – SR 99 to West Hill Mobile Manor Driveway
    - Bicycle – LOS 1
    - Pedestrian – Areas of High Pedestrian Activity
- S 259th St – West Hill Mobile Manor Driveway to east study limits
    - Bicycle – LOS 1
    - Pedestrian – Other Arterials
- S 240th St – All in study area
    - Bicycle – LOS 2
    - Pedestrian - Downtown/TOD Standard
- S 252nd St from SR 99 to 29th Ave S; 29th Ave S from S 252nd St to S 259th St; S 244th from SR 99 to just west of I-5; and new facility just west of I-5 between S 240th and S 244th St
    - Bicycle – LOS 2

Sec 3.2.2.2 – Transportation: Environmental Impacts, "Intersections" #2 (SR 99/S 244th St), #3 (SR 99/Midway Mobile Home Park), and #4 (S 246th St) are commercial driveways on the east side of SR 99 and do not need to be analyzed as intersections unless there is a direct impact on a public right-of-way intersection on the west side.

Sec 3.2.2.2. – Transportation: Environmental, Long Term Impacts - The location of the gates will need to be designed so expected queues do not extend into the public right of way assuming the likely usage and an additional safety factor.

Sec 3.2.2.2 - Transportation: Environmental, Long Term Impacts, Parking: Kent City Code 15.15.310 requires the following: *In order to provide adequate off-street parking, the lead agency for an HCT facility shall be required to provide a parking study, prepared as part of an EIS or separately, for each station, demonstrating that the parking demand will be satisfied.* This standard would apply to the OMF-S facility. Please indicate when this requirement would be fulfilled.

Sec. 3.2.2.3 – Transportation: Construction Impacts – Given the peak number of construction vehicles per day for the Midway Landfill alternatives, particularly the hybrid and full excavation alternatives, consultation with the Washington State Department of Transportation should be completed to consider options to access directly to I-5 similar to access during the landfill waste removal during the construction of the FWLE. Just north of the existing stormwater pond on the Midway Landfill, Structure B of the FWLE project has enough vertical separation to allow trucks to pass underneath and access I-5.

Figure 3.2-8 – Existing Annual Average Daily Traffic Along Truck Routes: Midway Landfill Alternative - This figure identifies the proposed haul route for the Midway Landfill Alternative. Considerable truck traffic is proposed. If a Midway Landfill option is chosen, will be required to complete a 2-inch minimum overlay on all haul routes within Kent's jurisdiction. In addition, a direct I-5 connection should be considered, particularly for the hybrid and full excavation options. Structure B within the FWLE project, just north of the Midway Landfill will be elevated enough to allow for a future road, therefore an alternative to access I-5 can be evaluated.

Sec. 3.3.2.3 – Construction Impacts – Temporary Construction Easements (TCEs) should be identified in the DEIS on a map. How will these TCEs impact traffic volumes and access to city streets. These need to be considered in the analysis.

Sec. 3.4.1.1 – Land Use: Affected Environment, Midway Landfill Alternative - The Midway Landfill would eliminate some commercial businesses along Pacific Highway South which are also shown on Figure 3.4-1. These commercial businesses should be discussed and specifically identified section 3.4.1.1.

Sec. 3.4.2 – Land Use: Consistency with Regional and Local Comprehensive Plans and Zoning - This type of facility is anticipated in KCC 15.04.060, allowed via a conditional use permit (CUP), and so would not be a fundamentally inconsistent land use. Any design-specific impacts would need to be mitigated as part of the CUP approval.

Sec. 3.4.3.3 – Land Use: Construction Impacts – The DEIS estimates a Midway Landfill alternative would take up to 8 years to complete. What is the degree of uncertainly in these estimates? How would the construction duration impact residents to the south, adjacent to S. 259th Street?

Table 3.5-5 – Economics: Property Acquisition Impacts on Businesses and Employees - This table identifies the four (4) businesses that would be displaced, with ten (10) total businesses affected. Please provide a complete list of the business names impacted for the Midway Landfill Site options.

Table 3.5-5 – Economics: Property Acquisition Impacts on Businesses and Employees - For this table Note 3 states employee displacements are based on building size and business type. The

number of businesses where employees could be displaced are not that great the actual number can be identified. Numbers on the table appear to be absolute and not necessarily representative of the actual number of displacements.

Sec. 3.6.2.3 – Social Resources, Community Facilities, and Neighborhoods: Construction Impacts - The Midway Landfill Alternative might also impact the residential properties along the southern edge of the Midway Landfill. Provide a description of how these properties would be impacted, particularly since options at the Midway Landfill could take up to eight years for construction.

Table 4.5-1 – Past, Present, and Reasonably Foreseeable Future Actions and Figure 4.5-1 – Past, Present, and Reasonably Foreseeable Future Actions -
Both the WSDOT SR509 (Map ID #1) and ST FWLE (Map ID#2) are long linear projects. As depicted on Figure 4.5-1. These projects should be clearly illustrated on the map.

GENERAL COMMENT - OMF-S appears to be larger than the Forrest Street OMF and the OMF-E. The alternatives in the DEIS appear to have expanded since earlier discussions with ST. Has the size of the OMF-S expanded and if so, please provide an explanation of why the expansion has occurred? If there is expansion, how much of the expansion is intended for the expansion of light rail north of Seattle?

GENERAL COMMENT – Many assumptions were made with each of the alternatives. A complete list of assumptions for each site alternative should be provided for the public and decision makers to review and understand during the comment period.

Appendix C - OMF-S DEIS Conceptual Design Drawings

Midway Landfill Option 2 – Hybrid (Sheet 5) vs. Midway Landfill Option 3 Total excavation. Why include deep dynamic compaction in Option 2 sheet 5? Based on the cross section for the hybrid option, why add deep dynamic compaction when the full excavation option does calls out 3-foot over excavation from the 1966 topography? Otherwise these are similar from an excavation perspective. Can the deep dynamic compaction be eliminated for a cost savings and/or a reduced construction time?

As required by Kent City Code section 15.15.020, the design requirements of KCC 15.15 shall apply to this site. An analysis of the site requirements from this section should be included.

Appendix D2 Interim Midway Landfill Preparation Memorandum

Sec. 2.1 - Earthwork Process, page 14, Line 16 states the active excavation and hauling are assumed to be 12-hour shifts but may be 16-hours with two shifts. Is the construction duration for these alternatives based on a 12-hour shifts or 16-hour shifts? Both should be represented in the DEIS. Would 16-hour shifts decrease construction costs? Also, what would the reduction in the construction duration be with 16-hour shifts?

Sec. 2.1 - Earthwork Process, page 14, Line 20 states excavation is assumed to be permitted only between May 1 and September 30. This is a significant assumption. This would have significant impact on construction duration and the cost of construction. Which agency makes this final determination and how can this be resolved prior to the decision making by the Sound Transit Board?

Sec. 2.2 - Drilled Shaft and Slab Installation, Page 14 line 36 states that drilled shafts are assumed to be 10-feet in diameter. These are quite large shafts and potentially very expensive. This is a significant assumption. Are these the largest shafts that would be required? What is the difference in cost and construction duration if the columns were a smaller diameter? What information is needed to the determine if smaller diameter shafts could be used and what are the cost savings? How can this be determined to refine potential construction costs prior to decision making by the Sound Transit Board?

Sec. 2.5 - Construction Phasing and Material Reuse, page 18, line 27 assumes a 5-acre open refuse area that will be limiting for space demands. How was the 5-acre open refuse area assumed and who makes that final determination? This might be able to be larger. Which agency makes this final determination and how can this be resolved prior to the decision making by the Sound Transit Board? If this can be larger, is there a potential reduction in cost and construction duration for Midway Landfill alternatives?

Sec. 4.0 - Schedule, Page 33, Line 22, second schedule consideration states there may be an advantage to separating out. A description of the advantage should be included in the analysis.

Appendix D3 Conceptual Landfill Refuse Plan

Sec. 2.6.1 – Why is deep dynamic compaction proposed for the hybrid option but not the full excavation option when material will be removed and reused? See Figures 2 and 3.

Sec. 2.6.2.2 - Drilled Shaft and Slab Installation, Page 26, Line 8 states that the grid spacing for the drilled shafts changed from the 100-ft by 100-ft spacing due to land landfill optimization process. Line 2 identifies a 35-foot by 70-foot grid. What information led to this change and what is the impact to construction cost and duration?

Sec. 2.6.2.3 – Environment Considerations During Construction, Page 30, Line 22 discusses re-use of screened soils from the landfill. How and when will this information be determined? This could have an impact on the cost and duration of construction.
Sec. 2.6.3.1 – Truck Haul Routes – Are construction haul routes described in the documents for waste removal or all construction vehicles? Specifically, if the Midway Landfill site is selected, and concrete trucks are locally sourced, what is the route for the concrete trucks? City streets included in the haul routes for concrete trucks should receive an overlay at the conclusion of the project.
Sec. 2.6.3.2 – Level of Service – If the Midway Landfill site is selected, and concrete trucks are locally sourced, how will the quantity of the concrete trucks impact traffic patterns? Does the data in Table 2-5 include concrete trucks?
Appendix D4 Midway Landfill Human Health Risk Assessment

GENERAL QUESTION - For Contaminants of Interest, are there any potential mitigation measures that can be implemented during construction to mitigate any potential human health risks for all options at the Midway Landfill site?
Appendix G1 - OMF-S DEIS – Transportation Technical Report

Sec. 4.1.1.1 – Please updates with Kent's current Transportation Master Plan.

Sec 4.1.x – "Intersections" #2 (SR 99/S 244th St), #3 (SR 99/Midway Mobile Home Park), and #4 (S 246th St) are commercial driveways on the east side of SR 99 and do not need to be analyzed as intersections unless there is a direct impact on a public right-of-way intersection on the west side.

Sec 4.2.1.x – The location of the gates will need to be designed so expected queues do not extend into the public right of way assuming the likely usage and an additional safety factor.

Sec 4.2.1.5 – Why would parking be lost on S 252nd St.? The project would be required to construct standard frontage improvements which may include width for on-street parking.

Sec 4.2.2.1 – Converting the median to a southbound left-turn in the 24600 block will require WSDOT approval (RCW 46.61.020 (13)). Kent will require mitigation for the lost landscaping in the median.

Sec 4.6.1 – With this much truck traffic, S 272nd St. will need post-construction restoration.

Potential Funding Resources

The March 2021 *Center for Creative Land Recycling* newsletter included some articles that may be a resource for funding or resources that could be used should the Midway Landfill site be selected. The website for the *Center For Creative Land Recycling* can be found at https://www.cclr.org/. Also, the articles in the March 2021 Newsletter are listed below:

1) Vision to Action: Engaging Communities for Better Redevelopment - https://www.cclr.org/sites/default/files/V2A%20Fact%20Sheet%20%2B%20Case%20Studies%20%283%29.pdf
2) Real Estate Technical Assistance Opportunity - https://www.cclr.org/cre-technical-assistance?mc_cid=01cd720724&mc_eid=b4c1148da3
3) Targeted Brownfields Assessment Request in Region 10 (EPA) - https://www.epa.gov/brownfields/targeted-brownfields-assessment-requests-region-10?mc_cid=01cd720724&mc_eid=b4c1148da3
4) Power Up Your Program:
   Using the Brownfields Community Capacity Assessment Tool Webinar - https://www.ksutab.org/education/webinars/details?id=452&mc_cid=01cd720724&mc_eid=b4c1148da3

Thank you again for the opportunity to comment on Draft Environmental Impact Statement for the proposed Operation and Maintenance Facility-South.

Sincerely,

Kurt Hanson
Economic and Community Development Director

c: Dana Ralph, Mayor
Derek Matheson, Chief Administrative Officer
Chad Bieren, P.E., Public Works Director
Matt Gilbert, Economic and Community Development Manager
Kelly Peterson, City of Kent Liaison to Sound Transit – FWLE

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
1	As previously stated by the City of Kent, the City of Kent does not object to the OMF-S facility being located within the city provided the OMF-S is constructed on the Midway Landfill site. The city provides the comments below on the three alternatives being analyzed in the DEIS. Figure ES-8 - Illustrated Metrics: Preliminary Capital and Operating Costs Estimates - Why the increased annual cost operation at the Midway Landfill compared to the other two sites? A 10% increase in costs at the Midway Landfill should be explained. This has not been identified in the DEIS and the public should be provided an opportunity to comment on the increased maintenance cost.	The additional $1M in annual operations and maintenance costs for the Midway Landfill is discussed in the 2023 Draft EIS and this Final EIS in the Executive Summary and Section 2.5, Funding and Opinion of Probable Cost. The additional annual expenses are expected to be necessary to mitigate for potential risks posed by settlement and methane gas over the lifespan of the facility as well as higher operating costs for the trains to deploy each morning before passenger service begins and return to the OMF each night after passenger service has shut down.
2	Sec. 1.1 - Purpose of the Project - The purpose and need should identify which ST expansion projects requires the construction of the OMF-S facility. Is the OMF-S facility needed for the Federal Way Link Extension (FWLE) project? A portion of the FWLE is funded with ST3 funds.	Chapter 1, Purpose and Need for the Project, in the 2023 Draft EIS and this Final EIS explains that OMF South would be built in the South Corridor to maintain and store a portion of the light rail vehicle (LRV) fleet for the Sound Transit 3 system expansion as well as to receive, test, commission, store, maintain, and deploy new LRVs for the entire system.
3	Sec. 2.6 - Funding and Conceptual Cost Estimates - The DEIS identifies conceptual cost estimates that that vary greatly between the Midway Landfill site and the other sites being considered. A detailed breakdown of the assumed costs associated with each alternative should be included in the DEIS to fully understand the alternatives being considered.	The purpose of the EIS process is to identify the potential impacts to the natural and built environment. The cost estimates were included for comparison purposes. A detailed cost breakdown is not included in the Final EIS.
4	Sec 2.7.2 - Next Steps and Schedule: Benefits and Disadvantages of Delaying Project Implementation - The FWLE project was extended as part of ST3. Would the delay of the OMF-S impact the level of service anticipated once the FWLE project was completed?	FWLE was included in Sound Transit 2, with additional funding provided by Sound Transit 3. A delay of OMF South would not affect the completion of FWLE or affect the FWLE level of service.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
5	Sec 3.2.1.2 - Transportation: Impact Thresholds - The City of Kent does not agree with the mitigation threshold of +10 seconds. Mitigation may be required based on a lower delay threshold. Sec 3.2.1.2 - Transportation: Impact Thresholds - The second paragraph needs to be clarified. Is the mitigation threshold for LOS E for SR 99 and LOS F for the other streets that are not HSS or state highways? Sec 3.2.1.2 - Transportation: Impact Thresholds - The City of Kent's current (2021) Transportation Master Plan LOS for SR 99 is LOS D or better.	Sound Transit typically uses a 10-second or 10-percent additional delay threshold when determining whether mitigation is needed for intersections already operating at LOS F. This threshold is used because it represents the conditions when there would start to be a noticeable vehicle delay increase compared with the No-Build Alternative. Section 3.2, Transportation, in the 2023 Draft EIS and this Final EIS clarifies the LOS standards for WSDOT, Federal Way, and Kent and notes that Kent follows the WSDOT LOS standard for SR 99, which is D or better.
6	Sec 3.2.1.4 - Transportation: Transit - Metro Route 166 was eliminated in September 2020. Portions of the route are now served by Route 165.	This information was updated in Section 3.2, Transportation, in the 2023 Draft EIS and is reflected in this Final EIS.
7	Sec. 3.2.2.1 - Transportation: Environmental Impacts - Kent's future transportation projects have changed with the adoption of the new Transportation Master Plan located at https://www.kentwa.gov/city-hall/public-works/transportation-and-streets/transportation-planning. Please review and revise as necessary.	The list of projects planned by the City of Kent was updated in Section 3.2, Transportation, in the 2023 Draft EIS. This update is reflected in the Final EIS.
8	Sec 3.2.2.1 - Transportation: Environmental Impacts - Due to the impacts of construction on local streets, if the Midway Landfill site is selected for the OMF-S, South 259th Street will require a full width overlay.	Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would identify haul routes as part of its traffic management plan and comply with mitigation measures as required by the Kent City Code.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
9	Sec. 3.2.2.1. - Transportation: Environmental Impacts, Non-Motorized Network - The updated Transportation Master Plan (TMP), adopted March 2021, details bicycle and pedestrian standards for Kent's transportation network. Below bicycle and pedestrian standards for the roadways in the Midway Landfill Study area. For more details on these standards, please see chapter 5 of the TMP located at https://kentwa.gov/home/showpublisheddocument?id=16632. • SR-99 - South 240th St to 1st driveway south of 244th St ○ Bicycle - LOS 1 ○ Pedestrian - Downtown/TOD Standard • SR-99 - 1st driveway south of 244th St to S 259th St ○ Bicycle - LOS 1 ○ Pedestrian - Areas of High Pedestrian Activity • S 259th St - SR 99 to West Hill Mobile Manor Driveway ○ Bicycle - LOS 1 ○ Pedestrian - Areas of High Pedestrian Activity • S 259th St - West Hill Mobile Manor Driveway to east study limits ○ Bicycle - LOS 1 ○ Pedestrian - Other arterials • S 240th St - All in study area ○ Bicycle - LOS 2 ○ Pedestrian - Downtown/TOD Standard • S 252nd St from SR 99 to 29th Ave S; 29th Ave S from 252nd St to S 259th S; S 244th from SR 99 to just west of I-5; and new facility just west of I-5 between S 240th and S 244th St ○ Bicycle- LOS 2	Appendix G1, Transportation Technical Report, of the 2023 Draft EIS and this Final EIS includes the LOS standards for nonmotorized facilities in the study area.
10	Sec 3.2.2.2 - Transportation: Environmental Impacts, "Intersections" #2 (SR 99/S 244th St), #3 (SR 99/Midway Mobile Home Park), and #4 (S 246th St) are commercial driveways on the east side of SR 99 and do not need to be analyzed as intersections unless there is a direct impact on a public right-of-way intersection on the west side.	These intersections were included for analysis early in the project to accommodate potential design changes. Based on the city's comments, Sound Transit removed analysis of these intersections from the text of Section 3.1, Transportation, of the 2023 Draft EIS, but kept the analysis of them in Appendix G1, Transportation Technical Report. This update is reflected in this Final EIS.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
11	Sec 3.2.2.2. - Transportation: Environmental, Long Term Impacts - The location of the gates will need to be designed so expected queues do not extend into the public right of way assuming the likely usage and an additional safety factor.	As stated in Section 3.2.2.2 of the 2023 Draft EIS and this Final EIS, the access driveways and gate locations along driveways should allow for sufficient capacity to accommodate the inbound and outbound vehicles trips without additional queueing and delays that would impact intersection operations. While driveway space would be able to accommodate some number of vehicles, queues during peak hours could extend into the public right-of-way. Sound Transit will continue to revise the design to accommodate vehicle queues within the entrance driveway to the extent possible.
12	Sec. 3.2.2.2 - Transportation: Environmental, Long Term Impacts, Parking: Kent City Code 15.15.310 requires the following: *In order to provide adequate off-street parking, the lead agency for an HCT facility shall be required to provide a parking study, prepared as part of an EIS or separately, for each station, demonstrating that the parking demand will be satisfied.* This standard would apply to the OMF-S facility, Please indicate when this requirement would be fulfilled.	The OMF South project does not include a station. OMF South would be designed to accommodate the number of employees and visitors and to comply with the parking requirements of local jurisdictions. Section 4.2.1.5 of Appendix G1, Transportation Technical Report, of the Draft 2023 and this Final EIS discusses the parking assumptions for each alternative.
13	Sec. 3.2.2.3 - Transportation: Construction Impacts - Given the peak number of construction vehicles per day for the Midway Landfill alternatives, particularly the hybrid and full excavation alternatives, consultation with the Washington State Department of Transportation should be completed to consider options to access directly to I-5 similar to access during the landfill waste removal during the construction of the FWLE. Just north of the existing stormwater pond on the Midway Landfill, Structure B of the FWLE project has enough vertical separation to allow trucks to pass underneath and access I-5.	Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would consult with WSDOT on the possibility of direct access to I-5. Since the landfill is to the west of I-5, direct access could only be to southbound I-5 and would be constrained by the newly built FWLE facilities. This would only be a consideration if the excavated waste were to be hauled to a transfer facility south of the landfill.
14	Figure 3.2-8 - Existing Annual Average Daily Traffic Along Truck Routes: Midway Landfill Alternative - This figure identifies the proposed haul route for the Midway Landfill Alternative. Considerable traffic is proposed. If a Midway Landfill option is chosen, it will be required to complete a 2-inch minimum overlay on all haul routes within Kent's jurisdiction. In addition, a direct I-5 connection should be considered, particularly for the hybrid and full excavation options. Structure B within the FWLE project, just north of the Midway Landfill will be elevation enough to allow for a future road, therefore an alternative to access I-5 can be evaluated.	Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would identify haul routes as part of its traffic management plan and comply with mitigation measures as required by the Kent City Code. As stated in Section 3.2, Transportation, of the 2023 Draft EIS and this Final EIS Sound Transit would consult with WSDOT on the possibility of direct access to I-5.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
15	Sec. 3.3.2.3 - Construction Impacts - Temporary Construction Easements (TCEs) should be identified in the DEIS on a map. How will these TCEs impact traffic volumes and access to city streets. These need to be considered in the analysis.	Due to the conceptual level of design, temporary construction easements are not identified in the EIS. Temporary construction easements would be determined during final design. The discussion of impacts to traffic volumes and access to city streets encompasses broadly anticipated impacts from temporary construction easements in addition to permanent acquisitions.
16	Sec 3.4.1.1 - Land Use: Affected Environment, Midway Landfill Alternative - The Midway Landfill would eliminate some commercial businesses along Pacific Highway South with are also shown on Figure 3.4-1. These commercial businesses should be discussed and specifically identified section 3.4.1.1.	The potential impacts to properties and businesses are based on a conceptual level of design. Potentially affected parcels are listed in Appendix H, Supporting Information for Other Technical Analyses. The Final EIS does not list individual businesses; it identifies the number of business displacements for each alternative for comparison of impacts between alternatives. The number of estimated business displacements is listed in Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS. Additionally, Section 3.4, Land Use, identifies the impacts to commercial land uses within the Midway Landfill site.
17	Sec. 3.4.2 - Land Use: Consistency with Regional and Local Comprehensive Plans and Zoning - This type of facility is anticipated in KCC 15.04.060, allowed via a conditional use permit (CUP), and so would not be fundamentally inconsistent land use. Any design-specific impacts would need to be mitigated as part of the CUP approval.	Section 3.4.2, Consistency with Regional and Local Comprehensive Plans and Zoning, of the 2023 Draft EIS was updated in response to this comment. This update is reflected in this Final EIS. Design-specific details associated with permit submittals will be developed during the final design phase that follows the publication of the Final EIS.
18	Sec. 3.4.3.3 - Land Use: Construction Impacts - The DEIS estimates a Midway Landfill alternative would take up to 8 years to complete. What is the degree of uncertainly in these estimates? How would the construction duration impact residents to the south, adjacent to S. 259th Street?	The project schedule for the Midway Landfill Alternative reflected in the 2023 Draft EIS and this Final EIS is based on a conceptual level of design. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would update the project schedule as the design progressed. Please see Sections 3.2, Transportation and 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods in this Final EIS for information about the potential construction and long-term impacts of the Midway Landfill Alternative to adjacent residents.
19	Table 3.5-5 – Economics: Property Acquisition Impacts on Businesses and Employees – This table identifies the four (4) businesses that would be displaced, with ten (10) total businesses affected. Please provide a complete list of the business names impacted for the Midway Landfill Site options.	The potential impacts to properties and businesses are based on a conceptual level of design. The nature of the impacted businesses is discussed in the 2023 Draft EIS and this Final EIS in Section 3.5, Economics, and the property parcels anticipated to be impacted are shown in Appendix H1, Potentially Affected Parcels. The analysis includes the number of impacted businesses by alternative for comparison of potential impacts between the alternatives.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
20	Table 3.5-5 – Economics: Property Acquisition Impacts on Businesses and Employees – For this table Note 3 states employee displacements are based on building size and business type. The number of businesses where employees could be displaced are not that great the actual number can be identified. Numbers on the table appear to be absolute and not necessarily representative of the actual number of displacements.	The number of displaced employees is based on the business building size (taken from King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers. While not an actual survey of businesses, it allows an equal comparison between alternatives, which is the intent of an EIS.
21	Sec. 3.6.2.3 – Social Resources, Community Facilities, and Neighborhoods: Construction Impacts – The Midway Landfill alternative might also impact the residential properties along the southern edge of the Midway Landfill. Provide a description of how these properties would be impacted, particularly since options at the Midway Landfill could take up to eight years for construction.	Section 3.6.2.3 in the 2023 Draft EIS and this Final EIS describes construction impacts to neighborhoods in proximity to the Midway Landfill Alternative under the subheading Impacts Common to All Build Alternatives. The impacts include access and mobility restrictions, increased truck traffic, localized adverse impacts to air and visual quality, and increased noise and vibration.
22	Table 4.5-1 – Past, Present and Reasonably Foreseeable Future Actions and Figure 4.5-1 – Past, Present and Reasonably Foreseeable Future Actions – Both the WSDOT SR509 Map (Map ID #1) and ST FWLE (MAP ID #2) are long linear projects. As depicted in Figure 4.5-1. These projects should be clearly illustrated on the map.	The figures in Chapter 4, Cumulative Effects Analysis, of the 2023 Draft EIS were reconfigured to address this comment. Figure 4.3-1 now shows the extent of the SR 509 and FWLE project corridors as they relate to the OMF South Midway Landfill Alternative. Figure 4.3-2 shows the location of the remainder of the projects discussed in the analysis. This update is reflected in the Final EIS.
23	GENERAL COMMENT – OMF-S appears to be larger than the Forrest Street OMF and the OMF-E. The alternatives in the DEIS appear to have expanded since earlier discussions with ST. Has the size of the OMF-S expanded and if so, please provided an explanation of why the expansion has occurred? If there is an expansion, how much of the expansion is intended for the expansion of light rail north of Seattle?	At the beginning of the site identification process, it appeared that a site of 40 to 50 acres would be large enough to meet the needs of OMF South based on a typical OMF layout template. However, as project development continued and the programming requirements of OMF South were more fully refined, it became apparent that larger sites were necessary to accommodate site circulation, site access, space for frontage improvements and building setback requirements, and variation in parcel sizes. In addition, more space was needed for repair and daily cleaning of the higher-capacity LRVs required to serve system-wide ridership growth. See Section 2.2, Alternative Development and Scoping, in the 2023 Draft EIS and this Final EIS for more detail.
24	GENERAL COMMENT – Many assumptions were made with each of the alternatives. A complete list of assumptions for each site alternative should be provided for the public and decision makers to review and understand during the comment period.	The assumptions concerning the design and construction of each alternative are discussed throughout the EIS as needed to understand and estimate the potential impacts under each element of the environment.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
25	Appendix C - OMF-S DEIS Conceptual Design Drawings Midway Landfill Option 2 - Hybrid (Sheet 5) vs. Midway Landfill Option 3 Total excavation. Why include deep dynamic compaction in Option 2 sheet 5? Based on the cross section for the hybrid option, why add deep dynamic compaction when the full excavation option does calls out 3-foot over excavation from the 1966 topography? Otherwise these are similar from an excavation perspective. Can the deep dynamic compaction be eliminated for a cost savings and/or a reduced construction time?	Deep dynamic compaction or some other form of stabilization would likely be necessary for the Hybrid subsurface design option because a portion of the landfill would be left in place. The supporting documents in Appendix D were written early in the conceptual design process. The assumptions made were purposefully conservative to account for unknowns. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
26	As required by Kent City Code section 15.15.020, the design requirements of KCC 15.15 shall apply to this site. An analysis of the site requirements from this section should be included.	Section 3.4., Land Use, of the 2023 Draft EIS and this Final EIS notes that the OMF would need to comply with Kent City Code Chapter 15.15, which includes design requirements to ensure that high-capacity transit facilities are well designed.
27	Appendix D2 Interim Midway Landfill Preparation Memorandum Sec, 2.1 - Earthwork Process, page14, Line 16 states the active excavation and hauling are assumed to be 12-hour shifts but may be 16-hours with two shifts. Is the construction duration for these alternatives based on a 12-hour shifts or 16-hour shifts? Both should be represented in the DEIS. Would 16-hour shifts decrease construction costs? Also, what would the reduction in the construction duration be with 16-hour shifts?	The construction durations assume 12-hour shifts. The supporting documents in Appendix D were written early in the conceptual design process. The assumptions made were purposefully conservative to account for unknowns. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
28	Sec. 2.1 - Earthwork Process, page14, Line 20 states excavation is assumed to be permitted only between May 1 and September 30. This is a significant assumption. This would have significant impact on construction duration and the cost of construction. Which agency makes this final determination and how can this be resolved prior to the decision making by the Sound Transit Board?	The supporting documents in Appendix D were written early in the conceptual design process. The assumptions made were purposefully conservative to account for unknowns. The construction window was assumed to be limited to the 22-week dry season between May 1 and September 30 to reduce the amount of precipitation that could potentially infiltrate into the open area of the landfill, which could further contribute to contaminated groundwater. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
29	Sec.2.2 - Drilled Shaft and Slab Installation, Page 14 line 36 states that drilled shafts are assumed to be 10-feet in diameter. These are quite large shafts and potentially very expensive. This is a significant assumption, Are these the largest shafts that would be required? What is the difference in cost and construction duration if the columns were a smaller diameter? What information is needed to the determine if smaller diameter shafts could be used and what are the cost savings? How can this be determined to refine potential construction costs prior to decision making by the Sound Transit Board?	The supporting documents in Appendix D were written early in the conceptual design process. The assumptions made were purposefully conservative to account for unknowns. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
30	Sec. 2,5 - Construction Phasing and Material Reuse, page 18, line 27 assumes a 5-acre open refuse area that will be limiting for space demands. How was the 5-acre open refuse area assumed and who makes that final determination? This might be able to be larger. Which agency makes this final determination and how can this be resolved prior to the decision making by the Sound Transit Board? If this can be larger, is there a potential reduction in cost and construction duration for Midway Landfill alternatives?	The 5-acre assumption is reasonable at the EIS stage in the planning process. The size would allow for continued control of landfill gas and water infiltration prevention. The actual size would need regulatory approval, and Ecology previously indicated they would allow only small areas to be open at a time. The 5-acre assumption was the basis for hauling transport modeling. Additional space would increase hauling and traffic impacts and could potentially overwhelm any facility receiving the material. The allowable open area would be coordinated with SPU and Ecology during final design if the Midway Landfill Alternative were selected as the project to be built.
31	Sec. 4,0 - Schedule, Page 33, Line 22, second schedule consideration states there may be an advantage to separating out. A description of the advantage should be included in the analysis.	As stated in Appendix D2, Interim Midway Landfill Preparation Memorandum, the schedules are preliminary and at a planning level. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
32	Appendix D3 Conceptual Landfill Refuse Plan Sec, 2.6.1 - Why is deep dynamic compaction proposed for the hybrid option but not the full excavation option when material will be removed and reused? See Figures 2 and 3.	The Full Excavation subsurface design option assumes complete backfill with competent soils. The Conceptual Landfill Site Reuse Plan was written as a high-level discussion to present possible construction approaches for the subsurface design options. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
33	Sec. 2.6.2.2 - Drilled Shaft and Slab Installation, Page 26, Line B states that the grid spacing for the drilled shafts changed from the 100-ft by 100-ft spacing due to land landfill optimization process. Line 2 identifies a 35-foot by 70-foot grid. What information led to this change and what is the impact to construction cost and duration?	As noted in the Conceptual Landfill Site Reuse Plan, the proposed spacing was modified after the design estimates for facility loads were advanced and more was learned about the landfill characteristics. At this very preliminary stage of engineering review of the Midway Landfill Alternative, it is not possible to make a definitive statement regarding the total schedule and budget, but it would have the potential to shorten the construction schedule and reduce cost. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.

City of Kent (Communications ID 473482)		
Comment ID	**Comment Text**	**Response**
34	Sec, 2,6,2.3 - Environment Considerations During Construction, Page 30, Line 22 discusses reuse of screened soils from the landfill. How and when will this information be determined? This could have an impact on the cost and duration of construction'.	As noted in the Conceptual Landfill Site Reuse Plan, reuse of screened material would be subject to regulatory approval. Sound Transit would work with Ecology to determine the parameters of what would be allowed for reuse and what would need to be taken off-site for disposal. Actual screening could take place on-site. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
35	Sec. 2.6.3.1 – Truck Haul Routes – Are construction haul routes described in the documents for waste removal or all construction vehicles? Specifically, if the Midway Landfill site is selected, and concrete trucks are locally sourced, what is the route for the concrete trucks? City streets included in the haul routes for concrete trucks should receive an overlay at the conclusion of the project.	While the identified haul routes are meant to be representative of likely routes for waste-hauling vehicles, they could be representative for other construction vehicles as well. Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would identify haul routes as part of its traffic management plan and comply with measures as required by the Kent City Code.
36	Sec. 2.6.3.2 – Level of Service – If the Midway Landfill site is selected, and concrete trucks are locally sourced, how will the quantity of the concrete trucks impact traffic patterns? Does the data in Table 2-5 include concrete trucks?	Concrete trucks are included in the analysis presented in Table 2-5 of Appendix D3, Conceptual Landfill Site Reuse Plan, in the 2023 Draft EIS and this Final EIS. While the identified haul routes are meant to be representative of likely routes for waste-hauling vehicles, they could be representative for other construction vehicles as well. Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would identify haul routes as part of its traffic management plan and comply with measures as required by the Kent City Code.
37	Appendix D4 Midway Landfill Human Risk Assessment GENERAL QUESTION – For Contaminants of Interest, are there any potential mitigation measures that can be implemented during construction to mitigate any potential human health risks for all options at the Midway Landfill site?	Section 3.13, Hazardous Materials, in the 2023 Draft EIS and this Final EIS discusses avoidance, minimization, and mitigation measures that would apply to all subsurface construction design options for the Midway Landfill Alternative.
38	Appendix G1 – OMF-S DEIS – Transportation Technical Report Sec. 4.1.1.1 – Please update with Kent's current Transportation Master Plan.	Appendix G1, Transportation Technical Report, of the 2023 Draft EIS was revised to include the list of projects planned by the city of Kent. This update is reflected in the Final EIS.
39	Sec. 4.1.x – "Intersections" #2 (SR 99/S 244th St), #3 (SR 99/Midway Mobile Home Park), and #4 (S 246th St) are commercial driveways on the east side of SR 99 and do not need to be analyzed as intersections unless there is a direct impact on a public right-of-way intersection on the west side.	Based on the city's comment, Sound Transit removed the analysis of these intersections from the text of Section 3.1, Transportation, of the 2023 Draft EIS, but kept the analysis of them in Appendix G1, Transportation Technical Report. This update is reflected in this Final EIS.

City of Kent (Communications ID 473482)

Comment ID	Comment Text	Response
40	Sec 4.2.1.x – The location of the gates will need to be designed so expected queues do not extend into the public right of way assuming the likely usage and an additional safety factor.	Please see response to Comment ID 11.
41	Sec. 4.2.1.5 – Why would parking be lost on S 252nd St? The project would be required to construct standard frontage improvements which may include width for on-street parking.	The analysis conservatively estimated parking loss. The analysis assumed that roadway improvements on S 252nd Street could remove the gravel shoulder that some residents use for parking.
42	Sec. 4.2.2.1 – Converting the median to a southbound left-turn lane in the 24600 block will require WSDOT approval (RCW 46.61.020 (13)). Kent will require mitigation for the lost landscaping on the median.	Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would coordinate with the city of Kent and WSDOT on proposed roadway improvements during final design and comply with measures as required by Kent City Code.
43	Sec. 4.6.1 – With this much truck traffic, S 272nd St will need post-construction restoration.	Should the Midway Landfill Alternative be selected as the project to be built after publication of the Final EIS, Sound Transit would identify haul routes as part of its traffic management plan and comply with measures as required by Kent City Code, including post-construction restoration.

44	Potential Funding Resources
	The March 2021 *Center for Creative Land Recycling* newsletter included some articles that may be a resource for funding or resources that could be used should the Midway Landfill site be selected. The website for the *Center for Creative Land Recycling* can be found at https://www.cclr.org/. Also, the articles in the March 2021 Newsletter are listed below:
	1) Vision to Action: Engaging Communities for Better Redevelopment – https;//www.cclr.org/sites/default/files/V2A%20Fact%20Sheet%20%2B%20Case%20Studies%20%283%29.pdf
	2) Real Estate Technical Assistance Opportunity – https://www.cclr.org/cre-technical-assistance?mc_cid=01cd720724&mc_eid=b4c1148da3
	3) Targeted Brownfields Assessment Request in Region 10 (EPA) – https://www.epa.gov/brownfields/trageted-brownfields-assessment-requests-region-10?mc_cid=01cd720724&mc_eid=b4c1148da3
	4) Power Up Your Program: Using the Brownfields Community Capacity Assessment Tool Webinar – https://www.ksutab.org/education/webinars/details?id=452&mc_cid=01cd720724&mc_eid=b4c1148da3
		Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

CITY OF Federal Way

OFFICE OF THE MAYOR
33325 8th Avenue South
Federal Way, WA 98003
253-835-2402
www.cityoffederalway.com
Jim Ferrell, Mayor

April 6, 2021

Sound Transit Board
401 S Jackson Street
Seattle, Washington 98104

Re: Operations and Maintenance Facility – South Draft Environmental Impact Statement

Dear Sound Transit Board Members,

The City of Federal Way's Mayor and Councilmembers have reviewed the findings of the Draft Environmental Impact Statement (DEIS) of the potential sites for the Operations and Maintenance Facility South (OMF-South), conducted a Council Study Session with Sound Transit staff, have heard from our community, and have reviewed technical comments prepared by City staff. Our review has affirmed our belief that the Midway Landfill needs to be identified as the preferred alternative and ultimately be the site selected for this facility and the two Federal Way sites should be removed from further review.

We recognize that Sound Transit is building new transit infrastructure to support sustainable growth in our region. In doing so, Sound Transit should not make a decision that will have a lasting negative impact. Environmental review by way of NEPA and SEPA was implemented at the Federal and State levels to evaluate the impacts of government decisions in order to prevent them from causing unnecessary impacts to communities like those that the OMF-South will have in Federal Way. The 336th Street site will remove a church, a school, and a daycare that serve our community as well as residences and other businesses. The 344th Site will remove multiple churches, 20 residences, and a dozen businesses, including the Garage Town community that the DEIS presents as a single business but is in fact made up of over 60 unique owners and Ellenos Real Greek Yogurt, who recently invested millions of dollars in improvements to their regional and growing business. The Midway Landfill will displace significantly fewer businesses and employees, no residents, and no civic institutions.

The DEIS presents a clear preferred alternative when the impacts are considered and it is the Midway Landfill. In accordance with NEPA and SEPA, cost is not an Environmental Impact, however the prepared DEIS clearly shows that Sound Transit has elected to include costs within the decision matrix. In considering the overall impacts and a robust environmental review process, cost cannot be a factor in your decision, the impacts to the Federal Way sites are significant and will be far too detrimental to our community.

The DEIS inaccurately assumes that the City of Federal Way will approve vacating public roads, that City staff will modify our Development Standards to permit this development that would not be approved of other public or private developers, or that adequate mitigation to these items could be found. We strongly object to Sound Transit's finding of regulatory certainty on behalf of the Federal Way sites by unilaterally assuming City approval. Additionally, Sound Transit does not have adequate authority to commit the City of Federal Way to a future legislative act in vacation of opened and utilized public right-of-way.

The City and Sound Transit have a shared interest in the success of the light rail system and have enjoyed a successful partnership on the Federal Way Link Extension to date. We have seen and heard from Sound Transit a willingness to look to the future and make the decisions that are in the best interest for the future of this region. In this spirit, we ask that the Sound Transit Board remove the two Federal Way locations and select the Midway Landfill as the preferred alternative and site of the new OMF-South.

City staff will provide additional technical comments under separate cover.

Sincerely,

FEDERAL WAY MAYOR AND CITY COUNCIL

Jim Ferrell, Mayor

Susan Honda
Susan Honda, Council President

Lydia Assefa-Dawson
Lydia Assefa-Dawson, Councilmember

Gregory Baruso, Councilmember

Hoang V. Tran, Councilmember

Leandra Craft, Councilmember

Martin A. Moore, Councilmember

Linda Kochmar
Linda Kochmar, Councilmember

CC: Peter Rogoff, CEO, Sound Transit
EJ Walsh, P.E., Public Works Director
Brian Davis, Community Development Director
Ryan Medlen, Sound Transit Liaison

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

April 19, 2021

By Email

Mr. Curvie Hawkins
Mr. Hussein Rehmat
Sound Transit
401 S Jackson Street
Seattle, WA 98104
OMFSouthDEIS@soundtransit.org

RE: Operations and Maintenance Facility – South DEIS City of Federal Way Technical Review Comments

Dear Mr. Hawkins and Mr. Rehmat,

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Operations and Maintenance Facility South (OMF South). As you are aware, two of three sites that Sound Transit is considering are within the City of Federal Way. We have appreciated the collaborative nature of the relationship Sound Transit staff looks to have with the City.

The City has taken an official position on the OMF South in a previously provided letter signed by the Mayor and full City Council dated April 6, 2021. This second letter focuses on technical comments and input to help the EIS be finalized and published as the most accurate document possible.

City staff understands that this project is not intending to use Federal funds and therefore not subject to NEPA at this time and that the DEIS is issued as result of Sound Transit issuing a Determination of Significance under SEPA. In light of this and pursuant to WAC 197-11-550, many of our comments can be regarded as requests for clarifying or additional information.

However, items with greater significance are clearly identified as a request for alternative methodology or specific mitigation measures that will be necessary to allow the City to permit the project in the event that one of the locations within Federal Way is ultimately identified.

Construction Cost and Schedule

The DEIS prominently presents cost and construction schedule information in the executive summary, body of the DEIS, and in presentations to the public on the same level as displacements, ecological impacts, and other environmental impacts. Cost to the developer is not a factor of consideration in SEPA reviews or an applicable environmental element in the WAC that has to be considered. The DEIS does not clearly identify the basis for consideration of construction costs so City staff is unable to provide comment beyond that it is not an environmental impact and should not be considered in the EIS. By putting forth these three alternatives in the DEIS, Sound Transit has identified them as reasonable alternatives and should consider them against their environmental impacts alone.

If Sound Transit determines inclusion of costs is appropriate and should remain part of the EIS, then the discussion must be comprehensive for all three alternatives. High-level construction cost information was included for the Midway Landfill, but not for the other alternatives. Comparable evaluation of the relocation, property acquisition, and environmental mitigation would be necessary to understand how cost factors into the analysis being performed in the EIS. If such an analysis is not complete, then it should be noted why no further study is required and the actual costs should be removed and discussed at a summarized, conceptual level only. Other questions left unanswered with regards to cost include:

- Is Sound Transit limiting their ability to seek Federal assistance by building the mainline as part of a project not subject to NEPA?
- Why is the additional maintenance cost for the Midway site not addressed?
- What is the estimated cost of the mainline construction? Alteration to the BPA Power Lines?
- Why does the Midway Landfill Site consider additional costs for settlement even on the option to completely remove the waste from the site?
- The operating cost difference is not addressed in the DEIS, what is the reason for this difference?

As with the discussion on costs, schedule is not a typical environmental element. With no basis for inclusion provided, all discussion about construction schedule should be removed from the DEIS or considered comprehensively for all three site alternatives. As discussed under the City's comments on transportation impacts, both Federal Way alternatives require improved public rights-of-way to be vacated. The vacation process is expected to take 18-24 months and is a Council legislative action. This will add significantly to the timeline.

The following are additional comments relating to cost and schedule:

Page 2-24

- Work hour variance approvals will be required for the construction schedule presented to be allowed in Federal Way.

Page 2-29

- Section 2.6 just covers cost estimates. Where is a discussion on funding in this section?

Page 2-31

- Do these dates consider Sound Transit's realignment effort?
- Based on outlined schedule, 2024 is not a realistic start of construction with required ROW vacations.
- Table 2.7-1 does not present a feasible schedule including the Right of Way vacation process for FW. Sound Transit needs to review that and incorporate into schedule. Right-of-way vacation would need to start approximately early Summer of 2021 for the proposed schedule to be accomplished.
- The requirements, mitigation and processes for Right of Way vacation are not identified or included within the DEIS.

Transportation Impacts

Both site alternatives in Federal Way, 336th St. and 344th St., remove improved public rights-of-way and a north-south road connection. 341st Pl., 344th St., and 20th Ave. S., are all identified in the Federal Way Comprehensive Plan as minor collectors (refer to Map III-3). Additionally, they are each a bicycle route identified in Map III-16. The DEIS indicates the shared markings are an unfunded project when the project is currently out to bid. Additionally, the trip distribution model presented does not redistribute trips from the roads proposed for vacation.

We have appended to this letter an attachment that includes a number of comments and corrections to the Technical Appendix G1. These appended comments are meant to aid in improving the technical report to better inform the analysis of the EIS. The mitigation requested in the body of this letter takes precedence in our ability to permit the project.

The following comments relate to Section 3.2 of the DEIS:

Page 3.2-5

- Level of Service is not the basis for defining impacts associated with right-of-way vacations. Refer to FWRC Chapter 4.20.

Page 3.2-7

- While Section 3.2.1.4 may be correct that the Midway Landfill is primarily served by routes on Hwy 99, the Federal Way sites include Pierce Transit routes split between 336th St., Hwy 99, and 16th Ave S. King County only has a commuter route on Hwy 99.

Page 3.2-11

- Regarding Section 3.2.1.6, the City is in the process of updating on-street parking restrictions in the area and the rule will be in effect this summer.
- Regarding Section 3.2.1.7, the number of collisions is only one part of the safety measures the City uses and is meaningless by itself. For intersections, the City uses collision rate (collisions per million entering vehicles); societal cost; and severity rate (societal cost per million entering vehicles). The DEIS should use these measurements as they are more useful to determining whether mitigation is needed and will ultimately be required as part of Concurrency permitting of the sites.

Page 3.2-14

- Verify that Pierce Transit will continue their service long-term. They have stated they intend to truncate their lines at the South Federal Way Station when TDLE opens.
- Installation of shared lane markings for bicycles is currently out to bid.

Page 3.2-15

- Why not use a travel demand model for more realistic trip assignment, especially when roadway closures would redistribute trips?

Page 3.2-23, Table 3.2-8

- Standard v/c is 1.0 at unsignalized intersections in Federal Way.
- V/c needs to be reported for all intersections in Federal Way.

Page 3.2-39

- The City can provide actual traffic counts upon request and Table 3.2-17 as well as other sections of the report can be updated to provide more accurate information. AADT is not typically presented as a range.

Page 3.2-41

- All signage is required to be reflective regardless, so providing it is not a mitigation measure.

Page 3.2-42

- Section 3.2.3 is incorrect for the Federal Way sites as the facility has long-term planning and operational impacts by not providing a road network consistent with City Development Standards and removing existing roads incorporated into the Comprehensive Plan.

Alternative Methodology - Transportation

The trip distribution modeling needs to address the redistribution of existing trips based on the proposed conditions. Further analysis and appropriate mitigation is required as part of any request for a right of way vacation under Federal Way code.

Mitigation - Transportation

No mitigation for the loss of the roads or alternate travel routes is identified nor do the conceptual designs meet Federal Way Development Standards for vehicular block perimeter. The City of Federal Way requires the project mitigate all public roadways being vacated by incorporating roadways of identical functionality for vehicles, pedestrians, and bicycles in a manner that complies with the City's block perimeter requirements and Comprehensive Plan.

Public Safety

The DEIS correctly states that the City of Federal Way has expressed concerns over the potential effects on response times from either the 336th St. or 344th St. alternatives. 20th Ave. functions as a bypass road for Pacific Highway and 16th Ave. that provides an alternative north-south route for officers who may be responding from anywhere in the City. Section 3.14 states that "it is not possible to accurately determine how the road closure would affect their response time." While then concluding that "the closure [of 20th Avenue] would likely have very little impact on their response time to the area".

We disagree that this impact to response times is insignificant. Given that this issue was identified prior to publication of the DEIS and no mitigation is provided, there must be an analysis to justify the findings in the EIS.

Mitigation – Public Safety

Incorporate a replacement north-south connection parallel to 16th Ave and Pacific Highway for emergency vehicle response. This mitigation overlaps with the requested mitigation for the impacts to the City road network.

Economic and Fiscal Impacts

The following comments relate to Section 3.5:

- Sound Transit should provide actual counts for employee displacements rather than estimates.
- Property taxes as a snapshot in time should be easily calculable as they are published every tax year by the King County Assessor's Office.
- The DEIS does not consider the opportunity cost difference between the three sites. As a landfill and Superfund site, the Midway site will likely have a low opportunity cost. City staff contracted with the FCS Group to assess the opportunity cost of the Federal Way's sites. The findings include that the 344th St. and 336th St. sites have 31.4 and 21 acres of vacant or redevelopable land respectively based on King County buildable lands guidance. As the OMF-South will represent a permanent change of land use to public/institutional, the diminished capacity for population and employment growth for the region that change in use represents needs to be considered.

Page 3.5-8, Table 3.5-5

- The City had the FCS Group review potential employment. Their review found general concurrence with the baseline for the estimated employees directly displaced, but found the impact of those jobs lost would cause a significant number of additional jobs to be lost in the area. In total, the OMF-South will result in $30 - $50 million in lost economic output depending on what site is chosen.
- We understand the information presented to be based on the conceptual 10% OMF-South plans. However, the DEIS needs to acknowledge that any change to the design that expands the footprint will not be inconsequential. Environmental mitigation, additional transportation improvements, and stormwater management are all risks to the footprint expanding. The immediate area surrounding either Federal Way site alternative supports over 300 additional jobs.

Page 3.5-9

- Reference to fiscal impacts as small is a matter of opinion. The DEIS language should be neutral.

- Clarify whether the proportion of assessed valuation is based on assessed valuation or taxable valuation. As all land and buildings typically have an assessed valuation even if they are tax exempt, such as government buildings or developments receiving special tax exemptions. Taxable valuation is more relevant to assessing economic and fiscal impacts.

Alternative Methodology – Economics

- Provide an accurate count for the purposes of employment displacement.
- Consider indirect and induced job loss, as well as economic output loss.
- Address the level of risk and the potential consequences to the OMF-South footprint expanding as design progresses. Further plan development beyond 10% may be required to provide this information and an accurate comparison with the three sites.
- Evaluate and assess the impact to growth capacity and the economic opportunity costs for the three alternative sites. The City has evaluated the 344th St. and 336th St. sites and found the potential impacts to tax revenue to be even greater than estimated impacts based on current development. Industrial vacancy rate in the City is approximately 0.5% and the lost employment opportunities represent a 50% to 100% increase in direct employment effects.

Land Use Impacts

The following comments relate to Section 3.4:

Page 3.4-20

An essential public facility (EPF) is allowed in all zones consistent with State Law and pursuant to FWRC 19.105.020. The design has not progressed to a point for specific mitigation to be discussed, but at a minimum land use compatibility measures consistent with Federal Way Revised Code is required. The project is also expected to comply with community design guidelines under FWRC 19.115.

The following comments are from City staff review of Appendix F, Technical Report on Land Use:

Page F2-10

- Table F2-4 is incomplete without acknowledging that the OMF-South is considered an EPF and will be reviewed under FWRC 19.105.020.

Page F2-13

- The information presented in Appendix C is not sufficient to justify the finding that the response to LUP14 is accurate or feasible.
- With regards to the comment on LUP23, how is a finding that alternative facilities could be developed consistent with the lack of provision of alternative facilities in the conceptual designs presented in Appendix C? One of the alternatives stretches from I-5 to 16th Ave. which eliminates the possibility for an alternative facility.

Page F2-14

- Comprehensive Plan policies need to be considered in totality. The proposal does not seem consistent with LUP35 or LUP38.
- With regards to the finding on LUP47, the Neighborhood Business (BN) zone is not proximal to the light rail system.
- With regards to the finding of LUP59, this sentence doesn't make sense as this policy states that the City development code will have a process for reviewing EPFs as per State law. The policy is not for de facto EPF approval nor is approval of an EPF implementation of this policy.

Additional Information – Land Use

Describe the proposal in enough detail to affirm that adequate room exists for appropriate compatibility between land uses. Deference to complying with code is identified, but a specific landscape buffer and planting schematic is not. The EIS needs to verify that adequate room exists on the site for this buffering after considering construction of lead tracks, security needs, and guideway clear zone requirements. The conceptual plans are not detailed enough for us to concur that mitigation is feasible.

Mitigation – Land Use

EPFs are required to provide mitigation based on the level of impact which will be reviewed as the project develops and information is refined. However, it is noted that FWRC 19.125 requires a 25-foot Type 1 landscaping buffer between industrial uses and residential zoning districts. That provides a baseline as to the level of screening that will be expected for at least a portion of the 336th St. and 344th St. alternatives. The impact of the guideway clear zone on the ability to meet the planting performance standards must be considered.

Environmental and Water Resources

The DEIS notes that Sound Transit will develop plans to mitigate "the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis." The work is noted as being planned to be done in accordance with Federal, State, and local requirements as well as through consultation with tribal biologists. Similarly, water resources are noted as providing of mitigation through compliance with applicable stormwater permitting requirements. Such a broad statement for purposes of mitigation is hard to refute and we encourage Sound Transit to thoroughly evaluate the feasibility of the path forward for the Federal Way sites.

The following comments apply to Section 3.10:

- Has the potential need for large, woody debris as part of the stream restoration been evaluated? This could add to any potential flooding complications.
- Loss of fish habitat and associated identifiable mitigation is not included.

Page 3.10-6

- This section notes that the West Fork Hylebos Creek Tributary is subject to flooding issues while also noting the plan is to regrade the area constricting the wetland and possibly the stream bed. There doesn't appear to have been adequate hydraulics analysis to assess the feasibility of this work as presented in Appendix C.
- It is not clear how City Code will be met as part of regrading and realigning a stream channel.

Page 3.10-11

- The S 344th St. site indicates there is a 60-foot culvert in the current designs to accommodate an emergency access road. Under FWRC 19.145 it will be very challenging to meet the requirements to build a new culvert for a stream. Alternative site designs must be provided to show there is no other option and convenience is not a justification. The design needs to be updated to remove the culvert.

The following comments applies to Appendix G3 and is from pages G3-8 and G3-9:

- The Executive Proposed Basin Plan Hylebos Creek and Lower Puget Sound (King County 1991) should be a data source considered.

The following comment applies to Section 3.11 and is from page 3.11-14:

- Shouldn't the relocation of the existing WSDOT stormwater facility be part of the environmental analysis? No location is identified and it is a result of the proposed project.

Noise and Visual Impacts

The assessment of visual impacts by the Federal Way site alternatives, which both impact 336th at I-5, did not adequately address the presence of the historic Weyerhauser Campus immediately east. 336th St. and 344th St. site visual impacts need to be considered from former Weyerhaeuser property along 336th; this would likely change its level of visual impact from medium to medium-high or high;

The following comments pertain to Appendix G2:

- What is the source for the projected project noise level? How will this be verified against project completion?

Page G2-11

- What about bells from the light rail vehicles or other signals at crossings or upon exiting onto the tracks? This is not directly addressed.

Cumulative Impacts

The Commercial Enterprise (CE) zone is the only light industrial zone in the City of Federal Way and land will be converted for both the OMF-South (should a Federal Way location be selected) and the Tacoma Dome Link Extension. The cumulative impacts section discusses the impacts of light rail in the context of typical mixed-use, transit-oriented development which is not consistent with the current City industrial zoning. TDLE will be building stations in industrially zoned and/or developed lands in Fife and Tacoma (east station). Industrial land is at a premium in the region and if it is challenging for businesses displaced by transit facilities to relocate, it may push them further out to find suitable locations (as previously noted, the vacancy rate is as low as 0.5%). This related action could lead to sprawl or greenfield development and the DEIS should contemplate cumulative impacts of this land conversion comprehensively. The DEIS needs to consider the cumulative impacts of all known Sound Transit projects on industrial land supply based on current zoning.

Section 2.4.1 notes the OMF South and OMF North will have greater capacities than OMF East and OMF Central. What is the impact of other link extensions? This implies OMF North and South will produce greater externalities. Total capacity of the 4 OMFs is 496 LRVs. As OMF South is being built before OMF North, any reduction in footprint as a result of planned capacity exceeding project capacity will fall on OMF South. Section 4.5 should include a table of the link extensions coming online, such as Lynnwood and East, along with OMF capacities to better highlight the need and impacts of regional light rail extensions within Sound Transit 3.

Please reach out to either of us or Ryan Medlen if you have any questions regarding the comments in this letter.

Sincerely,

EJ Walsh, P.E.
Public Works Director

Brian Davis
Community Development Director

cc: Jim Ferrell, Mayor
Ryan Medlen, Sound Transit Liaison

Attachment: Supplemental Appendix G1 comments
Sound Transit OMF Site Opportunity Cost Impact Assessment

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

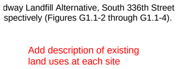
Attachment

Supplemental Appendix G1 comments

[This page intentionally left blank]

Appendix-G1-transportation-tech-report.pdf Markup Summary

10 (1)



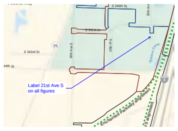
dway Landfill Alternative, South 336th Street
spectively (Figures G1.1-2 through G1.1-4).

Add description of existing land uses at each site

Page Index: 10

Add description of existing land uses at each site

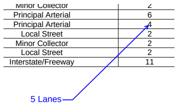
21 (1)


S 344th St
Label 21st Ave S on all figures

Page Index: 21

Label 21st Ave S on all figures

22 (1)



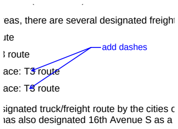
Minor Collector	2
Principal Arterial	6
Principal Arterial	4
Local Street	2
Minor Collector	2
Local Street	2
Interstate/Freeway	11

5 Lanes

Page Index: 22

5 Lanes

41 (1)



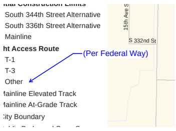
eas, there are several designated freight
ite
route
ace: T3 route
ace: T3 route
signated truck/freight route by the cities c
as also designated 16th Avenue S as a

add dashes

Page Index: 41

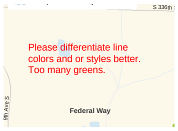
add dashes

43 (2)


South 344th Street Alternative
South 336th Street Alternative
Mainline
ht Access Route
T-1
T-3
Other
ainline Elevated Track
ainline At-Grade Track
ity Boundary
15th Ave S
S 332nd St
(Per Federal Way)

Page Index: 43

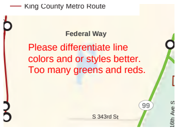
(Per Federal Way)


S 336th
Please differentiate line colors and or styles better. Too many greens.
Federal Way

Page Index: 43

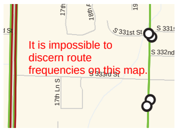
Please differentiate line colors and or styles better. Too many greens.

46 (2)


King County Metro Route
Federal Way
Please differentiate line colors and or styles better. Too many greens and reds.
99
S 343rd St
16th Ave S

Page Index: 46

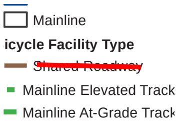
Please differentiate line colors and or styles better. Too many greens and reds.


S 331st St
S 332nd
17th Ln S
It is impossible to discern route frequencies on this map.

Page Index: 46

It is impossible to discern route frequencies on this map.

49 (2)



Mainline

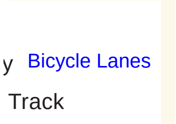
icycle Facility Type

~~Shared Roadway~~

Mainline Elevated Track

Mainline At-Grade Track

Page Index: 49



y Bicycle Lanes

Track

Page Index: 49

Bicycle Lanes

54 (3)

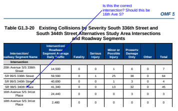
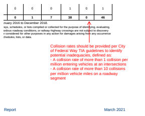


Table G1.3-20 Existing Collisions by Severity South 336th Street and South 344th Street Alternatives Study Area Intersections and Roadway Segments

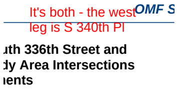
Page Index: 54

Is this the correct intersection? Should this be 16th Ave S?



Page Index: 54

Collision rates should be provided per City of Federal Way TIA guidelines to identify potential inadequacies, defined as:
- A collision rate of more than 1 collision per million entering vehicles at an intersections
- A collision rate of more than 10 collisions per million vehicle miles on a roadway segment



It's both - the west leg is S 340th Pl

OMF S

uth 336th Street and

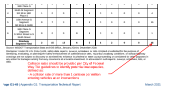
dy Area Intersections

ents

Page Index: 54

It's both - the west leg is S 340th Pl

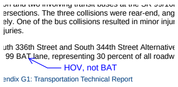
58 (1)



Page Index: 58

Collision rates should be provided per City of Federal Way TIA guidelines to identify potential inadequacies, defined as:
- A collision rate of more than 1 collision per million entering vehicles at an intersections

59 (1)



ersections. The three collisions were rear-end, ang

ely. One of the bus collisions resulted in minor injui

juries.

uth 336th Street and South 344th Street Alternative

99 BAT lane, representing 30 percent of all roadw

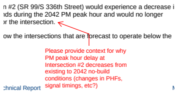
HOV, not BAT

endix G1: Transportation Technical Report

Page Index: 59

HOV, not BAT

63 (1)



n #2 (SR 99/S 336th Street) would experience a decrease i

ds during the 2042 PM peak hour and would no longer

r the intersection.

ow the intersections that are forecast to operate below the

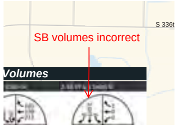
Please provide context for why PM peak hour delay at Intersection #2 decreases from existing to 2042 no-build conditions (changes in PHFs, signal timings, etc?)

chnical Report

Page Index: 63

Please provide context for why PM peak hour delay at Intersection #2 decreases from existing to 2042 no-build conditions (changes in PHFs, signal timings, etc?)

65 (1)

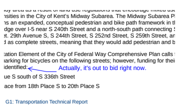


SB volumes incorrect

Page Index: 65

SB volumes incorrect

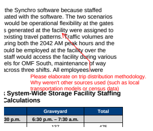
74 (1)



Page Index: 74

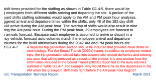
Actually, it's out to bid right now.

76 (2)



Page Index: 76

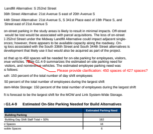
Please elaborate on trip distribution methodology. Why weren't other sources used (such as local transportation models or census data)



Page Index: 76

A separate trip generation section should be included that provides more detail on methodology. Per the Sound Transit (2020a) report, in addition to employee-related trips, the trip generation should take into account site-related deliveries and existing site uses that will be removed as a result of the project. It is also unclear how the information included in the Sound Transit (2020b) report led to the auto volumes outlined in Table G1.4-7. For example, why would there be so few departures in the AM when the graveyard shift ends right before the AM peak hour begins?

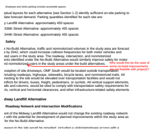
78 (1)



Page Index: 78

Please provide clarification: 450 spaces of 427 spaces?

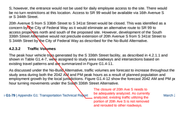
79 (1)



Page Index: 79

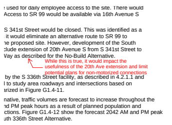
Why would this be the case of some no-build improvements are not feasible with projects?

88 (3)



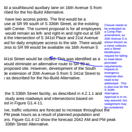
Page Index: 88

The closure of 20th Ave S needs to be adequately analyzed. As currently analyzed, existing traffic utilizing the portion of 20th Ave S is not removed and rerouted to other roadways.



Page Index: 88

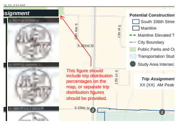
While this is true, it would impact the usefulness of the 20th Ave extension and limit potential plans for non-motorized connections



Page Index: 88

Closure needs to be evaluated as a Comp Plan amendment, as 20th Avenue S is shown therein as a minor collector, and a Street Modification request for failing to meet block perimeter requirements. Impacts to emergency response also need to be addressed. This is also true for the S 344th Alternative. Approval is in no way assured, but realignment may be considered.

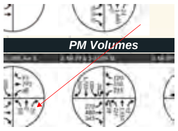
89 (1)



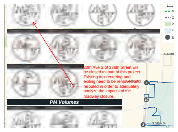
Page Index: 89

This figure should include trip distribution percentages on the map, or separate trip distribution figures should be provided.

90 (2)



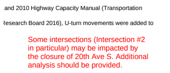
Page Index: 90



Page Index: 90

20th Ave S of 336th Street will be closed as part of this project. Existing trips entering and exiting need to be removed and rerouted in order to adequately analyze the impacts of the roadway closure.

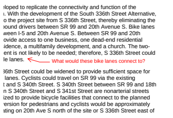
93 (1)



Page Index: 93

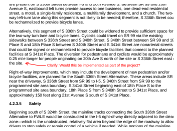
Some intersections (Intersection #2 in particular) may be impacted by the closure of 20th Ave S. Additional analysis should be provided.

95 (2)



Page Index: 95

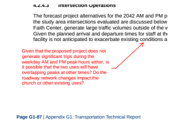
What would these bike lanes connect to?



Page Index: 95

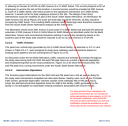
Clarify: Would this be implemented as part of the project?

96 (2)



Page Index: 96

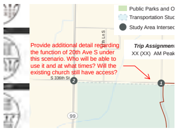
Given that the proposed project does not generate significant trips during the weekday AM and PM peak hours either, is it possible that the two uses will have overlapping peaks at other times? Do the roadway network changes impact the church or other existing uses?



Page Index: 96

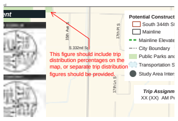
For trips removed from intersection #6: volumes should either be: (1) rerouted to other intersections in the network, or (2) if to be removed completely, trips should be removed at other intersections as well and justification should be provided as to why those trips will be removed from the network.

97 (2)



Page Index: 97

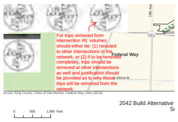
Provide additional detail regarding the function of 20th Ave S under this scenario. Who will be able to use it and at what times? Will the existing church still have access?



Page Index: 97

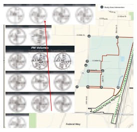
This figure should include trip distribution percentages on the map, or separate trip distribution figures should be provided.

98 (4)

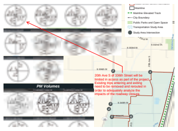


Page Index: 98

For trips removed from intersection #6: volumes should either be: (1) rerouted to other intersections in the network, or (2) if to be removed completely, trips should be removed at other intersections as well and justification should be provided as to why those trips will be removed from the network.

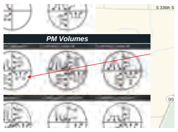


Page Index: 98



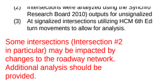
Page Index: 98

20th Ave S of 336th Street will be limited in access as part of the project. Existing trips entering and exiting need to be removed and rerouted in order to adequately analyze the impacts of the roadway closure.



Page Index: 98

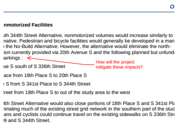
99 (1)



Page Index: 99

Some intersections (Intersection #2 in particular) may be impacted by changes to the roadway network. Additional analysis should be provided.

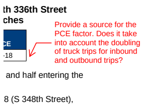
103 (1)



Page Index: 103

How will the project mitigate these impacts?

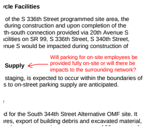
114 (1)



Page Index: 114

Provide a source for the PCE factor. Does it take into account the doubling of truck trips for inbound and outbound trips?

118 (1)



Page Index: 118

Will parking for on-site employees be provided fully on-site or will there be impacts to the surrounding network?

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Attachment

Sound Transit OMF Site Opportunity Cost Impact Assessment

[This page intentionally left blank]

FCS GROUP
Solutions-Oriented Consulting

| Memorandum

To: E.J. Walsh and Ryan Medlen
City of Federal Way

Date: April 19, 2021

From: Gordon Wilson
Todd Chase
Tim Wood
FCS GROUP

Gordon Wilson

RE Sound Transit OMF Site Opportunity Cost Impact Assessment DRAFT

INTRODUCTION

As Sound Transit expands its light rail network throughout the region, it has identified the need for a new regional Operations and Maintenance Facility (OMF) to store and maintain its growing fleet of vehicles. The agency has determined that an OMF should be located to the south of Sea-Tac International Airport. Sound Transit has pared down an initial list of candidate sites to three, including one on a landfill site in Kent and two potential sites in Federal Way.

The City of Federal Way contracted with **FCS** GROUP to analyze the potential economic impacts of the two Federal Way sites. A previous Memorandum by FCS dated April 13 describes the potential short-term economic impact of the OMF based on the most current assumptions that have been made available by Sound Transit as of April 1, 2021.

Because much of the property being considered by Sound Transit is classified as vacant or underutilized land, this Memorandum evaluates the opportunity cost to local and state governments if this land is utilized by the OMF. When vacant and underutilized land is not developed by private (or not-for-profit) entities at its highest and best use it will not produce governmental tax revenues, jobs or housing. This in-turn represents a potential opportunity cost associated with foregone future tax revenues, jobs and housing within local and state government agencies.

SITE DESCRIPTIONS

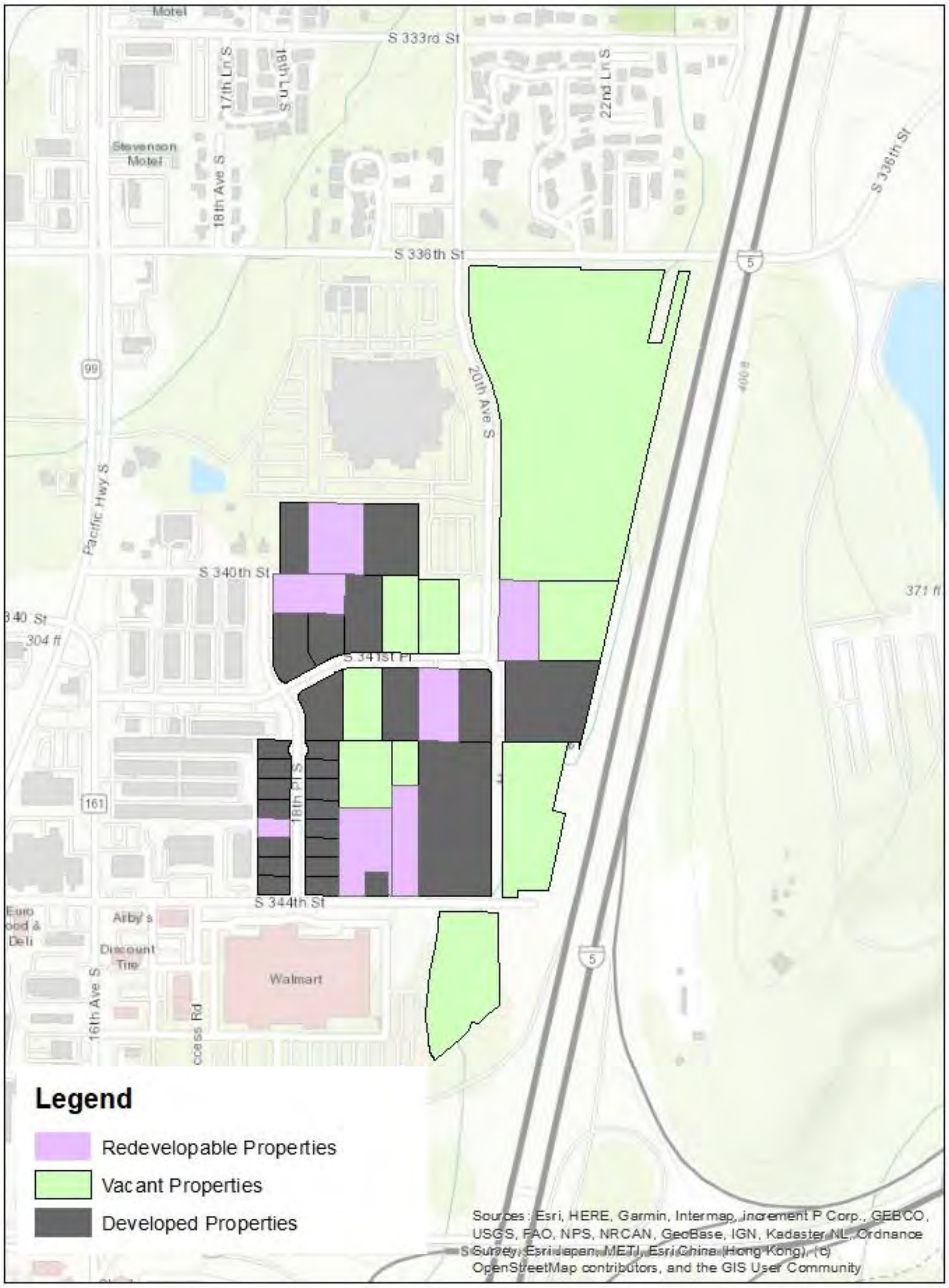
For the purposes of this analysis, FCS evaluated the two Federal Way sites. The two sites are adjacent to one another located between Pacific Highway and Interstate 5 in the Kitts Corner area of the City (see the site map in **Exhibits 1 & 2**). There is a 27.37-acre area which is a part of both sites consisting of warehouses, residential and industrial properties and housing.

The two sites are as follows:

- **344th Street Site**: is a 59.64-acre site south of the CFC site. Existing uses are primarily industrial and commercial, with some single family residential, spread across 52 separate parcels with a southern boundary along South 344th Street. The site includes the 27.37-acre area that is shared (included) with the CFC site mentioned below. The vacant and redevelopable land within this site (31.43 net acres) is identified by zone classification in **Exhibit 3**.
- **Christian Faith Center (CFC) Site:** is a 59.98-acre northernmost site which is primarily owned by the Christian Faith Center, including a large church, school and community facility. The CFC owns 80% of the site, the remainder includes the 27.37-acre shared area mentioned above. This

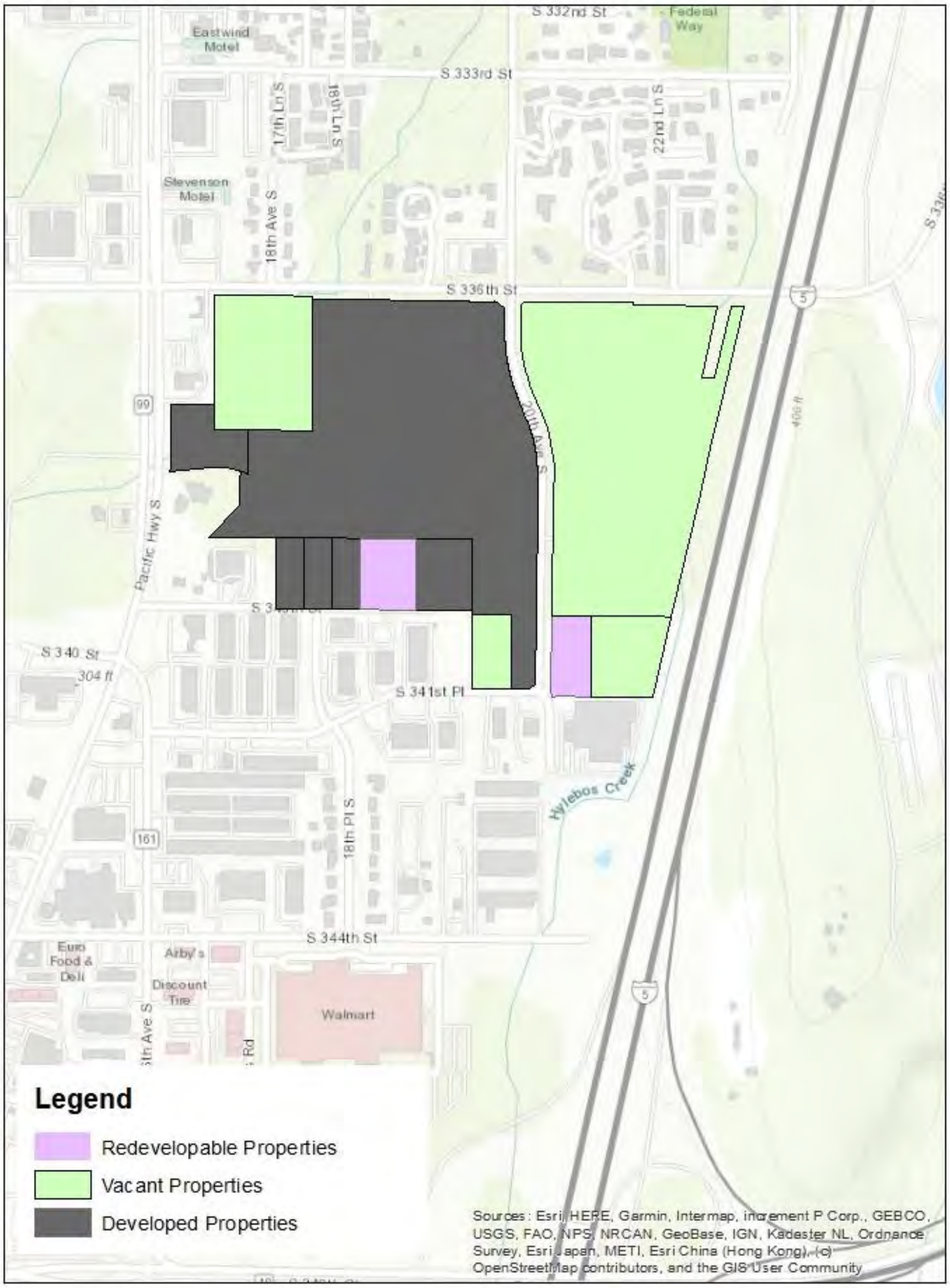
site will be referred to as the CFC site in this study. The vacant and redevelopable land within this site (21.06 net acres) is identified by zone classification in **Exhibit 3**.

Exhibit 1: Vacant and Redevelopable Site Map by Tax Lot (344th Site)


Motel
S 333rd St
17th Ln S
18th Ln S
22nd Ln S
Stevenson Motel
18th Ave S
S 336th St
S 336th St
5
99
20th Ave S
Pacific Hwy S
S 340th St
340 St
304 ft
371 ft
S 341st Pl
161
18th Pl S
S 344th St
Euro Food & Deli
Arby's
Discount Tire
Walmart
16th Ave S
Access Rd
5
Legend
🟪 Redevelopable Properties
🟩 Vacant Properties
⬛ Developed Properties

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Exhibit 2: Vacant and Redevelopable Site Map by Tax Lot (CFC Site)


S 332nd St
Federal Way
Eastwind Motel
S 333rd St
17th Ln S
18th Ln S
22nd Ln S
Stevenson Motel
18th Ave S
S 336th St
5
S 336
400 ft
99
20th Ave S
Pacific Hwy S
S 340 St
304 ft
S 341st Pl
Hylebos Creek
161
18th Pl S
S 344th St
Euro Food & Deli
Arby's
Discount Tire
Walmart
Legend
🟪 Redevelopable Properties
🟩 Vacant Properties
⬛ Developed Properties

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

The tax lots shown in **Exhibits 1 and 2** were evaluated using current King County Assessor data and local planning data to determine their current zoning, gross land area and current value of land and improvements. Land that is potentially constrained by "critical areas" such as wetlands and drainage areas has also been considered in the calculation of net vacant land area.

Land within the OMF sites have been classified by current land use zoning designation and grouped into three categories:

- **Developed:** defined to include tax lots with an improvement value greater than land value based on King County Assessor data;
- **Vacant:** includes tax lots that are classified by the King County Assessor as vacant;
- **Redevelopable:** includes underutilized tax lots where the land value is equal or greater than the improvement value per the King County Assessor records.

This analysis focuses exclusively on the vacant and redevelopable tax lots. The calculation of gross and net land area and building area (SF) for the OMF Sites is summarized in **Exhibit 3**.

As indicated below, this buildable land analysis has identified a total of 31.43 acres of vacant and redevelopable land within the 344th Site, including 24.23 vacant acres and 7.20 redevelopable areas. The majority of this vacant and redevelopable land (15.75 acres) is planned for higher density multifamily housing with an underlying zone classification of RM3600. The 344th Site also incudes 15.68 acres of vacant and redevelopable Commercial Enterprise (CE) and Business Commercial (BC) land area.

The CFC Site includes 21.06 acres of vacant and redevelopable land area, including 18.49 acres of vacant land and 2.57 acres of redevelopable land. All of the vacant and redevelopable multifamily land is shared between the two sites. Please refer to **Appendix A** for a more detailed summary of the vacant and redevelopable land base and the underlying land use zoning allowances.

Exhibit 3: Summary of Vacant and Redevelopable Land Area

Vacant & Redev. Land Area (acres)*	344th Parcels	CFC Parcels	Shared Parcels
RM 3600 Zones			
Vacant	14.32	14.32	14.32
Redevelopable	1.43	1.43	1.43
CE/BC Zones			
Vacant	9.91	4.17	3.08
Redevelopable	5.77	1.14	1.14
Total			
Vacant	24.23	18.49	17.40
Redevelopable	7.20	2.57	2.57
Total	**31.43**	**21.06**	**19.97**

* Excludes land classified as critical lands and developed lands.
Redevelopment land is defined as having land value equal or greater than existing improvement value.

KEY ASSUMPTIONS

To assess the potential impact of utilizing vacant land for the OMF in lieu of private development, FCS evaluated opportunity costs in terms of housing, population, employment, and foregone tax revenues. Key metrics include:

- **Property Tax Revenue:** Taxable property values for each OMF siting scenario were based on current records provided by the King County Assessor's office. It is assumed that the OMF would be tax-exempt public property. The opportunity cost analysis assumes that vacant and underutilized land is developed as taxable private property by year 10 (2031). Current property tax millage rates were applied to the taxable value in each area to calculate the potential loss of property tax revenue. It should be noted that for analysis purposes, current property ownership status (private vs. non-profit) is not considered to be a constraint regarding a site's future development potential or taxable status. Hence, this analysis assumes that a non-profit, such as the CFC, will eventually opt to sell some of its land to a private developer, who then develops the property for its zoned use.

- **Local Retail Sales Tax:** Retail sales reports from ESRI Business Analyst Online and Dunn & Bradstreet were used to identify taxable sales within the potential OMF sites. Annualized retail sales figures were multiplied by the City's current local sales tax rate (1%) to determine sales tax revenue once vacant and redevelopable land is developed by year 10 (2031).
- **State Shared Revenues:** This group of revenues is distributed by the State to cities based on population. In this analysis, the revenue estimates are the per-capita distribution multiplied by the number of people residing in each site. The Washington Municipal Research and Service Center (MRSC) provides per-capita distribution estimates for each type of State shared revenue. The opportunity cost analysis assumes that vacant and redevelopable multifamily zoned tax lots are fully developed by year 10 (2031) based on their underlying zoning and development standards. Following are the types of State shared revenues and the MRSC estimated distribution per capita:
  - Liquor Excise Tax: $5.66 per resident.
  - Liquor Control Board Profits: $7.90 per resident.
  - Motor Vehicle Fuel Tax (base): $20.07 per resident.
  - Motor Vehicle Fuel Tax (increase): $1.17 per resident.
  - Multi-Modal Transportation Tax: $1.34 per resident.
  - Criminal Justice Distribution: $1.17 per resident.
- **Housing and Population:** The opportunity cost analysis assumes that the vacant and underutilized multifamily zoned tax lots are fully developed by year 10 (2031) at allowed densities under current RM3600 zoning. For analysis purposes, it is assumed that this land is developed by a for-profit developer and allowances have been made for potential housing displacement. The analysis conservatively assumes that the vacant land which is partially impacted by critical lands does not transfer development density to unconstrained portions of their sites. Please refer to **Appendix B** for a summary of key development assumptions. Since there are few comparable multifamily developments in the OMF analysis area, FCS conducted a residual land value analysis to determine the scale and value of a large apartment development on a portion of the vacant land zoned for housing (see **Appendix C**).
- **Employment:** The opportunity cost analysis assumes that the vacant and underutilized CE/BC zoned tax lots are fully developed by year 10 (2031). It is assumed that this land is developed by a for-profit developer, and allowances have been made for potential business/job displacement as older buildings are replaced with new ones. Please refer to **Appendix B** for a summary of key assumptions.

ECONOMIC OVERVIEW

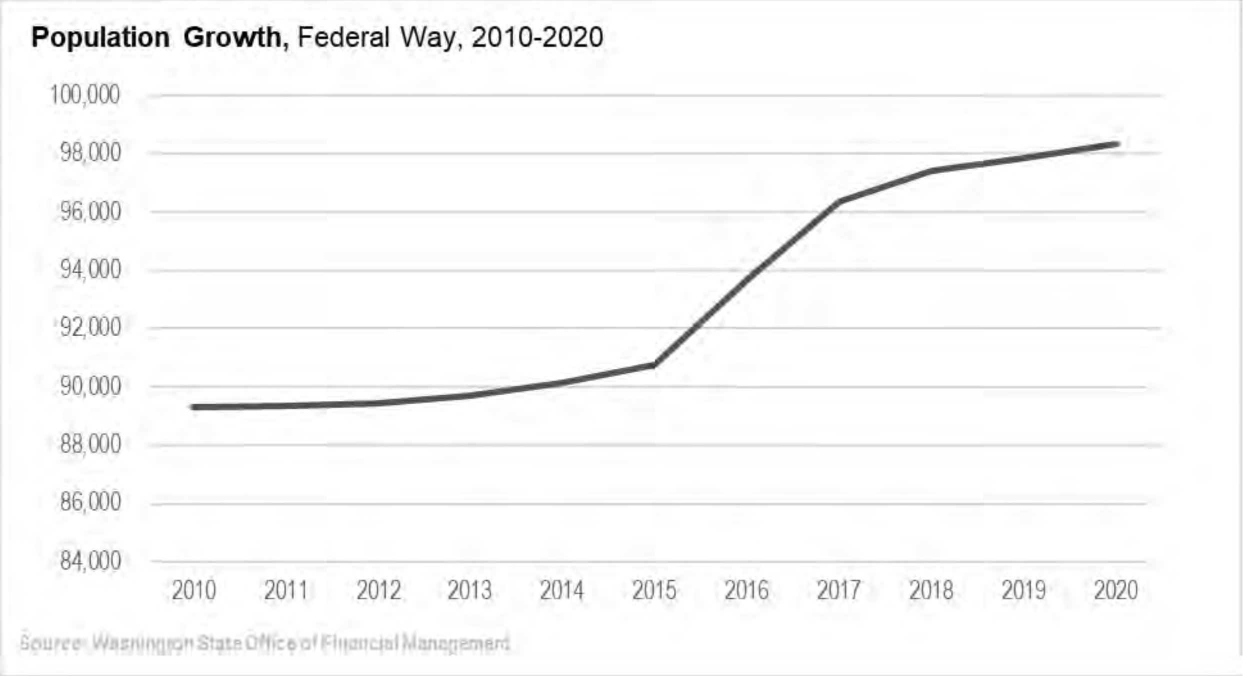
The Puget Sound Region is currently one of the fastest growing metropolitan areas in the United States. Significant population and employment growth has been occurring for decades and shows no sign of moderation.

Population

The City of Federal Way recorded a record-high population of 98,340 in 2020 (April 1 estimate by the Washington State Office of Financial Management (OFM) (**Exhibit 4**).

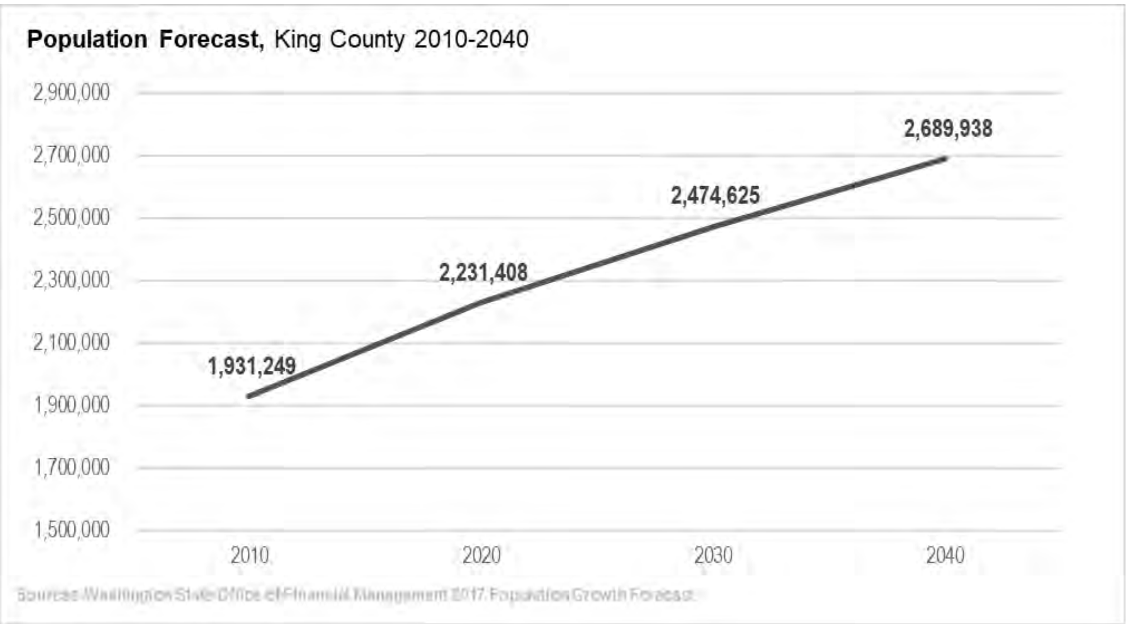
Long-range population forecasts prepared by OFM are not available on the city level but do anticipate King County will continue its rapid growth with nearly half a million new residents added to the County between now and 2040 (see **Exhibit 5**). If Federal Way's 4.4% share of King County's population growth holds constant, the City would be on tap for accommodating over 20,000 additional people by year 2040.

Exhibit 4: Population Trends (2010-2020)



Source: Washington State Office of Financial Management

Exhibit 5: King County Population Projection (2010-2040)

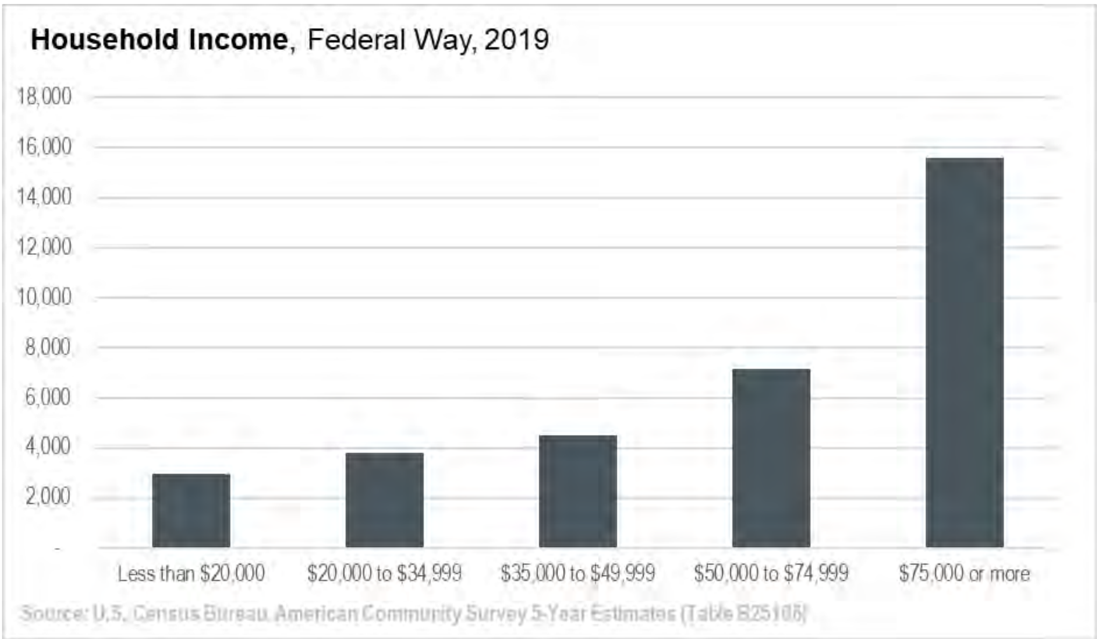


Source: Washington State Office of Financial Management 2017 Population Growth Forecast

Socio-economic Characteristics

As with many cities in the Puget Sound Region, income levels are relatively high in Federal Way compared with the rest of the state of Washington. As indicated in **Exhibit 6**, nearly half of the City's residents had household incomes above $75,000.

Exhibit 6: Households by Income Level, 2015-2019

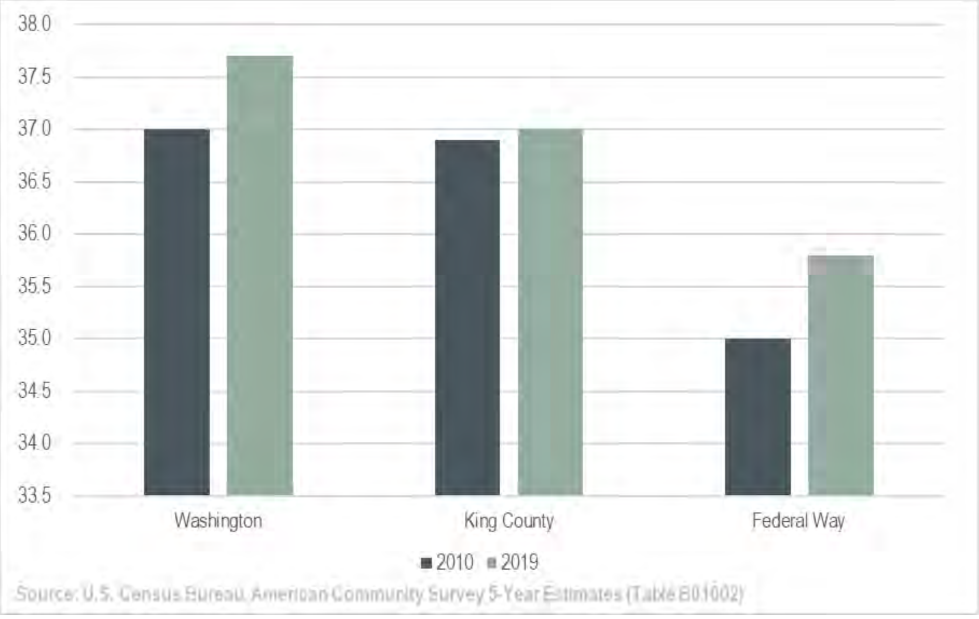


Source: U.S. Census Bureau American Community Survey 5-Year Estimates (Table B25108)

In comparison with the state and county averages, Federal Way has a higher share of younger residents. The median age in Federal Way (35.8) is below the King county and statewide average

(**Exhibit 7**). Younger families tend to require new housing arrangements as they age, start families and have children.

Exhibit 7: Median Age, Washington, King County, Federal Way, 2010, 2019



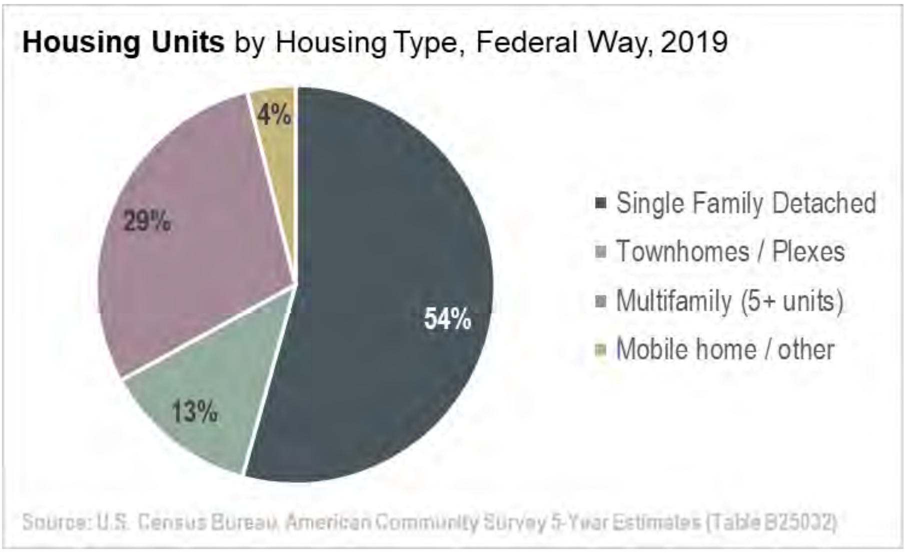
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (Table B01002)

EXISTING HOUSING INVENTORY AND TENANCY

Local housing inventory and tenancy patterns shed light on housing conditions and demand preferences. In 2019, there were 34,755 housing units in the City of Federal Way.

Like most communities, single-family detached housing is the most prevalent housing type with 54% of the housing stock. The remaining housing inventory in Federal Way includes multi-family (29%), townhomes and duplexes (13%), and mobile homes (4%), as shown in **Exhibit 8**.

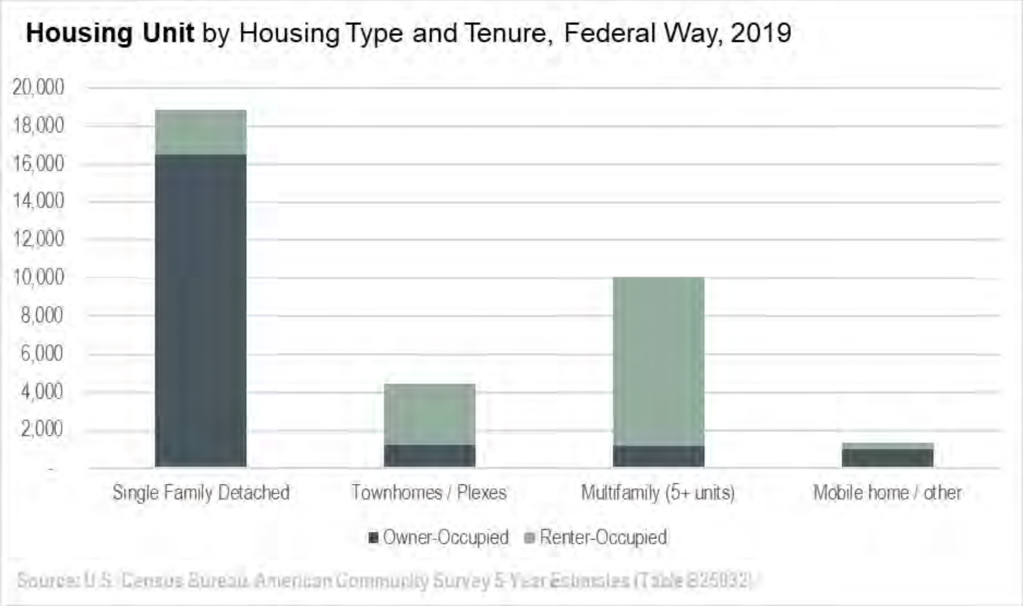
Exhibit 8: Existing Housing Mix and Tenancy, 2015-2019, City of Federal Way



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (Table B25032)

Owner-occupied housing accounts for 57% of the housing inventory while renter-occupied units account for 43% of the inventory. As would be expected, most homeowners reside in single-family detached units or manufactured homes. Most renters also reside in by single family attached and multifamily units, as indicated in **Exhibit 9**.

Exhibit 9: Existing Housing Tenancy, 2015-2019, City of Federal Way

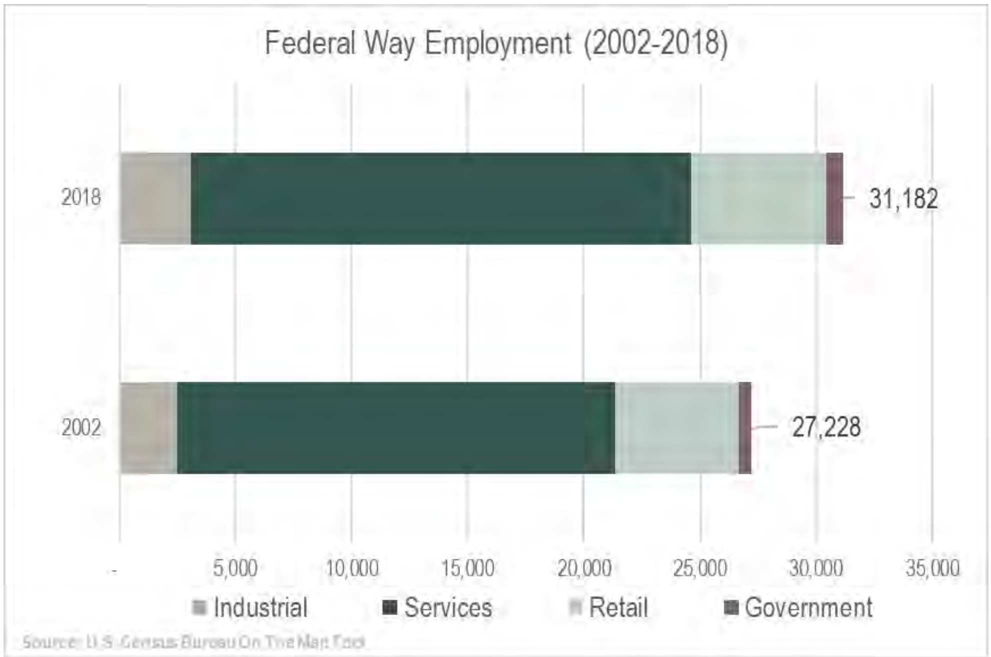


Source: U.S. Census Bureau American Community Survey 5-Year Estimates (Table B25032)

EMPLOYMENT

Between 2002 and 2018, employment levels in Federal Way climbed by nearly 4,000 jobs, with most growth occuring in the industrial and services sectors (**Exhibit 10**).

Exhibit 10: Federal Way Employment (2002-2018)



Source: U.S. Census Bureau On The Map Tool

REAL ESTATE MARKET OVERVIEW

The greater Puget Sound real estate market is beginning to bounce back from the Covid-19 pandemic. Key market indicators are described below based on published residential and commercial real estate broker reports for the 1st Quarter 2021.

Industrial Real Estate

- Industry professionals expect 2021 to be a record breaking year for the industrial real estate market in the Puget Sound.
- Vacancy is stable region-wide at 5% and year-over-year lease rates are beginning to increase.
- Absorption has begun to outpace project completions, indicating a tightening market overall.
- The Federal Way market is particularly tight with an overall industrial vacancy rate of 0.5%.
- Average total asking rent in Federal Way is 17% higher than the regional average.

Office Real Estate

- Industry professionals caution that until the vast majoritiy of the workforce is immunized agaisnt Covid-19, it is unlikely that the office market will return to pre-pandemic conditions for years. Vacancy rates continue to increase in the region, rising to 7.7% in Q4 2020.
- Within the South King County submarket, office vacancy is at the highest levels observed in the region (14.1%).
- New development activity is still high and 72% of the new office developments in the region are pre-commited.
- Alaska Airlines HQ expansion project is presently under construction and will be a highlight of the regional office market.

Retail Real Estate

- Industry professionals highlight the “twin threats” to retail from both Covid-19 and increases in e-commerce.
- Vacancy rates began to decrease in Q4 of 2020, settling at a rate of 3.18%.
- While growth in retail lease rates was modest, there was a slight year-over-year increase.
- Industry experts expect a slight “snap back” with vacancy increasing about 0.8% in the first half of 2021 before stablizing later in the year.

Multifamily Housing

- Multifamily real estate is taking longer to bounce back from the dip observed in 2020 with overall vacancy rates in the region up from 5.7% in Q1 of 2020 to 7.6% in Q1 of 2021.
- Institutional investments in multifamily developments is up significantly year-over-year.
- Year-over-year multifamily construction activity in the Region is up to 3,411 units in Q1 2021 compared with 3,006 units in Q1 2020.

- Average monthly rents in the Region during Q1 2021 range from $1,297 (studio), $1,503 (1 bedroom), $1.797 (2 bedroom) and $2,126 (3 bedroom).
- While the short-term market impacts of the Covid-19 pandemic is still being felt, the long-term economic growth trend for the Puget Sound Region, King County and Federal Way is very positive.

OPPORTUNITY COST METHODOLOGY

This opportunity cost analysis generally follows the methodology applied in the previous OMF economic impact analysis by FCS. The steps taken include:

Step 1. Identify and quantify vacant and underutilized tax lots and land area by land use zone (based on Assessor data).

Step 2. Estimate and deduct critical lands from gross land area (based on King County Critical Lands maps layer).

Step 3. Identify existing buildings, jobs and housing units on vacant and underutilized tax lots (based on Assessor data).

Step 4. Review applicable current zoning and development standards regarding allowable building density, height, parking requirements, setbacks, etc.

Step 5. Analyze County Assessor data to compare appraised value of land and building improvements of developed properties to vacant and underutilized properties. Apply findings to the vacant and redevelopable land inventory to estimate potential increases in assessed value and taxable construction materials for new development in the CE/BE zones.

Step 6. Analyze existing employment and sales data for existing enterprises within the CE/BC zones and apply vacancy and job density assumptions to the vacant and redevelopable land area to estimate potential net changes in employment and taxable sales.

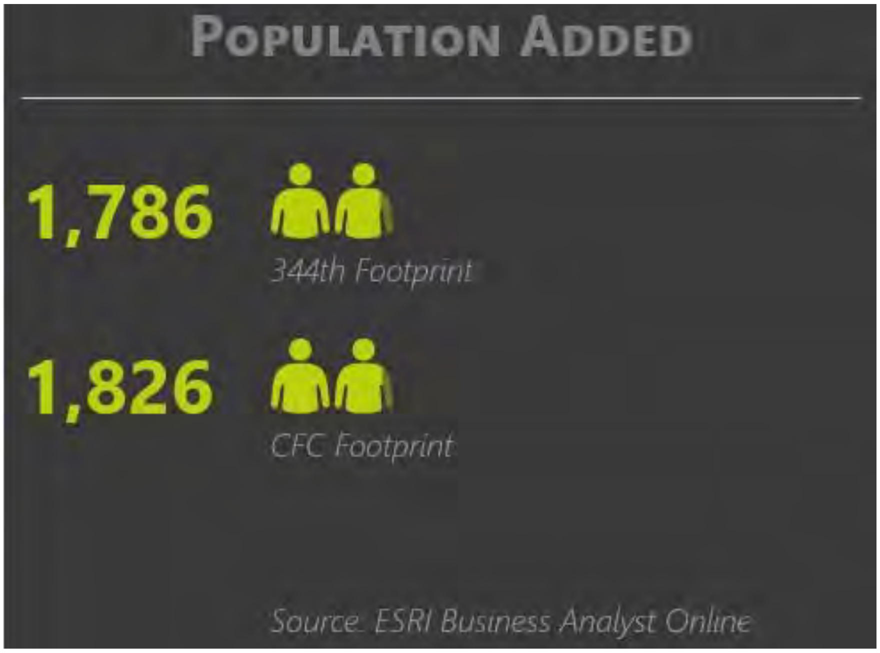
Step 7. Conduct Residual Land Value analysis for the multifamily sites to determine the allowable use of those sites if fully developed. This analysis (provided in **Appendix C**) is considered common practice when analyzing housing and mixed-use development potential. The findings are used to estimate: land and improvement values; housing units; population; and related factors.

Step 8. Apply current tax rates to values derived from steps 1-7 to determine fiscal impacts on local and state governments if vacant and redevelopment sites are not utilized for their planned use. The analysis assumes development buildout occurs by year 10 (2031). A 30-year cash flow analysis has been conducted assuming that property tax rates increase by 1.0% annually and other taxes increase by 0.05% annually.

Foregone Population-based Shared Tax Revenue

Exhibit 11 shows the potential amount of population added by new development on the vacant and redevelopable land area is expected to add 1,786 new residents in the 344th site and 1,826 residents in the CFC site.

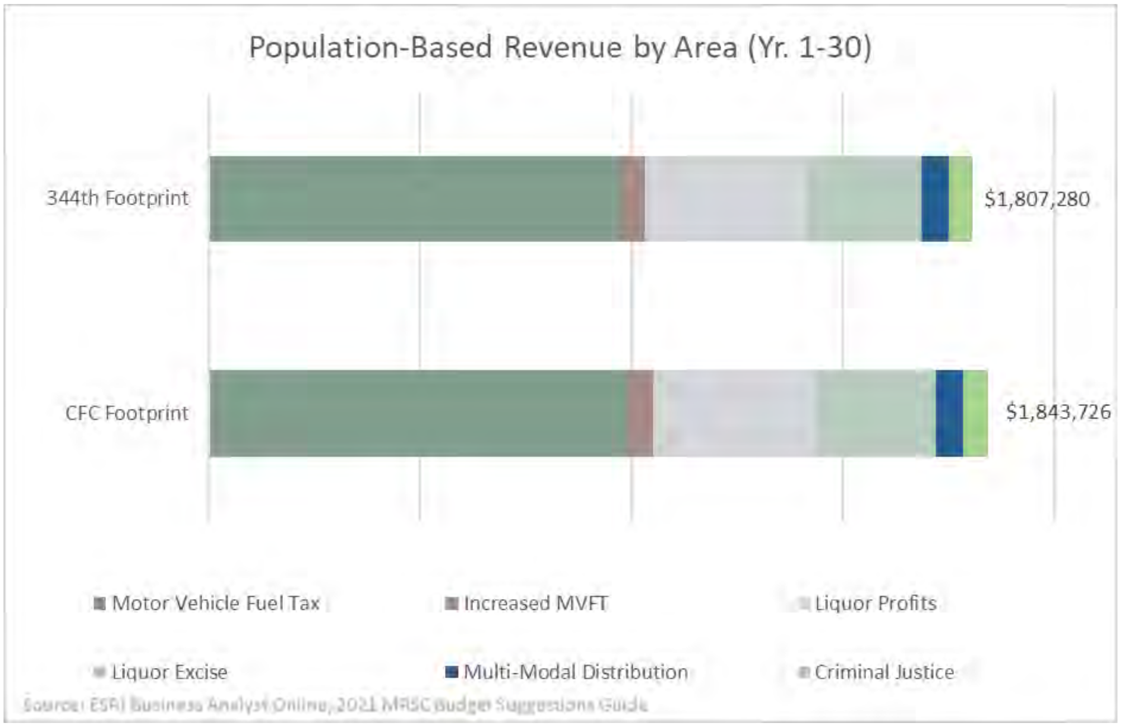
Exhibit 11: Potential Foregone Population Increase (Years 1-30)



Source: ESRI Business Analyst Online

Population is used to determine the impact of foregone state shared revenues, which are distributed based on population. The cumulative forecast of foregone population-based shared tax revenue over the next 30 years is shown in **Exhibit 12**.

Exhibit 12: Cumulative Population-Based Foregone Revenues by Site (Years 1-30)

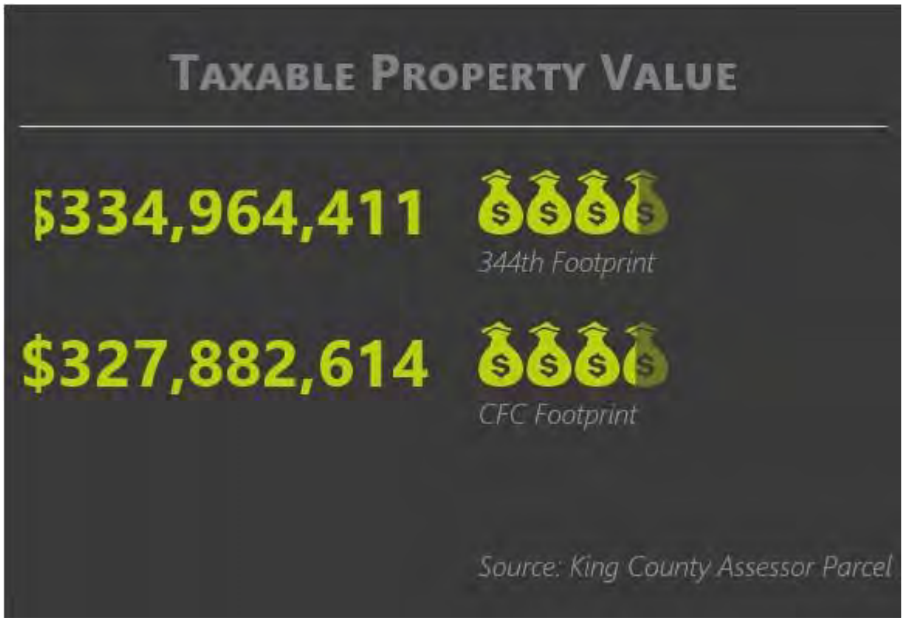


Source: ESRI Business Analyst Online, 2021 MRSC Budget Suggestions Guide

Foregone Property Tax Revenue

Development of the OMF would preclude the full buildout of the two sites, which means the City of Federal Way and other government entities would not realize property tax revenues from new development. Estimated taxable property value at buildout is shown in **Exhibit 13**. Potential foregone property tax revenue is slightly higher for the 344th footprint because there is more vacant and redevelopable land in that area.

Exhibit 13: Foregone Taxable Property Values



TAXABLE PROPERTY VALUE

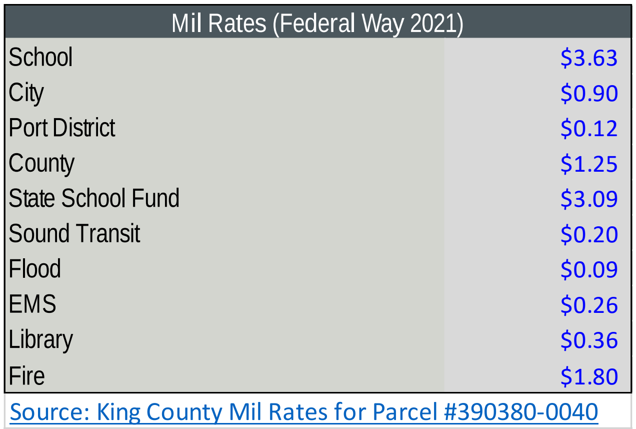
$334,964,411
344th Footprint

$327,882,614
CFC Footprint

Source: King County Assessor Parcel

Taxable property value drives property tax revenues. Figures shown above are used in conjunction with property mil rates shown in **Exhibit 14** to determine overall property tax impacts for each site.

Exhibit 14: Property Tax Rates by District (2021)

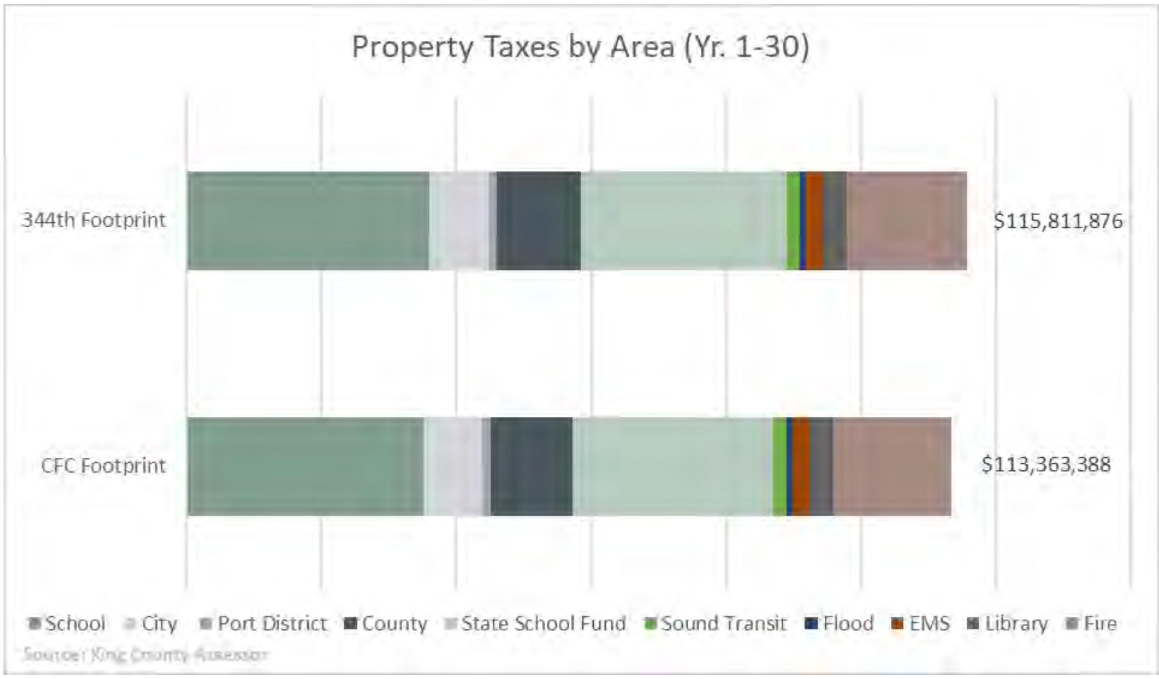


Mil Rates (Federal Way 2021)	
School	$3.63
City	$0.90
Port District	$0.12
County	$1.25
State School Fund	$3.09
Sound Transit	$0.20
Flood	$0.09
EMS	$0.26
Library	$0.36
Fire	$1.80

Source: King County Mil Rates for Parcel #390380-0040

Exhibit 15 shows the amount of foregone property tax revenue to all taxing jurisdictions, including the school district, the State School Fund, City, County, South King Fire and Rescue, and other local governments. The cumulative amount of foregone 30-year property tax revenue to all taxing districts with the 344th Site ($115,811,876) is just slightly larger than the CFC Site ($113,363,388). The amount of cumulative 30-year property tax revenue for the City is also higher with the 344th Site ($8.9 million) than with the CFC Site ($8.7 million).

Exhibit 15: Foregone Property Tax Revenues by Area (Years 1-30)



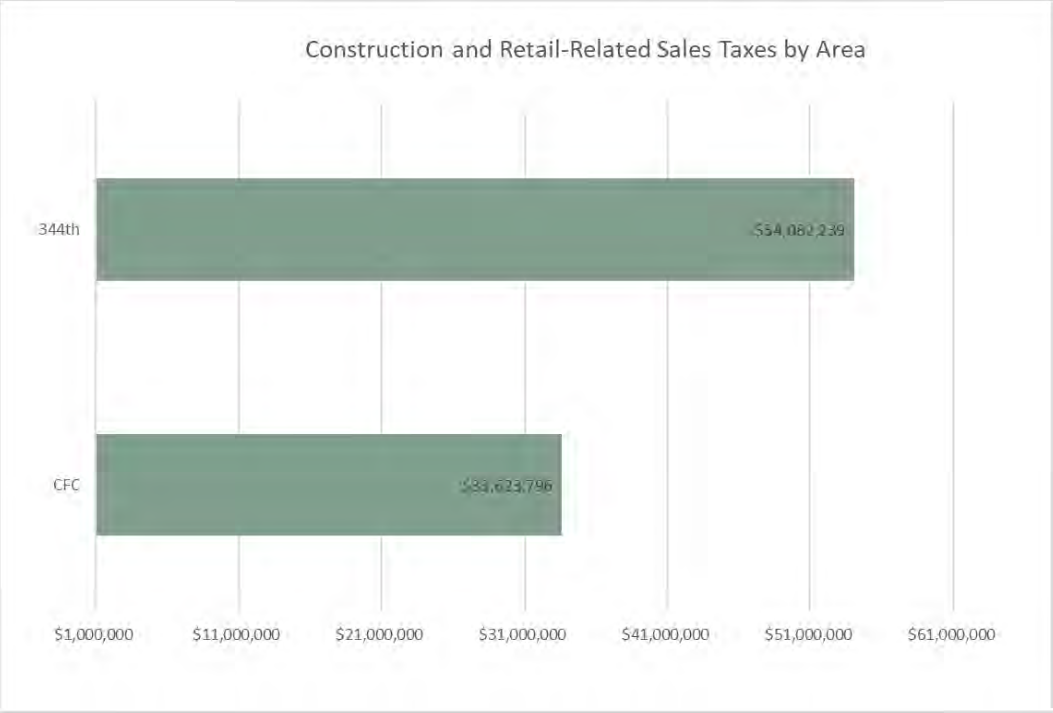
Source: King County Assessor

Foregone Sales Tax Revenue

When new development occurs, the City assesses a sales tax on construction materials that are delivered to a site. Based on the value of foregone private construction, the 344th Site is expected to result in $535 million in foregone taxable sales; while the CFC site is expected to cause about $333 million in foregone taxable construction value.

Applying current (2020) retail sales tax rates, the amount of foregone state and local sales tax revenues have been projected for both sites (**Exhibit 16**). The cumulative amount of foregone state, county and City sales taxes from OTF development are projected to range from $54 million with the 344th Site to nearly $34 million in the CFC Site.

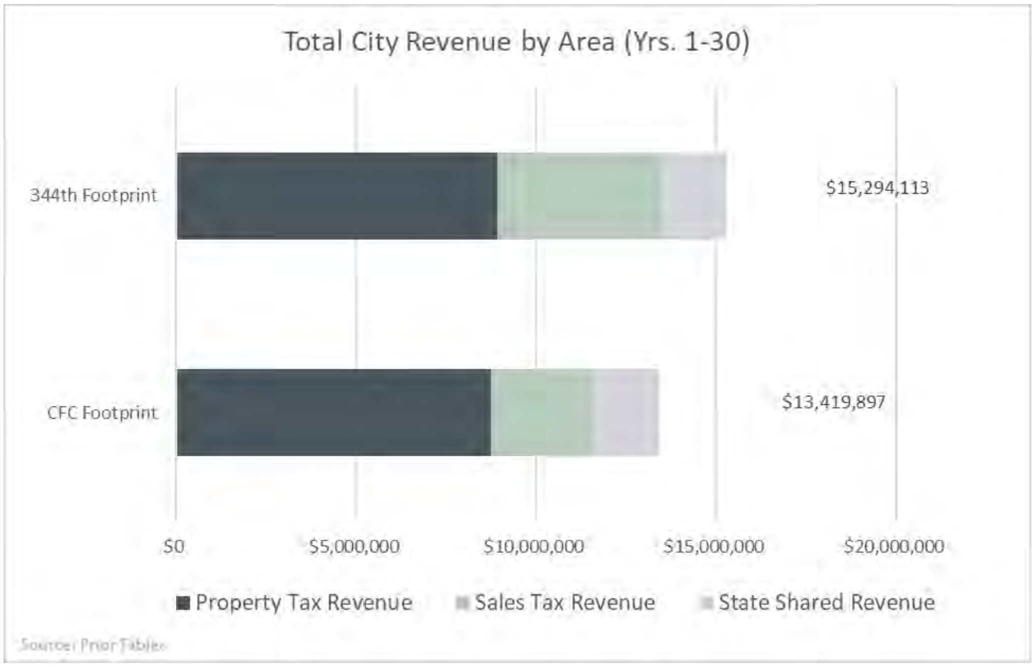
Exhibit 16: Cumulative Foregone Sales Tax Revenues (Years 1-30)



Summary of Opportunity Costs

The long-term opportunity cost of foregone tax revenues for the City of Federal Way are summarized in **Exhibits 17 and 18.** The combination of foregone property tax revenue, sales tax revenue and state-shared tax revenue is forecasted to range from $13.4 million with the CFC Site to $15.3 million with the 344th Site.

Exhibit 17: Cumulative Foregone Revenues, City of Federal Way, Years 1-30



Source: Prior Tables

Exhibit 18: Cumulative Foregone Revenues, City of Federal Way, Years 1-30

	344th Footprint	CFC Footprint
State Shared Revenue		
Motor Vehicle Fuel Tax	$974,000	$991,787
Multi-Modal Distribution	$64,768	$66,218
Increased MVFT	$56,551	$57,817
Liquor Profits	$381,840	$390,389
Liquor Excise	$273,571	$279,697
Criminal Justice Distribution	$56,551	$57,817
Subtotal State Shared Revenue	$1,807,280	$1,843,726
Property Tax Revenue		
School	$35,941,101	$35,181,237
City	$8,935,357	$8,746,446
Port District	$1,186,352	$1,161,270
County	$12,343,447	$12,082,482
State School Fund	$30,571,829	$29,925,481
Sound Transit	$1,951,086	$1,909,836
Flood	$881,943	$863,297
EMS	$2,623,260	$2,567,799
Library	$3,537,376	$3,462,589
Fire	$17,840,125	$17,462,950
Subtotal Property Tax Revenue	$115,811,876	$113,363,388
Sales Tax Revenue		
Federal Way Sales Tax Revenue	$4,551,476	$2,829,725
State & County Sales Tax Revenue	$49,530,763	$30,794,070
Subtotal Sales Tax Revenue	$54,082,239	$33,623,796
Subtotal Federal Way Revenue	$15,294,113	$13,419,897
Subtotal Other Government Revenue	$156,407,282	$135,411,012
Total Revenue	$171,701,395	$148,830,910

Summary of Housing and Employment Impacts

The housing and population-related opportunity costs would be the same for both site options. As indicated in **Exhibit 19**, it is conservatively estimated that the vacant and redevelopable RM3600 zoned land can accommodate 1,216 new dwelling units and 1,844 people once developed. It is estimated that there would be a variation in the amount of housing and population displaced between the site options.

After accounting for potentially displaced population, the net opportunity cost of the OTF is forecasted to range from 1,158 housing units (1,786 people) with the 344th Site and 1,198 dwelling units (1,826 people) with the CFC Site (**Exhibit 19**).

Exhibit 19: Opportunity Cost of Foregone Housing and Population Growth

Net New Population If Vacant and Redevelopment Land is Developed Under Current Zoning

	344th Parcels	CFC Parcels	Shared Parcels
New Dwellings Added*	1,216	1,216	1,216
Less Vacancy Allowance	4%	4%	4%
Avg. People per Dwelling Unit*	1.58	1.58	1.58
People in New Development	1,844	1,844	1,844
Less Persons Displaced	(58)	(18)	-
Net New People Added	1,786	1,826	1,844
Net New Housing Units Added	1,158	1,198	1,216

* based on multifamily housing residual land value analysis in Appendix.

The opportunity cost of foregone job growth varies by Site. As shown in **Exhibit 20**, using the current mix of employment types, the amount of foregone private-sector job growth is expected to range from 90 jobs with the CFC Site to 188 jobs with the 344th Site.

Exhibit 20: Permanent Employment Impact Analysis

Employment Analysis without OMF	344th Site	CFC Site	Shared Parcels
Existing Employment (2021)	**156**	**218**	**35**
Potential Light Industrial Jobs Added	115	49	36
Potential Commercial Jobs Added	110	46	34
Less Jobs Displaced	(38)	(5)	(5)
Net New Jobs Added without OMF	**188**	**90**	**66**
Total Existing and Potential Jobs without OMF	**344**	**308**	**101**
Employment Analysis with OMF			
Existing Direct Employment (2021)	**156**	**218**	**35**
Potential OMF Jobs On Site	476	476	n/a
Less Existing and Potential Jobs Displaced	(344)	(308)	(101)
Total Existing and Potential Jobs with OMF	**288**	**386**	n/a
Difference in Jobs with and without OMF	**55**	**(77)**	

Excludes potential employment on multifamily-zoned land.

According to the Sound Transit Draft Environmental Impact Statement (DEIS), the OMF will generate about 476 relatively high wage direct jobs on site. After accounting for potentially displaced jobs, the OMF would likely result in a net increase in jobs with the 344th Site (55 jobs), and a decrease in jobs with the CFC Site (-77 jobs).

SUMMARY OF FINDINGS

This Memorandum evaluates the opportunity cost to local and state governments if vacant and underutilized land is developed for the OMF. When vacant and underutilized land is not developed by private (or not-for-profit) entities at its highest and best use it will not produce governmental tax revenues, jobs or housing. This in-turn represents a long-term opportunity cost associated with foregone future tax revenues, jobs and housing.

The buildable land analysis identified 31.43 acres of vacant and redevelopable land within the 344th Site, including 24.23 vacant acres and 7.20 acres of redevelopable land area. The majority of this vacant and redevelopable land (15.75 acres) is planned for higher density multifamily housing with an underlying zone classification of RM3600. The 344th Site also includes 15.68 acres of vacant and redevelopable Commercial Enterprise (CE) and Business Commercial (BC) land area.

The CFC Site includes 21.06 acres of vacant/redevelopable land area, with 18.49 acres of vacant land and 2.57 acres of redevelopable land. All of the vacant multifamily land is shared between the two sites.

The opportunity cost analysis assumes that vacant and redevelopable multifamily-zoned tax lots are fully developed by year 10 (2031) based on their underlying zoning and development standards. For analysis purposes, it is assumed that this land is developed by a for-profit developer and allowances have been made for potential housing and employment displacement. The analysis also conservatively assumes that the vacant land impacted by critical lands is not able to transfer development density to unconstrained portions of their sites.

While the short-term economic impacts of the Covid-19 pandemic are still being felt, the long-term economic growth for the Puget Sound Region, King County and City of Federal Way is very positive. If Federal Way's 4.4% share of King County's population growth holds constant, the City would be on tap for accommodating over 20,000 additional people (7,500+ housing units) by year 2040.

After accounting for potentially displaced population, the net opportunity cost of the OTF is forecasted to range from 1,158 housing units (1,786 people) with the 344th Site and 1,198 dwelling units (1,826 people) with the CFC Site.

After accounting for potentially displaced jobs, the OMF would likely result in a net increase in jobs with the 344th Site (55 jobs), and a decrease in jobs with the CFC Site (-77 jobs).

With development of the OTF, the combination of foregone property tax revenue, foregone sales tax revenue and foregone state-shared tax revenue to the City of Federal Way over the next 30 years is forecasted to range from $13.4 million with the CFC Site to $15.3 million with the 344th Site.

In summary, the overall opportunity cost attributed to the OTF facility varies marginally depending upon the site that is chosen. While direct employment within the study area could be higher with the OTF, the level of foregone tax revenues and reduction in housing development potential in the area is significant.

Appendix A: Detailed Developable Land Analysis

344th

		<1.0 acre		1 to 5		5+		Total	
		Taxlots	Area	Taxlots	Area	Taxlots	Area	Taxlots	Area
RM3600	Vacant	-	-	-	-	1.00	19.09	1.00	19.09
	Redevelopable	-	-	1.00	1.50	-	-	1.00	1.50
	Existing Building SF	-	-	-	3,200	-	-	-	3,200
	Net Redevelopable	-	-	-	1.43	-	-	-	1.43
	Less Constraints	-	-	-	-	1.00	4.77	1.00	4.77
	Net Developable	**-**	**-**	**1.00**	**1.43**	**1.00**	**14.32**	**2.00**	**15.74**
CE	Vacant	1.00	0.45	7.00	12.57	-	-	8.00	13.02
	Redevelopable	1.00	0.24	5.00	6.13	-	-	6.00	6.37
	Existing Building SF	-	3,200		23,100	-	-	-	26,300
	Net Redevelopable	-	0.17		5.60	-	-	-	5.77
	Less Constraints	-	-	3.00	3.11	-	-	3.00	3.11
	Net Developable	**2.00**	**0.62**	**12.00**	**15.06**	**-**	**-**	**14.00**	**15.68**

CFC

		<1.0 acre		1 to 5		5+		Total	
		Taxlots	Area	Taxlots	Area	Taxlots	Area	Taxlots	Area
RM3600	Vacant	-	-	-	-	2.00	24.10	2.00	24.10
	Redevelopable	-	-	1.00	1.50	-	-	1.00	1.50
	Existing Building SF	-	-	-	3,200	-	-	-	3,200
	Net Redevelopable	-	-	-	1.43	-	-	-	1.43
	Less Constraints	-	-	-	-	2.00	9.78	2.00	9.78
	Net Developable	**-**	**-**	**1.00**	**1.43**	**2.00**	**14.32**	**3.00**	**15.74**
CE	Vacant	-	-	2.00	3.30	-	-	2.00	3.30
	Redevelopable	-	-	1.00	1.22	-	-	1.00	1.22
	Existing Building SF	-	-	-	3,200	-	-	-	3,200
	Net Redevelopable	-	-	-	1.14	-	-	-	1.14
	Less Constraints	-	-	1.00	0.22	-	-	1.00	0.22
	Net Developable	**-**	**-**	**3.00**	**4.23**	**-**	**-**	**3.00**	**4.23**
BC	Vacant	-	-	1.00	1.55	-	-	1.00	1.55
	Redevelopable	-	-	-	-	-	-	-	-
	Existing Building SF	-	-	-	-	-	-	-	-
	Net Redevelopable	-	-	-	-	-	-	-	-
	Less Constraints	-	-	1.00	0.46	-	-	1.00	0.46
	Net Developable	**-**	**-**	**1.00**	**1.08**	**-**	**-**	**1.00**	**1.08**

Shared

		<0.5		1 to 5		5+		Total	
		Taxlots	Area	Taxlots	Area	Taxlots	Area	Taxlots	Area
RM3600	Vacant	-	-	-	-	1.00	19.09	1.00	19.09
	Redevelopable	-	-	1.00	1.50	-	-	1.00	1.50
	Existing Building SF	-	-	-	3,200	-	-	-	3,200
	Net Redevelopable	-	-	-	1.43	-	-	-	1.43
	Less Constraints	-	-	-	-	1.00	4.77	1.00	4.77
	Net Developable	**-**	**-**	**1.00**	**1.43**	**1.00**	**14.32**	**2.00**	**15.74**
CE	Vacant	-	-	2.00	3.30	-	-	2.00	3.30
	Redevelopable	-	-	1.00	1.22	-	-	1.00	1.22
	Existing Building SF	-	-	-	3,200	-	-	-	3,200
	Net Redevelopable	-	-	-	1.14	-	-	-	1.14
	Less Constraints	-	-	1.00	0.22	-	-	1.00	0.22
	Net Developable	**-**	**-**	**3.00**	**4.23**	**-**	**-**	**3.00**	**4.23**

Source: King County Assessor and FCS.

Appendix B: Opportunity Cost Assumptions

Opportunity Cost Analysis Assumptions

Summary of Current Employment and Sales in OMF Analysis Area CE Zones

General Use	Employment	Mix	Sales per Job
Light Industrial	183	59%	$ 156,361
Office/Commercial	125	41%	$ 202,192
Total/Avg.	308	100%	$ 174,961

Source: ESRI Business Locator; compiled by FCS GROUP.

Existing Assessed Value of Improvements per SF of Land Area, OMF Analysis Area

	CE/BC Zones
Developed	$21.83
Redevelopable	$13.78
Difference when Redevelopable Land is Developed	$8.05

Vacant & Redev. Land Area (acres)*	344th Parcels	CFC Parcels	Shared Parcels
RM 3600 Zones			
Vacant	14.32	14.32	14.32
Redevelopable	1.43	1.43	1.43
CE/BC Zones			
Vacant	9.91	4.17	3.08
Redevelopable	5.77	1.14	1.14
Total			
Vacant	24.23	18.49	17.40
Redevelopable	7.20	2.57	2.57
Total	**31.43**	**21.06**	**19.97**

* Excludes land classified as critical lands and developed lands.

Redevelopment land is defined as having land value equal or greater than existing improvement value.

Existing Building Area	344th Parcels	CFC Parcels	Shared Parcels
RM3600 Zones	3,200	3,200	3,200
CE/BC Zones	26,300	3,200	3,200
Avg. SF per Job	619	619	619
Vacancy Allowance	10%	10%	10%
Current Employment	38	5	5

Excludes land classified as critical lands and developed lands.

Potential Net New Assessed Value of Vacant and Redevelopment Land Under Current Zoning

Net New Assessed Value	344th Parcels	CFC Parcels	Shared Parcels
RM3600 Zones (on vacant and redev. Land)*	$323,517,549	$323,517,549	$323,517,549
CE/BC Zones			
on Vacant land	$9,423,566	$3,965,315	$2,928,818
on Redevelopable land	$2,023,297	$399,750	$399,750
Total Net New AV	$334,964,411	$327,882,614	$326,846,116

Excludes land classified as critical lands and developed lands.

* based on multifamily housing residual land value analysis in Appendix.

Potential Net New Taxable Construction Materials

	344th Parcels	CFC Parcels	Shared Parcels
Total Construction Value (AV)	$334,964,411	$327,882,614	$326,846,116
Materials Share of Total Value	45%	45%	45%
Taxable Value of Construction	$150,733,985	$147,547,176	$147,080,752

Potential Net New Taxable Sales from Commercial Development (Annual)

	344th Parcels	CFC Parcels	Shared Parcels
Commercial Jobs Added	76	37	27
Sales Per Job	$202,192	$202,192	$202,192
Taxable Value of Net New Annual Sales	$15,389,349	$7,414,468	$5,376,570

Development & Employment Assumptions for CE/BC Zoned Land

	344th Parcels	CFC Parcels	Shared Parcels
Floor Area Ratio	0.35	0.35	0.35
Light Industrial Mix	59%	59%	59%
Commercial Mix	41%	41%	41%
Bldg. SF per Light Ind. Job	700	700	700
Bldg. SF per Com. Job	500	500	500
Vacancy Allowance	10%	10%	10%
Occupied Light Industrial SF	80,793	33,997	25,110
Occupied Commercial SF	55,186	23,222	17,152
Light Industrial Jobs Added	115	49	36
Commercial Jobs Added	110	46	34
Less Jobs Displaced	(38)	(5)	(5)
Net New Jobs Added	**188**	**90**	**66**

Excludes land classified as critical lands and developed lands.

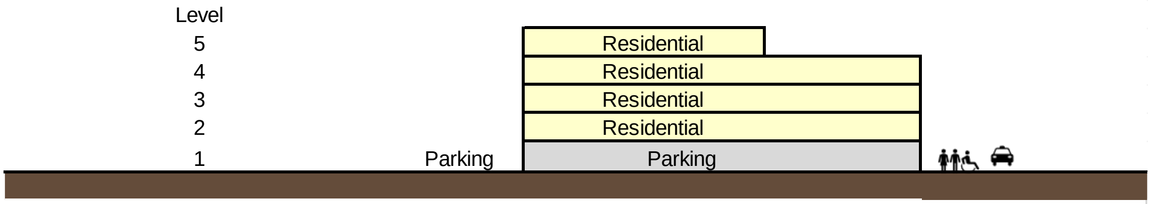
Net New Population If Vacant and Redevelopment Land is Developed Under Current Zoning

	344th Parcels	CFC Parcels	Shared Parcels
New Dwellings Added*	1,216	1,216	1,216
Less Vacancy Allowance	4%	4%	4%
Avg. People per Dwelling Unit*	1.58	1.58	1.58
People in New Development	1,844	1,844	1,844
Less Persons Displaced	(58)	(18)	-
Net New People Added	1,786	1,826	1,844
Net New Housing Units Added	1,158	1,198	1,216

* based on multifamily housing residual land value analysis in Appendix.

Appendix C: Residual Land Value Analysis

3.5-Levels, Wood Frame Apartments over Parking (100% market rate)



Particulars					
Site Area	15.74	acres	685,634	SF	net of critical lands
Dwellings Total			1,216		
Population increase			2,092		
Commercial SF			-		
Parking Ratio			1.58	per dwelling	
Surface Parking Stalls			842		
Structured Parking			1,117	in podium	
Total Stalls			1,959		
Dwellings per acre			77		
Construction Cost			$359.5	million	
Cost per Dwelling Unit*			$313,325	excludes land cost	
Assessed Value Creation			$323.5	million	
Potential annual increase in City property tax rev.			$292,010	for Gen. Fund	
Target Annual Return on Developer Equity			*6%*		
Internal Rate of Return			*23%*		
Residual Land Value per SF of Land			*$21.64*		
Residual Land Value per dwelling unit			*$12,199*		
Overall Feasibility			*Excellent*		

Apartment Development Pro forma Analysis
Zone: RM3600
3.5-Levels, Wood Frame Apartments over Parking (100% market rate)
Unit Cost and Revenue Input Assumptions

Particulars	Variable	Unit			Notes
Density & Land Use					
Site Size (gross area)	685,634	SF		15.74	Acres
Building Coverage	57%				per code
Building footprint	390,800	SF			
Parking Area (uncovered)	43%	294,823	SF	842	surface stalls
Building Levels (above grade)	3.5	levels			
Parking Levels (below building)	1.0	levels			
Parking Area (below building)	390,800	levels		1117	stalls below building
Residential Building area (above ground)	1,367,800			**1959**	total stalls
Residential floor area (net sqft)	1,094,240				
Residential floor area (gross sqft)	1,367,800		1,172,400		check sum
Average dwelling unit size (market rate units)	900	net SF			allowance
Average dwelling unit size (affordable units)	900	net SF			allowance
Market Rate Dwellings (studio units)	**550**	net SF			allowance
Market Rate Dwellings (1 bedroom)	936	net SF			allowance
Market Rate Dwellings (2 bedroom)	1,100	net SF			allowance
Net-to-Gross building area factor	1.20				Allowance
Residential dwellings	**1,216**	dwellings	Parking stalls per Unit		*Use Goal Seek, D62 = D29 to get # of Units*
Dwellings (studio units)	20%	dwellings	1.25		per code
Dwellings (1 bedroom)	55%	dwellings	1.5		per code
Dwellings (2 bedroom)	25%	dwellings	2.0		per code
	100%		**1.58**	avg	
Affordable dwelling units (share)	0%	dwellings			Assume 80% of AMI qualifies
Affordable dwellings	-				Assume 80% of AMI qualifies
Dwellings per Acre	**77**				
Above Ground FAR (excl. parking)	**2.0**				
Parking program					
Parking spaces per dwelling unit	1.58	per dwelling			
Parking spaces total (on site)	**1,915**	spaces			per code
Parking spaces: above ground, surface	842				
Parking spaces: above ground, in structure	1,117				
	1,959				
Parking area per space	350	SF			Allowance
Parking area total	670,400	SF			
Parking area: above ground	-				
Parking area: below ground					
Development Program Summary					
Residential floor area (gross)	1,367,800	SF			
Retail floor area	-	SF			
Other floor area	-	SF			
Parking area: above ground	390,800			0.6	
Total floor area: above ground	**1,759,000**				
Parking area: below ground	-				
FAR above grade, excluding parking	2.0				
FAR above grade, including parking	**2.6**				

Apartment Development Pro forma Analysis
Zone: RM3600
3.5-Levels, Wood Frame Apartments over Parking (100% market rate)
Unit Cost and Revenue Input Assumptions

Particulars	Variable	Unit			Notes
Construction costs					
Site Preparation/Access/Utilities	$3.50	per SF of land	$2,399,720		
Type I Construction	n/a				
Type V Construction	$170	per GSF building	$232,526,000		
Above Grade Parking	$100	per GSF parking	$39,080,000		
Surface Parking & Open Space	$4,000	per stall	$3,369,403		
Tenant Improvements & Bldg. Systems	$30	per NSF building	$32,827,200		
Subtotal			**$310,202,324**		
Estimated Impact Fees & Charges	$15,000	per dwelling	$18,241,387		
Soft Costs (design, engineering, other fees, etc.)	10.0%	**of subtotal**	$31,020,232		
Total Construction Cost			**$359,463,943**	**$204**	cost per total sf of building & parking area
				$295,589	cost per dwelling unit (excludes land)
Ratio of Materials Cost to Construction Cost	0.45		**$161,758,774**	value of materials delivered to site	
Local Sales Excise tax					
Project Income Assumptions					
Lease-up period	12	months			
Market rate rent premium assumed	0%				
Market-rate units under 900 sqft	$2.25	per SF/month			allowamce
Market-rate units over 900 sqft	$2.10	per SF/month			allowamce
Commercial Rents per sqft		per SF/year			Loopnet.com
Parking Revenue per space	$0	per stall/month			allowamce
Revenue escalation rate	2.8%	per year			
Cap Rate	5.0%				Apartmentvaluation.com
Project Operating Costs					
Assessed Value (AV) to Market Value Ratio	90%				
Property Tax Rate, Total Levies	$11.70	per $1000 AV			
Est. annual property tax. Total Levies	$3,784,767	per year			
Property Tax Rate, Federal Way Levy	$0.90	per $1000 AV			
Est. annual property tax. City Levies	$292,010				
Non-pass through Operating Cost (% of gross revenue)					
Vacancy & credit loss	4.0%				
Property taxes	13.0%				
Insurance	0.2%				
Maintenance	2.1%				
Reserves for replacement	2.0%				
Management & other expenses	10.0%				
Total Annual Operating & Vacancy Costs	**31.3%**				
Expense escalation rate	2.8%	per year			
Debt Service					
Loan-to-Value Ratio (excl. land)	60%				
Debt Coverage Ratio	1.25				
Interest Rate	4.0%				
Years of Construction	1.0				interest only payment during construction
Amortization (years)	20				
Loan origination fee	1.0%				
Transaction cost during sale or refinance in yr 12	5.0%				
Equity Assumptions					
Targeted Return on Equity & Overhead	**6.0%**				

[1] derived from RSMeans, low-range cost for Seattle area; excludes land cost and financing, and extra-ordinary site work.

[2] assumes blended average of city rates and fees.

[3] includes design, permitting, fees

[4] assumes 1 year construction period with payment on interest only.

[5] assumes market-based rents.

15-Apr-21

3.5-Levels, Wood Frame Apartments over Parking (100% market rate)

Apartment Prototype — **1216 Apartments** — **PRELIMINARY DRAFT FOR LONG RANGE PLANNING ONLY**

Residual Land Value Analysis — **3.5 Levels**

		2020	1	2	3	4	5	6	7	8	9	10	11	12
	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
DEVELOPMENT PROGRAM ASSUMPTIONS	**land & permitting**	**construction**												
Market Rate Dwellings (studio units)			243	243	243	243	243	243	243	243	243	243	243	243
Market Rate Dwellings (1 bedroom)			669	669	669	669	669	669	669	669	669	669	669	669
Market Rate Dwellings (2 bedroom)			304	304	304	304	304	304	304	304	304	304	304	304
Parking stalls (leasable)			1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117	1,117
Occupancy %		0%	50%	80%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
INCOME														
Avg. Monthly Rental Income: Market Rate Units			$2,025	$2,081	$2,140	$2,199	$2,261	$2,324	$2,389	$2,456	$2,525	$2,596	$2,668	$2,743
Gross Annual Rental Income			$14,772,240	$24,297,380	$29,973,248	$30,812,499	$31,675,249	$32,562,156	$33,473,897	$34,411,166	$35,374,678	$36,365,169	$37,383,394	$38,430,129
Less Vacancy & Credit Loss Allowance			($590,890)	($971,895)	($1,198,930)	($1,232,500)	($1,267,010)	($1,302,486)	($1,338,956)	($1,376,447)	($1,414,987)	($1,454,607)	($1,495,336)	($1,537,205)
Less Misc. Operating Expenses			($3,864,418)	($6,356,195)	($7,841,002)	($8,060,550)	($8,286,245)	($8,518,260)	($8,756,771)	($9,001,961)	($9,254,016)	($9,513,128)	($9,779,496)	($10,053,322)
NET OPERATING INCOME (before debt service and replacement reserves)		$0	$10,316,932	$16,969,290	**$20,933,317**	$21,519,450	$22,121,994	$22,741,410	$23,378,169	$24,032,758	$24,705,675	$25,397,434	$26,108,563	$26,839,602
less Debt Service*		$ (11,379,640)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)	$ (20,933,346)
less Advance Developer Cash Equity		($500,000)												
CASH FLOW AVAILABLE (after debt & equity)		**($11,879,640)**	**($10,616,413)**	**($3,964,055)**	**($29)**	**$586,104**	**$1,188,648**	**$1,808,064**	**$2,444,824**	**$3,099,412**	**$3,772,330**	**$4,464,089**	**$5,175,217**	**$5,906,257**
Sale or Refinance in Year 10														$509,952,000
NET PROFIT (before depreciation & taxes)	**($17,886,217)**	**($11,879,640)**	**($10,616,413)**	**($3,964,055)**	**($29)**	**$586,104**	**$1,188,648**	**$1,808,064**	**$2,444,824**	**$3,099,412**	**$3,772,330**	**$4,464,089**	**$5,175,217**	**$515,858,257**

Supportable Debt (Construction-Permanent Loan)	
Supportable Annual Payment (@125% coverage)	$20,933,317
Supportable Debt @4.0% interest, 20-year term)	**$284,491,000**

Supportable Equity (for-profit developer)	
Targeted Return on Investment & Overhead	6.0%
Net present value of net profit (equity)	**$230,747,000**

Residual Land Value Analysis	**For-Profit Developer**
Supportable Debt	$284,491,000
Supportable Equity	$230,747,000
Less Debt Principal in Yr. 12	($140,938,876)
Subtotal Debt + Equity - Primary Loan Amt.	$374,299,124
Construction Cost	($359,463,943)
Residual Land Value	**$14,835,181**
Residual Land Value per Dwelling Unit	**$12,199**
Residual Land Value per Acre	**$942,515**
Residual Land Value per SqFt of Land Area	**$22**
Ratio of Land Value to Improvement Cost	**0.04**
Avg. Densitiy (dwellings per acre)	*77*
Site Size (acres)	*15.7*
Site Size (sqft)	*685,634*

SUMMARY of Revenue Assumptions	
Year 12 Sale or Refinance Fees/Costs	5.0%
Cap Rate	5.0%
Year 12 Sale or Refinance Value	**$509,952,000**
Annual Rent Rate escalation	2.8%
Annual Op. Expense Rate escalation	2.8%

Assessed Value & City Property Tax Created	
Project Improvement Value	$359,463,943
Project Land Value	$14,835,181
Project Total Value	$374,299,124
Assessed Value to Market Value Ratio	90%
Estimated Assessed Value	$336,869,211
Property Tax Rate per $1,000 AV	$11.70
Net New AV Created	$323,517,549
Annual Value of Tax Payments	**$3,785,000**
Annual Net New City Tax Revenue	**$292,010**

Source: FCS GROUP, based on assumptions stated in Appendix.

Appendix D: Detailed 30-Year Fiscal Impact Analysis

344th Site

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
State Shared Revenue															
Motor Vehicle Fuel Tax	$17,927	$18,016	$18,107	$18,197	$18,288	$18,379	$18,471	$18,564	$18,657	$18,750	$37,687	$37,876	$38,065	$38,255	$38,447
Multi-Modal Distribution	$1,197	$1,203	$1,209	$1,215	$1,221	$1,227	$1,233	$1,239	$1,246	$1,252	$2,504	$2,516	$2,529	$2,541	$2,554
Increased MVFT	$1,045	$1,050	$1,056	$1,061	$1,066	$1,071	$1,077	$1,082	$1,088	$1,093	$2,186	$2,197	$2,208	$2,219	$2,230
Liquor Profits	$7,056	$7,092	$7,127	$7,163	$7,199	$7,235	$7,271	$7,307	$7,344	$7,380	$14,761	$14,835	$14,909	$14,983	$15,058
Liquor Excise	$5,056	$5,081	$5,106	$5,132	$5,157	$5,183	$5,209	$5,235	$5,261	$5,288	$10,575	$10,628	$10,681	$10,735	$10,788
Criminal Justice Distribution	$1,045	$1,050	$1,056	$1,061	$1,066	$1,071	$1,077	$1,082	$1,088	$1,093	$2,186	$2,197	$2,208	$2,219	$2,230
Subtotal State Shared Revenue	$33,326	$33,492	$33,660	$33,828	$33,997	$34,167	$34,338	$34,510	$34,682	$34,856	$69,899	$70,249	$70,600	$70,953	$71,308
Property Tax Revenue															
School	$608,063	$614,143	$620,285	$626,487	$632,752	$639,080	$645,471	$651,925	$658,445	$665,029	$1,343,359	$1,356,792	$1,370,360	$1,384,064	$1,397,904
City	$151,171	$152,683	$154,210	$155,752	$157,309	$158,882	$160,471	$162,076	$163,697	$165,334	$333,974	$337,314	$340,687	$344,094	$347,535
Port District	$20,071	$20,272	$20,474	$20,679	$20,886	$21,095	$21,306	$21,519	$21,734	$21,951	$44,342	$44,785	$45,233	$45,685	$46,142
County	$208,830	$210,919	$213,028	$215,158	$217,310	$219,483	$221,677	$223,894	$226,133	$228,395	$461,357	$465,971	$470,630	$475,337	$480,090
State School Fund	$517,224	$522,396	$527,620	$532,896	$538,225	$543,607	$549,043	$554,534	$560,079	$565,680	$1,142,673	$1,154,100	$1,165,641	$1,177,297	$1,189,070
Sound Transit	$33,009	$33,339	$33,673	$34,009	$34,349	$34,693	$35,040	$35,390	$35,744	$36,102	$72,925	$73,654	$74,391	$75,135	$75,886
Flood	$14,921	$15,070	$15,221	$15,373	$15,527	$15,682	$15,839	$15,997	$16,157	$16,319	$32,964	$33,294	$33,627	$33,963	$34,303
EMS	$44,381	$44,825	$45,273	$45,726	$46,183	$46,645	$47,111	$47,583	$48,058	$48,539	$98,049	$99,029	$100,019	$101,020	$102,030
Library	$59,846	$60,445	$61,049	$61,660	$62,276	$62,899	$63,528	$64,163	$64,805	$65,453	$132,215	$133,538	$134,873	$136,222	$137,584
Fire	$301,825	$304,843	$307,891	$310,970	$314,080	$317,221	$320,393	$323,597	$326,833	$330,101	$666,804	$673,473	$680,207	$687,009	$693,879
Subtotal Property Tax Revenue	$1,959,341	$1,978,934	$1,998,724	$2,018,711	$2,038,898	$2,059,287	$2,079,880	$2,100,679	$2,121,685	$2,142,902	$4,328,662	$4,371,949	$4,415,669	$4,459,825	$4,504,424
Sales Tax Revenue															
Federal Way Sales Tax Revenue	$193,529	$193,529	$193,529	$193,529	$193,529	$193,529	$193,529	$193,529	$193,529	$193,529	$130,809	$130,809	$130,809	$130,809	$130,809
State & County Sales Tax Revenue	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$2,106,047	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515
Subtotal Sales Tax Revenue	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$2,299,575	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324
Subtotal Federal Way Revenue	$378,026	$379,704	$381,398	$383,109	$384,835	$386,578	$388,338	$390,114	$391,908	$393,718	$534,683	$538,372	$542,096	$545,856	$549,652
Subtotal Other Government Revenue	$3,914,216	$3,932,298	$3,950,561	$3,969,006	$3,987,635	$4,006,451	$4,025,455	$4,044,649	$4,064,035	$4,083,615	$5,418,203	$5,458,150	$5,498,497	$5,539,246	$5,580,404
Total Revenue	$4,292,242	$4,312,002	$4,331,959	$4,352,114	$4,372,471	$4,393,030	$4,413,793	$4,434,764	$4,455,943	$4,477,333	$5,952,886	$5,996,522	$6,040,593	$6,085,102	$6,130,055

344th Site

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
State Shared Revenue																
Motor Vehicle Fuel Tax	$38,639	$38,832	$39,026	$39,221	$39,417	$39,615	$39,813	$40,012	$40,212	$40,413	$40,615	$40,818	$41,022	$41,227	$41,433	$974,000
Multi-Modal Distribution	$2,567	$2,580	$2,593	$2,606	$2,619	$2,632	$2,645	$2,658	$2,671	$2,685	$2,698	$2,712	$2,725	$2,739	$2,753	$64,768
Increased MVFT	$2,241	$2,252	$2,264	$2,275	$2,286	$2,298	$2,309	$2,321	$2,333	$2,344	$2,356	$2,368	$2,380	$2,391	$2,403	$56,551
Liquor Profits	$15,133	$15,209	$15,285	$15,362	$15,438	$15,516	$15,593	$15,671	$15,749	$15,828	$15,907	$15,987	$16,067	$16,147	$16,228	$381,840
Liquor Excise	$10,842	$10,897	$10,951	$11,006	$11,061	$11,116	$11,172	$11,228	$11,284	$11,340	$11,397	$11,454	$11,511	$11,569	$11,627	$273,571
Criminal Justice Distribution	$2,241	$2,252	$2,264	$2,275	$2,286	$2,298	$2,309	$2,321	$2,333	$2,344	$2,356	$2,368	$2,380	$2,391	$2,403	$56,551
Subtotal State Shared Revenue	$71,664	$72,023	$72,383	$72,745	$73,108	$73,474	$73,841	$74,210	$74,581	$74,954	$75,329	$75,706	$76,084	$76,465	$76,847	$1,807,280
Property Tax Revenue																
School	$1,411,884	$1,426,002	$1,440,262	$1,454,665	$1,469,212	$1,483,904	$1,498,743	$1,513,730	$1,528,868	$1,544,156	$1,559,598	$1,575,194	$1,590,946	$1,606,855	$1,622,924	$35,941,101
City	$351,010	$354,520	$358,065	$361,646	$365,262	$368,915	$372,604	$376,330	$380,093	$383,894	$387,733	$391,611	$395,527	$399,482	$403,477	$8,935,357
Port District	$46,604	$47,070	$47,541	$48,016	$48,496	$48,981	$49,471	$49,966	$50,465	$50,970	$51,480	$51,994	$52,514	$53,039	$53,570	$1,186,352
County	$484,891	$489,740	$494,637	$499,583	$504,579	$509,625	$514,721	$519,869	$525,067	$530,318	$535,621	$540,977	$546,387	$551,851	$557,369	$12,343,447
State School Fund	$1,200,961	$1,212,971	$1,225,100	$1,237,351	$1,249,725	$1,262,222	$1,274,844	$1,287,593	$1,300,469	$1,313,473	$1,326,608	$1,339,874	$1,353,273	$1,366,806	$1,380,474	$30,571,829
Sound Transit	$76,645	$77,411	$78,186	$78,967	$79,757	$80,555	$81,360	$82,174	$82,996	$83,826	$84,664	$85,510	$86,366	$87,229	$88,101	$1,951,086
Flood	$34,646	$34,992	$35,342	$35,695	$36,052	$36,413	$36,777	$37,145	$37,516	$37,891	$38,270	$38,653	$39,040	$39,430	$39,824	$881,943
EMS	$103,050	$104,081	$105,121	$106,173	$107,234	$108,307	$109,390	$110,484	$111,589	$112,704	$113,832	$114,970	$116,120	$117,281	$118,454	$2,623,260
Library	$138,960	$140,349	$141,753	$143,170	$144,602	$146,048	$147,508	$148,984	$150,473	$151,978	$153,498	$155,033	$156,583	$158,149	$159,731	$3,537,376
Fire	$700,818	$707,826	$714,905	$722,054	$729,274	$736,567	$743,933	$751,372	$758,886	$766,475	$774,139	$781,881	$789,700	$797,597	$805,572	$17,840,125
Subtotal Property Tax Revenue	$4,549,468	$4,594,962	$4,640,912	$4,687,321	$4,734,194	$4,781,536	$4,829,352	$4,877,645	$4,926,422	$4,975,686	$5,025,443	$5,075,697	$5,126,454	$5,177,719	$5,229,496	$115,811,876
Sales Tax Revenue																
Federal Way Sales Tax Revenue	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$130,809	$4,551,476
State & County Sales Tax Revenue	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$1,423,515	$49,530,763
Subtotal Sales Tax Revenue	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$1,554,324	$54,082,239
Subtotal Federal Way Revenue	$553,484	$557,352	$561,257	$565,200	$569,180	$573,198	$577,255	$581,350	$585,484	$589,658	$593,872	$598,126	$602,421	$606,756	$611,133	$15,294,113
Subtotal Other Government Revenue	$5,621,973	$5,663,957	$5,706,362	$5,749,190	$5,792,447	$5,836,136	$5,880,262	$5,924,830	$5,969,843	$6,015,306	$6,061,224	$6,107,601	$6,154,442	$6,201,751	$6,249,534	$156,407,282
Total Revenue	$6,175,456	$6,221,309	$6,267,619	$6,314,390	$6,361,627	$6,409,334	$6,457,517	$6,506,180	$6,555,327	$6,604,964	$6,655,096	$6,705,727	$6,756,863	$6,808,508	$6,860,667	$171,701,395

CFC Site

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
State Shared Revenue															
Motor Vehicle Fuel Tax	$18,328	$18,420	$18,512	$18,605	$18,698	$18,791	$18,885	$18,979	$19,074	$19,170	$38,339	$38,531	$38,724	$38,917	$39,112
Multi-Modal Distribution	$1,224	$1,230	$1,236	$1,242	$1,248	$1,255	$1,261	$1,267	$1,274	$1,280	$2,560	$2,573	$2,585	$2,598	$2,611
Increased MVFT	$1,068	$1,074	$1,079	$1,085	$1,090	$1,095	$1,101	$1,106	$1,112	$1,118	$2,235	$2,246	$2,257	$2,269	$2,280
Liquor Profits	$7,214	$7,250	$7,287	$7,323	$7,360	$7,397	$7,434	$7,471	$7,508	$7,546	$15,091	$15,167	$15,243	$15,319	$15,395
Liquor Excise	$5,169	$5,195	$5,221	$5,247	$5,273	$5,299	$5,326	$5,352	$5,379	$5,406	$10,812	$10,866	$10,921	$10,975	$11,030
Criminal Justice Distribution	$1,068	$1,074	$1,079	$1,085	$1,090	$1,095	$1,101	$1,106	$1,112	$1,118	$2,235	$2,246	$2,257	$2,269	$2,280
Subtotal State Shared Revenue	$34,072	$34,242	$34,414	$34,586	$34,759	$34,932	$35,107	$35,283	$35,459	$35,636	$71,273	$71,629	$71,987	$72,347	$72,709
Property Tax Revenue															
School	$595,207	$601,159	$607,171	$613,242	$619,375	$625,568	$631,824	$638,142	$644,524	$650,969	$1,314,958	$1,328,107	$1,341,388	$1,354,802	$1,368,350
City	$147,975	$149,455	$150,949	$152,459	$153,983	$155,523	$157,079	$158,649	$160,236	$161,838	$326,913	$330,182	$333,484	$336,819	$340,187
Port District	$19,647	$19,843	$20,042	$20,242	$20,444	$20,649	$20,855	$21,064	$21,275	$21,487	$43,404	$43,838	$44,277	$44,720	$45,167
County	$204,415	$206,459	$208,524	$210,609	$212,715	$214,842	$216,991	$219,161	$221,352	$223,566	$451,603	$456,119	$460,680	$465,287	$469,940
State School Fund	$506,288	$511,351	$516,465	$521,630	$526,846	$532,114	$537,435	$542,810	$548,238	$553,720	$1,118,515	$1,129,700	$1,140,997	$1,152,407	$1,163,931
Sound Transit	$32,311	$32,634	$32,961	$33,290	$33,623	$33,959	$34,299	$34,642	$34,988	$35,338	$71,383	$72,097	$72,818	$73,546	$74,282
Flood	$14,606	$14,752	$14,899	$15,048	$15,199	$15,351	$15,504	$15,659	$15,816	$15,974	$32,267	$32,590	$32,916	$33,245	$33,577
EMS	$43,443	$43,877	$44,316	$44,759	$45,207	$45,659	$46,115	$46,577	$47,042	$47,513	$95,976	$96,936	$97,905	$98,884	$99,873
Library	$58,581	$59,167	$59,759	$60,356	$60,960	$61,569	$62,185	$62,807	$63,435	$64,069	$129,420	$130,714	$132,021	$133,342	$134,675
Fire	$295,444	$298,398	$301,382	$304,396	$307,440	$310,514	$313,619	$316,755	$319,923	$323,122	$652,707	$659,234	$665,826	$672,485	$679,209
Subtotal Property Tax Revenue	$1,917,917	$1,937,096	$1,956,467	$1,976,031	$1,995,792	$2,015,750	$2,035,907	$2,056,266	$2,076,829	$2,097,597	$4,237,146	$4,279,518	$4,322,313	$4,365,536	$4,409,191
Sales Tax Revenue															
Federal Way Sales Tax Revenue	$156,927	$156,927	$156,927	$156,927	$156,927	$156,927	$156,927	$156,927	$156,927	$156,927	$63,023	$63,023	$63,023	$63,023	$63,023
State & County Sales Tax Revenue	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$1,707,731	$685,838	$685,838	$685,838	$685,838	$685,838
Subtotal Sales Tax Revenue	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$1,864,657	$748,861	$748,861	$748,861	$748,861	$748,861
Subtotal Federal Way Revenue	$338,974	$340,624	$342,290	$343,971	$345,669	$347,382	$349,112	$350,858	$352,621	$354,401	$461,209	$464,834	$468,494	$472,189	$475,919
Subtotal Other Government Revenue	$3,477,672	$3,495,371	$3,513,248	$3,531,303	$3,549,539	$3,567,957	$3,586,559	$3,605,347	$3,624,324	$3,643,489	$4,596,071	$4,635,174	$4,674,667	$4,714,555	$4,754,842
Total Revenue	$3,816,646	$3,835,995	$3,855,537	$3,875,274	$3,895,207	$3,915,339	$3,935,671	$3,956,206	$3,976,945	$3,997,890	$5,057,280	$5,100,008	$5,143,161	$5,186,744	$5,230,761

CFC Site

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
State Shared Revenue																
Motor Vehicle Fuel Tax	$39,307	$39,504	$39,702	$39,900	$40,100	$40,300	$40,502	$40,704	$40,908	$41,112	$41,318	$41,524	$41,732	$41,941	$42,150	$991,787
Multi-Modal Distribution	$2,624	$2,638	$2,651	$2,664	$2,677	$2,691	$2,704	$2,718	$2,731	$2,745	$2,759	$2,772	$2,786	$2,800	$2,814	$66,218
Increased MVFT	$2,291	$2,303	$2,314	$2,326	$2,338	$2,349	$2,361	$2,373	$2,385	$2,397	$2,409	$2,421	$2,433	$2,445	$2,457	$57,817
Liquor Profits	$15,472	$15,550	$15,627	$15,706	$15,784	$15,863	$15,942	$16,022	$16,102	$16,183	$16,264	$16,345	$16,427	$16,509	$16,591	$390,389
Liquor Excise	$11,085	$11,141	$11,196	$11,252	$11,309	$11,365	$11,422	$11,479	$11,536	$11,594	$11,652	$11,710	$11,769	$11,828	$11,887	$279,697
Criminal Justice Distribution	$2,291	$2,303	$2,314	$2,326	$2,338	$2,349	$2,361	$2,373	$2,385	$2,397	$2,409	$2,421	$2,433	$2,445	$2,457	$57,817
Subtotal State Shared Revenue	$73,072	$73,438	$73,805	$74,174	$74,545	$74,917	$75,292	$75,669	$76,047	$76,427	$76,809	$77,193	$77,579	$77,967	$78,357	$1,843,726
Property Tax Revenue																
School	$1,382,034	$1,395,854	$1,409,812	$1,423,911	$1,438,150	$1,452,531	$1,467,056	$1,481,727	$1,496,544	$1,511,510	$1,526,625	$1,541,891	$1,557,310	$1,572,883	$1,588,612	$35,181,237
City	$343,589	$347,025	$350,495	$354,000	$357,540	$361,115	$364,727	$368,374	$372,058	$375,778	$379,536	$383,331	$387,165	$391,036	$394,947	$8,746,446
Port District	$45,618	$46,075	$46,535	$47,001	$47,471	$47,945	$48,425	$48,909	$49,398	$49,892	$50,391	$50,895	$51,404	$51,918	$52,437	$1,161,270
County	$474,639	$479,386	$484,180	$489,021	$493,912	$498,851	$503,839	$508,878	$513,966	$519,106	$524,297	$529,540	$534,835	$540,184	$545,586	$12,082,482
State School Fund	$1,175,570	$1,187,326	$1,199,199	$1,211,191	$1,223,303	$1,235,536	$1,247,892	$1,260,371	$1,272,974	$1,285,704	$1,298,561	$1,311,547	$1,324,662	$1,337,909	$1,351,288	$29,925,481
Sound Transit	$75,025	$75,775	$76,533	$77,298	$78,071	$78,852	$79,640	$80,437	$81,241	$82,053	$82,874	$83,703	$84,540	$85,385	$86,239	$1,909,836
Flood	$33,913	$34,252	$34,595	$34,941	$35,290	$35,643	$35,999	$36,359	$36,723	$37,090	$37,461	$37,836	$38,214	$38,596	$38,982	$863,297
EMS	$100,872	$101,880	$102,899	$103,928	$104,967	$106,017	$107,077	$108,148	$109,229	$110,322	$111,425	$112,539	$113,665	$114,801	$115,949	$2,567,799
Library	$136,022	$137,382	$138,756	$140,143	$141,545	$142,960	$144,390	$145,834	$147,292	$148,765	$150,253	$151,755	$153,273	$154,805	$156,354	$3,462,589
Fire	$686,002	$692,862	$699,790	$706,788	$713,856	$720,995	$728,204	$735,487	$742,841	$750,270	$757,773	$765,350	$773,004	$780,734	$788,541	$17,462,950
Subtotal Property Tax Revenue	$4,453,283	$4,497,816	$4,542,794	$4,588,222	$4,634,104	$4,680,445	$4,727,250	$4,774,522	$4,822,268	$4,870,490	$4,919,195	$4,968,387	$5,018,071	$5,068,252	$5,118,934	$113,363,388
Sales Tax Revenue																
Federal Way Sales Tax Revenue	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$63,023	$2,829,725
State & County Sales Tax Revenue	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$685,838	$30,794,070
Subtotal Sales Tax Revenue	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$748,861	$33,623,796
Subtotal Federal Way Revenue	$479,684	$483,485	$487,323	$491,197	$495,108	$499,056	$503,042	$507,065	$511,127	$515,228	$519,368	$523,548	$527,767	$532,026	$536,327	$13,419,897
Subtotal Other Government Revenue	$4,795,533	$4,836,629	$4,878,137	$4,920,060	$4,962,403	$5,005,168	$5,048,362	$5,091,987	$5,136,048	$5,180,550	$5,225,497	$5,270,894	$5,316,745	$5,363,054	$5,409,826	$135,411,012
Total Revenue	$5,275,217	$5,320,115	$5,365,460	$5,411,257	$5,457,510	$5,504,224	$5,551,403	$5,599,052	$5,647,176	$5,695,779	$5,744,866	$5,794,442	$5,844,511	$5,895,080	$5,946,152	$148,830,910

Shared Area

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
State Shared Revenue															
Motor Vehicle Fuel Tax	$18,509	$18,601	$18,694	$18,788	$18,882	$18,976	$19,071	$19,166	$19,262	$19,359	$38,717	$38,911	$39,105	$39,301	$39,497
Multi-Modal Distribution	$1,236	$1,242	$1,248	$1,254	$1,261	$1,267	$1,273	$1,280	$1,286	$1,293	$2,585	$2,598	$2,611	$2,624	$2,637
Increased MVFT	$1,079	$1,084	$1,090	$1,095	$1,101	$1,106	$1,112	$1,117	$1,123	$1,129	$2,257	$2,268	$2,280	$2,291	$2,303
Liquor Profits	$7,285	$7,322	$7,359	$7,395	$7,432	$7,469	$7,507	$7,544	$7,582	$7,620	$15,240	$15,316	$15,393	$15,470	$15,547
Liquor Excise	$5,220	$5,246	$5,272	$5,298	$5,325	$5,352	$5,378	$5,405	$5,432	$5,459	$10,919	$10,973	$11,028	$11,083	$11,139
Criminal Justice Distribution	$1,079	$1,084	$1,090	$1,095	$1,101	$1,106	$1,112	$1,117	$1,123	$1,129	$2,257	$2,268	$2,280	$2,291	$2,303
Subtotal State Shared Revenue	$34,408	$34,580	$34,753	$34,927	$35,101	$35,277	$35,453	$35,630	$35,808	$35,988	$71,975	$72,335	$72,697	$73,060	$73,425
Property Tax Revenue															
School	$593,325	$599,259	$605,251	$611,304	$617,417	$623,591	$629,827	$636,125	$642,486	$648,911	$1,310,801	$1,323,909	$1,337,148	$1,350,519	$1,364,024
City	$147,507	$148,982	$150,472	$151,977	$153,497	$155,032	$156,582	$158,148	$159,729	$161,327	$325,880	$329,138	$332,430	$335,754	$339,112
Port District	$19,585	$19,780	$19,978	$20,178	$20,380	$20,584	$20,789	$20,997	$21,207	$21,419	$43,267	$43,700	$44,137	$44,578	$45,024
County	$203,769	$205,807	$207,865	$209,943	$212,043	$214,163	$216,305	$218,468	$220,653	$222,859	$450,175	$454,677	$459,224	$463,816	$468,454
State School Fund	$504,688	$509,735	$514,832	$519,981	$525,180	$530,432	$535,736	$541,094	$546,505	$551,970	$1,114,979	$1,126,129	$1,137,390	$1,148,764	$1,160,252
Sound Transit	$32,209	$32,531	$32,856	$33,185	$33,517	$33,852	$34,191	$34,532	$34,878	$35,227	$71,158	$71,869	$72,588	$73,314	$74,047
Flood	$14,559	$14,705	$14,852	$15,001	$15,151	$15,302	$15,455	$15,610	$15,766	$15,923	$32,165	$32,487	$32,812	$33,140	$33,471
EMS	$43,305	$43,739	$44,176	$44,618	$45,064	$45,514	$45,970	$46,429	$46,894	$47,363	$95,672	$96,629	$97,595	$98,571	$99,557
Library	$58,396	$58,980	$59,570	$60,165	$60,767	$61,375	$61,988	$62,608	$63,234	$63,867	$129,011	$130,301	$131,604	$132,920	$134,249
Fire	$294,510	$297,455	$300,429	$303,434	$306,468	$309,533	$312,628	$315,754	$318,912	$322,101	$650,644	$657,150	$663,722	$670,359	$677,062
Subtotal Property Tax Revenue	$1,911,854	$1,930,972	$1,950,282	$1,969,785	$1,989,483	$2,009,377	$2,029,471	$2,049,766	$2,070,264	$2,090,966	$4,223,752	$4,265,989	$4,308,649	$4,351,736	$4,395,253
Sales Tax Revenue															
Federal Way Sales Tax Revenue	$147,869	$147,869	$147,869	$147,869	$147,869	$147,869	$147,869	$147,869	$147,869	$147,869	$45,701	$45,701	$45,701	$45,701	$45,701
State & County Sales Tax Revenue	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$1,703,416	$497,333	$497,333	$497,333	$497,333	$497,333
Subtotal Sales Tax Revenue	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$1,851,285	$543,034	$543,034	$543,034	$543,034	$543,034
Subtotal Federal Way Revenue	$329,784	$331,431	$333,094	$334,772	$336,467	$338,177	$339,904	$341,647	$343,407	$345,183	$443,555	$447,174	$450,827	$454,515	$458,238
Subtotal Other Government Revenue	$3,467,762	$3,485,406	$3,503,226	$3,521,224	$3,539,402	$3,557,762	$3,576,305	$3,595,034	$3,613,950	$3,633,056	$4,395,205	$4,434,184	$4,473,552	$4,513,314	$4,553,474
Total Revenue	$3,797,547	$3,816,837	$3,836,320	$3,855,996	$3,875,869	$3,895,939	$3,916,209	$3,936,681	$3,957,357	$3,978,239	$4,838,760	$4,881,358	$4,924,379	$4,967,829	$5,011,712

Shared Area

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
State Shared Revenue																
Motor Vehicle Fuel Tax	$39,695	$39,893	$40,093	$40,293	$40,495	$40,697	$40,901	$41,105	$41,311	$41,517	$41,725	$41,933	$42,143	$42,354	$42,566	$1,001,561
Multi-Modal Distribution	$2,650	$2,664	$2,677	$2,690	$2,704	$2,717	$2,731	$2,744	$2,758	$2,772	$2,786	$2,800	$2,814	$2,828	$2,842	$66,871
Increased MVFT	$2,314	$2,326	$2,337	$2,349	$2,361	$2,372	$2,384	$2,396	$2,408	$2,420	$2,432	$2,445	$2,457	$2,469	$2,481	$58,387
Liquor Profits	$15,625	$15,703	$15,781	$15,860	$15,940	$16,019	$16,099	$16,180	$16,261	$16,342	$16,424	$16,506	$16,588	$16,671	$16,755	$394,237
Liquor Excise	$11,194	$11,250	$11,307	$11,363	$11,420	$11,477	$11,535	$11,592	$11,650	$11,708	$11,767	$11,826	$11,885	$11,944	$12,004	$282,453
Criminal Justice Distribution	$2,314	$2,326	$2,337	$2,349	$2,361	$2,372	$2,384	$2,396	$2,408	$2,420	$2,432	$2,445	$2,457	$2,469	$2,481	$58,387
Subtotal State Shared Revenue	$73,792	$74,161	$74,532	$74,905	$75,279	$75,656	$76,034	$76,414	$76,796	$77,180	$77,566	$77,954	$78,344	$78,736	$79,129	$1,861,896
Property Tax Revenue																
School	$1,377,665	$1,391,441	$1,405,356	$1,419,409	$1,433,603	$1,447,939	$1,462,419	$1,477,043	$1,491,813	$1,506,732	$1,521,799	$1,537,017	$1,552,387	$1,567,911	$1,583,590	$35,070,022
City	$342,503	$345,928	$349,387	$352,881	$356,410	$359,974	$363,574	$367,209	$370,881	$374,590	$378,336	$382,119	$385,941	$389,800	$393,698	$8,718,797
Port District	$45,474	$45,929	$46,388	$46,852	$47,321	$47,794	$48,272	$48,755	$49,242	$49,735	$50,232	$50,734	$51,242	$51,754	$52,272	$1,157,599
County	$473,139	$477,870	$482,649	$487,475	$492,350	$497,274	$502,246	$507,269	$512,342	$517,465	$522,640	$527,866	$533,145	$538,476	$543,861	$12,044,287
State School Fund	$1,171,854	$1,183,573	$1,195,408	$1,207,363	$1,219,436	$1,231,631	$1,243,947	$1,256,386	$1,268,950	$1,281,640	$1,294,456	$1,307,401	$1,320,475	$1,333,679	$1,347,016	$29,830,881
Sound Transit	$74,787	$75,535	$76,291	$77,054	$77,824	$78,602	$79,388	$80,182	$80,984	$81,794	$82,612	$83,438	$84,272	$85,115	$85,966	$1,903,799
Flood	$33,806	$34,144	$34,485	$34,830	$35,179	$35,530	$35,886	$36,245	$36,607	$36,973	$37,343	$37,716	$38,093	$38,474	$38,859	$860,568
EMS	$100,553	$101,558	$102,574	$103,599	$104,635	$105,682	$106,739	$107,806	$108,884	$109,973	$111,073	$112,183	$113,305	$114,438	$115,583	$2,559,681
Library	$135,592	$136,948	$138,317	$139,700	$141,097	$142,508	$143,933	$145,373	$146,826	$148,295	$149,778	$151,275	$152,788	$154,316	$155,859	$3,451,643
Fire	$683,833	$690,671	$697,578	$704,554	$711,599	$718,715	$725,903	$733,162	$740,493	$747,898	$755,377	$762,931	$770,560	$778,266	$786,048	$17,407,747
Subtotal Property Tax Revenue	$4,439,206	$4,483,598	$4,528,434	$4,573,718	$4,619,455	$4,665,650	$4,712,306	$4,759,429	$4,807,023	$4,855,094	$4,903,645	$4,952,681	$5,002,208	$5,052,230	$5,102,752	$113,005,026
Sales Tax Revenue																
Federal Way Sales Tax Revenue	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$45,701	$2,392,707
State & County Sales Tax Revenue	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$497,333	$26,980,815
Subtotal Sales Tax Revenue	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$543,034	$29,373,522
Subtotal Federal Way Revenue	$461,996	$465,790	$469,620	$473,487	$477,390	$481,331	$485,309	$489,324	$493,379	$497,471	$501,603	$505,774	$509,985	$514,236	$518,528	$12,973,401
Subtotal Other Government Revenue	$4,594,035	$4,635,002	$4,676,379	$4,718,170	$4,760,378	$4,803,008	$4,846,065	$4,889,553	$4,933,475	$4,977,836	$5,022,641	$5,067,894	$5,113,600	$5,159,763	$5,206,387	$131,267,043
Total Revenue	$5,056,032	$5,100,793	$5,145,999	$5,191,656	$5,237,768	$5,284,339	$5,331,374	$5,378,877	$5,426,853	$5,475,308	$5,524,244	$5,573,669	$5,623,585	$5,673,999	$5,724,915	$144,240,444

This page intentionally left blank.

City of Federal Way (Communication ID 472867)

Comment ID	Comment Text	Response
1	We recognize that Sound Transit is building new transit infrastructure to support sustainable growth in our region. In doing so, Sound Transit should not make a decision that will have a lasting negative impact. Environmental review by the way of NEPA and SEPA was implemented at the Federal and State levels to evaluate the impacts of government decisions in order to prevent them from causing unnecessary impacts to communities like those that the OMF-South will have in Federal Way. The 336th Street site will remove a church, a school, and a daycare that serve our community as well as residences and other businesses. The 344th Site will remove multiple churches, 20 residences, and a dozen businesses, including the GarageTown community that the DEIS presents as a single business but is in fact made up of over 60 unique owners and Ellenos Real Greek Yogurt, which recently invested millions of dollars in improvements to their regional and growing business. The Midway Landfill would displace significantly fewer businesses and employees, no residents, and no civic institutions.	Please see the response to Common Comment 4 in Table L.1-1, Response to Common Comments, in the Final EIS.
2	The DEIS presents a clear preferred alternative when the impacts are considered and it is the Midway Landfill. In accordance with NEPA and SEPA, cost is not an Environmental Impact, however the prepared DEIS clearly shows that Sound Transit has elected to include costs within the decision matrix. In considering the overall impacts and a robust environmental review process, cost cannot be a factor in your decision, the impacts to the Federal Way sites are significant and will be far too detrimental to our community.	In addition to considering the potential impacts of the alternatives to the natural and built environment, the Sound Transit Board considered other factors, including cost, schedule, and input from Tribes, agencies, and the public in identifying the Preferred Alternative for the project. While cost is not an element of the environment, it is an important factor in determining whether an alternative is reasonable and feasible and should be considered through the NEPA/SEPA EIS process.
3	The DEIS inaccurately assumes the City of Federal Way will approve vacating public roads, that City staff will modify our Development Standards to permit this development that would not be approved of other public or private developers, or that adequate mitigation to these items could be found. We strongly object to Sound Transit's finding of regulatory certainty on behalf of the Federal Way sites by unilaterally assuming City approval. Additionally, Sound Transit does not have adequate authority to commit to the City of Federal Way to a future legislative act in vacation of opened and utilized public right of way.	Sound Transit recognizes that the city of Federal Way has regulatory authority over the development of OMF South, as legislative approval would be needed to vacate 20th Avenue S and for deviations from the maximum block standards. Sound Transit acknowledges that the outcome is not assured. Section 3.4, Land Use, of the 2023 Draft EIS and this Final EIS states this more directly.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
4	The City and Sound Transit have a shared interest in the success of the light rail system and have enjoyed a successful partnership on the Federal Way Link Extension to date. We have seen and heard from Sound Transit a willingness to look to the future and make the decisions that are in the best interest for the future of this region. In this spirit, we ask that the Sound Transit Board remove the two Federal Way locations and select the Midway Landfill as the preferred alternative and the site of the new OMF-South.	The Final EIS continues to evaluate all three build alternatives: South 336th Street (Preferred Alternative), South 344th Street, and Midway Landfill. The Sound Transit Board will select the project to be built after publication of the Final EIS.
5	Construction Cost and Schedule The DEIS prominently presents cost and construction schedule information in the executive summary, body of the DEIS, and in presentations to the public on the same level as displacements, ecological impacts, and other environmental impacts. Cost to the developer is not a factor of consideration in SEPA reviews or an applicable environmental element in the WAC that has to be considered. The DEIS does not clearly identify the basis for consideration of construction costs so City staff is unable to provide comment beyond that it is not an environmental impact and should not be considered in the EIS. By putting forth these three alternatives in the DEIS, Sound Transit has identified them as reasonable alternatives and should consider them against their environmental impacts alone. If Sound Transit determines inclusion of costs is appropriate and should remain part of the EIS, then the discussion must be comprehensive for all three alternatives. High-level construction cost information was included for the Midway Landfill, but not for the other alternatives. Comparable evaluation of the relocation, property acquisition, and environmental mitigation would be necessary to understand how cost factors into the analysis being performed in the EIS. If such an analysis is not complete, then it should be noted why not further study is required and the actual costs should be removed and discussed at a summarized, conceptual level only.	The opinion of probable cost and annual operating cost estimates for all three OMF South build alternatives are described in the Executive Summary and Section 2.5, Funding and Opinion of Probable Cost in the Final EIS. The opinion of probable cost includes construction and demolition (including environmental mitigation); property acquisition and relocation assistance; design, permitting, and program management; and allowances for construction contingencies. Estimates for annual operating costs include long-term expenses to maintain the facility, as well as operating costs associated with trains deploying from and returning to the OMF each day. Additionally, annual mainline maintenance expenses for the South 336th Street and South 344th Street alternatives would apply until TDLE is completed. The estimates are presented as ranges to reflect the conceptual nature of the project design at this phase of development, and the same cost estimating methodology was used for all three sites to allow comparison between alternatives.
6	Other questions left unanswered with regards to cost include: • Is Sound Transit limiting their ability to seek Federal assistance by building the mainline as part of a project not subject to NEPA?	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
7	- Why is the additional maintenance cost for the Midway site not addressed?	The additional annual operations and maintenance costs for the Midway Landfill were discussed in the Executive Summary and Section 2.6 of the 2021 Draft EIS, which is now Section 2.5, Funding and Opinion of Probable Cost, in the Final EIS. Annual maintenance costs for the Midway Landfill Alternative include expenses to address potential risks posed by settlement and methane gas over the lifespan of the facility as well as higher operating costs for the trains to deploy each morning before passenger service begins and to return to the OMF each night after passenger service has shut down.
8	- What is the estimated cost of the mainline construction? Alteration to the BPA Power Lines?	Estimated capital costs for mainline design and construction were reported in Table 2.6-1 of the 2021 Draft EIS. This information has been updated in Section 2.5, Funding and Opinion of Probable Cost, in the Final EIS. Depending on the design option, the estimate ranges from $338 million to $695 million. The relocation and alternation of the BPA power lines has a comparative cost estimate of approximately $8 million.
9	- Why does the Midway Landfill Site consider additional costs for settlement even on the option to completely remove the waste from the site?	The Midway Landfill site assumes the risk of additional settlement because, even after completely removing the landfill waste, the excavation must be replaced with new soil up to 80 feet deep. Complete compaction is difficult to achieve with that volume of fill. A considerable amount of time to achieve consolidation would be needed, adding to project schedule and cost.
10	- The operating cost difference is not addressed in the DEIS, what is the reason for this difference?	The increased operating cost for the Midway Landfill Alternative is due to potentially greater maintenance concerns and higher train deployment operations costs, as described in Comment ID 7.
11	As with the discussion on costs, schedule is not a typical environmental element. With no basis for inclusion provided, all discussion about construction schedule should be removed from the DEIS or considered comprehensively for all three site alternatives. As discussed under the City's comments on transportation impacts, both Federal Way alternatives require improved public rights-of-way to be vacated. The vacation process is expected to take 18-24 months and is a Council legislative action. This will add significantly to the timeline.	Section 2.3.4, Construction Methods, Sequence, and Activities, in the 2023 Draft EIS and this Final EIS discusses the anticipated construction schedule for all three OMF South alternatives in addition to the three construction design options for the Midway Landfill Alternative. The overall project schedule accounts for completion of the EIS process, development of final design, property acquisition, and permitting, including local development permits and approvals, such as street vacations.
12	*Page 2-24* - Work hour variance approvals will be required for the construction schedule presented to be allowed in Federal Way.	Permits and approvals for construction will be coordinated during the final design phase.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
13	*Page 2-29* • Section 2.6 just covers cost estimates. Where is a discussion on funding on this section?	The purpose of the EIS process is to identify the potential impacts to the natural and built environment. The cost estimates were included for comparison purposes. A detailed cost breakdown or discussion of funding sources is not included in the Final EIS. The OMF South project is currently planned to be funded through the Sound Transit 3 program and federal funding. Please see Common Comment 5 in Table L.1-1, Response to Common Comments, in the Final EIS for more information of federal funding sources.
14	*Page 2-31* • Do these dates consider Sound Transit's realignment effort? • Based on the outlined schedule, 2024 is not a realistic start of construction with required ROW vacations. • Table 2.7-1 does not present a feasible schedule including the Right of Way vacation process for FW. Sound Transit needs to review that and incorporate into schedule. Right-of-way vacation would need to start approximately early Summer of 2021 for the proposed schedule to be accomplished. • The requirements, mitigation and processes for Right of Way vacation are not identified or included within the DEIS.	Dates in the 2021 Draft EIS do not reflect the realignment effort. The 2021 Draft EIS was published before the Sound Transit Board approved project realignment priorities in August 2021. The dates in the 2023 Draft EIS and this Final EIS account for realignment. The overall project schedule includes completion of the EIS process, development of final design, property acquisition, and permitting, including for local development permits and approvals, such as street vacations. Section 3.4.2, Consistency with Regional and Local Comprehensive Plans and Zoning, in the 2023 Draft EIS and this Final EIS references Federal Way Revised Code Chapter 4.20 for the requirements, mitigation, and processes for street vacations.
15	**Transportation Impacts** Both site alternatives in Federal Way, 336th St and 344th St., remove improved public rights-of-way and a north-south road connection. 341st Pl., 344th St., and 20th Ave. S., are all identified in the Federal Way Comprehensive Plan as minor collectors (refer to Map III-3). Additionally, they are each a bicycle route identified in Map III-16. The DEIS indicates the shared markings are an unfunded project when the project is currently out to bid. Additionally, the trip distribution model presented does not redistribute trips from the roads proposed for vacation.	Section 3.2, Transportation, of the 2023 Draft EIS was updated to note current and constructed bicycle and pedestrian facilities. Traffic forecasts and distribution were completed using a conservative method to determine what impacts might occur at the OMF South site alternatives. The project team has refined the forecasts to account for street vacations, updated staffing levels for OMF South, and included realignments of the OMF access locations. These updates are reflected in this Final EIS.
16	The following comments relate to Section 3.2 of the DEIS: *Page 3.2-5* • Level of Service is not the basis for defining impacts associated with right-of-way vacations. Refer to FWRC Chapter 4.20.	Sound Transit would pursue the vacation of right-of-way in accordance with City of Federal Way Revised Code Chapter 4.20, Vacation of Streets. Please see Section 3.4, Land Use, in the 2023 Draft EIS and this Final EIS.
17	*Page 3.2-7* • While Section 3.2.1.4 may be correct that the Midway Landfill is primarily served by routes on Hwy 99, the Federal Way sites include Pierce Transit routes split between 336th St., Hwy 99, and 16th Ave S. King County only has a commuter route on Hwy 99.	The 2023 Draft EIS was updated to include locations of transit bus stops on S 336th Street and 16th Avenue S. Figure G1.3-15 in Appendix G1, Transportation Technical Report, shows the bus routes in the transportation study area associated with the Federal Way sites. These updates are reflected in this Final EIS.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
18	*Page 3.2-11* - Regarding Section 3.2.1.6, the City is in the process of updating on-street parking restrictions in the area and the rule will be in effect this summer.	The 2023 Draft EIS and the Final EIS describe the parking requirements currently in place in the study areas. Please see Section 3.2, Transportation, in the Final EIS and Section 3.6, Parking, in Appendix G1, Transportation Technical Report.
19	- Regarding Section 3.2.1.7, the number of collisions is only one part of the safety measures the City uses and is meaningless by itself. For intersections, the City uses collision rate (collisions per million entering vehicles); societal cost; and severity rate (societal cost per million entering vehicles). The DEIS should use these measurements as they are more useful to determining whether mitigation is needed and will ultimately be required as part of Concurrency permitting of the sites.	Section 3.2, Transportation, of the 2023 Draft EIS and this Final EIS include an analysis of crash data that use the city of Federal Way's approved methodology for determining collision rates. Each OMF South alternative was analyzed using the same type of data and methodology to allow for an equal comparison among alternatives. Therefore, the societal cost of collisions per million entering vehicles (MEV) was not included in the analysis. The analysis assesses accidents currently occurring within the project limits for each alternative in terms of type, cause, and as described in the transportation section of the Environmental Methodology Report (2019) reviewed by the city of Federal Way and other members of the Interagency Group.
20	*Page 3.2-14* - Verify that Pierce Transit will continue their service long-term. They have stated they intend to truncate their lines at the South Federal Way Station when TDLE opens.	The 2023 Draft EIS and this Final EIS describe the transit routes that are anticipated to serve the study areas. Please see Section 3.2, Transportation, of the Final EIS and Section 3.4, Transit, in Appendix G1, Transportation Technical Report.
21	- Installation of shared marking lines for bicycles is currently out to bid.	The 2023 Draft EIS and the Final EIS describe the current and planned bicycle and pedestrian facilities, including those developed since the 2021 Draft EIS was published. Please see Section 3.2, Transportation, of the Final EIS and Section 3.5, Nonmotorized Facilities, in Appendix G1, Transportation Technical Report.
22	*Page 3.2-15* - Why not use a travel demand model for more realistic trip assignment, especially when roadway closures would redistribute trips?	The transportation analysis used the PSRC Regional Travel Demand Model, which is not validated at the local level. The trip assignment was developed manually based on local changes to roadways and access, consistent with the Transportation Technical Analysis Methodology, which was reviewed by the city of Federal Way.
23	*Page 3.2-23, Table 3.2-8* - Standard v/c is 1.0 at unsignalized intersections in Federal Way. - V/c needs to be reported for all intersections in Federal Way	Tables 3.2-6 through 3.2-9 of the 2023 Draft EIS and this Final EIS show a v/c standard of 1.0 at unsignalized intersections in Federal Way. The v/c standard is shown for all Federal Way intersections that were studied.
24	*Page 3.2-39* - The City can provide actual traffic counts upon request and Table 3.2-17 as well as other sections of the report can be updated to provide more accurate information. AADT is not typically presented as a range.	Sound Transit requested additional AADT data from Federal Way. The partial data provided was not applicable to the analysis.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
25	*Page 3.2-41* - All signage is required to be reflective regardless, so providing it is not a mitigation measure.	The referenced text was drawn from the list of avoidance and minimization measures that could be used; it was not listed as a unique mitigation measure. The avoidance and minimization measures include actions that are considered best management practices and also actions that are required by code.
26	*Page 3.2-42* - Section 3.2.3 is incorrect for Federal Way sites as the facility has long-term planning and operational impacts by not providing a road network consistent with City Development Standards and removing existing roads incorporated into the Comprehensive Plan.	Sound Transit has revised the South 336th Street Alternative design to extend 18th Place South between S 340th Street and S 336th Street to replace 20th Avenue S. There would be no replacement for 20th Avenue S under the South 344th Street Alternative. Even so, the removal of 20th Avenue S is not anticipated to result in long-term operational impacts to freight, transit, nonmotorized transportation, parking, or safety.
27	***Alternative Methodology – Transportation*** The trip distribution modeling needs to address the redistribution of existing trips based on the proposed conditions. Further analysis and appropriate mitigation is required as part of any request for a right of way vacation under Federal Way code.	The traffic operations analysis in Section 3.2, Transportation, and Appendix G1, Transportation Technical Report, of the 2023 Draft EIS and this Final EIS accounts for roadway closures and redistribution of trips, as requested by this comment. If the Board selects to build the Preferred Alternative or the S 344th Street Alternative, Sound Transit would pursue vacation of right-of-way in accordance with city of Federal Way code requirements. Please see Section 3.4, Land Use, in the Final EIS.
28	***Mitigation - Transportation*** No mitigation for the loss of the roads or alternate travel routes is identified nor do the conceptual designs meet Federal Way Development Standards for vehicular block perimeter. The City of Federal Way requires the project mitigate all public roadways being vacated by incorporating roadways of identical functionality for vehicles, pedestrians, and bicycles in a manner that complies with the City's block perimeter requirements and Comprehensive Plan.	Sound Transit has revised the design for the South 336th Street Alternative, which has been identified as the Preferred Alternative, to include construction of an 18th Place S extension between S 336th Street and S 340th Street. Sound Transit would continue to coordinate with the city of Federal Way to comply with Federal Way Revised Code Chapter 4.20, Vacation of Streets. If the Board were to select the South 344th Street Alternative as the project to be built, Sound Transit would work with Federal Way to address the street vacation concerns for that alternative.
29	**Public Safety** The DEIS correctly states that the City of Federal Way has expressed concerns over the potential effects on response times from either the 336th St. or 344th St. alternatives. 20th Ave. functions as a bypass road for Pacific Highway and 16th Ave. that provides an alternative north-south route for officers who may be responding from anywhere in the City. Section 3.14 states that "it is not possible to accurately determine how the road closure would affect their response time." While then concluding that "the closure [of 20th Avenue] would likely have very little impact on their response time to the area". We disagree that this impact to response times is insignificant. Given that this issue was identified prior to the publication of the DEIS and no mitigation is provided, there must be an analysis to justify the findings in the EIS.	Section 3.14, Public Services, of the 2023 Draft EIS and this Final EIS includes an analysis of the changes to response times for emergency vehicles if the South 344th Street Alternative is selected as the project to be built and 20th Avenue S is vacated. The analysis found that emergency response would be minimally affected by the closure of 20th Avenue S. After the 2021 Draft EIS, Sound Transit revised the design of the Preferred Alternative to include an extension of 18th Place S to replace the function of 20th Avenue S. It is expected that emergency vehicles would use the 18th Place S extension to access properties to the south of the alternative and there would be no need for emergency services to change their operations to facilitate the realignment. Therefore, there would be no adverse effects on travel or response times for public service vehicles, including fire, emergency medical, and police.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
30	***Mitigation – Public Safety*** Incorporate a replacement north-south connection parallel to 16th Ave and Pacific Highway for emergency vehicle response. This mitigation overlaps with the requested mitigation for the impacts to the city road network.	After the 2021 Draft EIS, Sound Transit updated the Preferred Alternative design to include an extension of 18th Place S to replace the function of 20th Avenue S. Please see Section 2.2.8, Design Updates, in the 2023 Draft EIS and this Final EIS for a description.
31	**Economic and Fiscal Impacts** The following comments relate to Section 3.5: • Sound Transit should provide actual counts for employee displacements rather than estimates.	Please see response to Common Comment 1 in Table L.1-1, Response to Common Comments, in the Final EIS
32	• Property taxes as a snapshot in time should easily be calculable as they are published every tax year by the King County Assessor's Office.	Table 3.5-4, General Fund Revenues for the cities of Kent and Federal Way, in the 2023 Draft EIS and this Final EIS lists property tax revenues for both cities. The numbers were drawn from each city's adopted 2020 budget.
33	• The DEIS does not consider the opportunity cost difference between the three sites. As a landfill and Superfund site, the Midway site will likely have a low opportunity cost. City staff contracted with the FCS Group to assess the opportunity cost of the Federal Way's sites. The findings include that the 344th St. and 336th St. sites have 31.4 and 21 acres of vacant or developable land respectively based on King County buildable lands guidance. As the OMF-South will represent a permanent change of land use to public/institutional, the diminished capacity for population and employment growth for the region that change in use represents needs to be considered.	SEPA and NEPA do not require analysis of economic opportunity costs of land use decisions but rather an evaluation of environmental and economic impacts on existing and reasonably foreseeable future land uses for each built alternative. Section 3.4, Land Use, of the 2023 Draft EIS and this Final EIS describes the current zoning and the amount of land converted to a transportation use. It states that this land would no longer be available for other development.
34	*Table 3.5-8, Table 3.5-5* • The City had the FCS Group review potential employment. Their review found general concurrence with the baseline for the estimated employees directly displaces, but found the impact of those jobs lost would cause a significant number of additional jobs to be lost in the area. In total, the OMF-South will result in $30-50 million in lost economic output depending on what site is chosen.	The Final EIS does not estimate these secondary effects of economic loss because 1) while jobs would be displaced by site acquisition, it is premature to assume that these jobs would be losses to the city much less to region as whole (i.e., firms can relocate or consumers can adjust their spending to other substitutes); and, 2) subsequently, applying a regional multiplier to these jobs displacements is not supported by any analysis that these jobs would in fact be lost to the region or whether these indirect/induced jobs were even in the city to begin with.
35	• We understand the information presented to be based on the conceptual 10% OMF-South plans. However, the DEIS needs to acknowledge that any change to the design that expands the footprint will not be inconsequential. Environmental mitigation, additional transportation improvements, and stormwater management are all risks to the footprint expanding. The immediate area surrounding either Federal Way site alternative supports over 300 additional jobs.	As described in Chapter 2, Alternatives Considered, of the 2023 Draft EIS and this Final EIS, the Preferred Alternative (South 336th Street) footprint has been expanded to include additional parcels. The discussion of impacts has been updated to address these changes. Any further revisions to the site layout after publication of the Final EIS would be evaluated to determine whether additional environmental review would be necessary.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
36	*Page 3.5-9* • Reference to fiscal impacts as small is a matter of opinion. The DEIS language should be neutral. • Clarify whether the proportion of assessed valuation is based on assessed valuation or taxable valuation. As all land and buildings typically have an assessed valuation if they are tax exempt, such as government buildings or developments receiving special tax exemptions. Taxable valuation is more relevant to assessing economic and fiscal impacts.	The referenced analysis was based on the taxable value listed in Table 3.5-6, Total Taxable Assessed Valuation by Alternative, in the 2021 Draft EIS. While it is true that taxable value is important from a taxpayer perspective, due to the budget-based property tax system in Washington, it is unlikely that the taxable value issue would have an immediate impact on property tax revenues. The city's ability to levy its legislative maximum authority would be unchanged based on losses to either its total or taxable assessed valuation base.
37	***Alternative Methodology - Economics*** • Provide an accurate count for the purposes of employment displacement.	Please see response to Common Comment 1 in Table 5.5-1, Response to Common Comments, in the Final EIS.
38	• Consider indirect and induced job loss, as well as economic output loss.	Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS lists estimated business and employee displacements for each alternative. Some displaced businesses may choose to relocate in the same area, while others may not. Since the relocation decisions are determined by individual business owners, the Final EIS does not calculate a net job gain/loss. The number of displaced employees is based on the business building size (King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers and not on an actual survey of businesses.
39	• Address the level of risk and the potential consequences to the OMF-South footprint expanding as design progresses. Further plan development beyond 10% may be required to provide this information and an accurate comparison with the three sites.	As described in Chapter 2, Alternatives Considered, of the 2023 Draft EIS and this Final EIS, after publication of the 2021 Draft EIS, the footprint of the Preferred Alternative (South 336th Street) was expanded to include additional parcels. The discussion of impacts was updated to address these changes.
40	• Evaluate and assess the impact to growth capacity and the economic opportunity costs for the three alternative sites.	Section 3.5, Economics, of the Final EIS does not evaluate potential opportunity costs. However, the section does state that the conversion of commercial land to a transportation use would make it unavailable for other uses. See also Section 3.4, Land Use. The net economic effect of these changes can be uncertain given the relocation decisions of displaced businesses as well as market factors influencing development in the city. SEPA and NEPA do not require analysis of economic opportunity costs of land use decisions but rather an evaluation of environmental and economic impacts on existing and reasonably foreseeable future land uses for each built alternative.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
41	The City has evaluated the 344th St. and 336th St. sites and found the potential impacts to tax revenue to be even greater than estimated impacts based on current development. Industrial vacancy rate in the City is approximately 0.5% and the lost employment opportunities represent a 50% to 100% increase in direct employment effects.	This comment references a city-prepared analysis that contemplates the "opportunity costs" of siting OMF South in Federal Way. The analysis frames the opportunity cost as those exacted on the city from 1) the displacement of existing businesses and 2) the forgone value of future redevelopment of vacant and underutilized parcels in terms of employment and taxes. The Final EIS addresses displacement of existing businesses by estimating the amount of employment loss from business displacement. Additionally, it identifies the amount of land that would be converted to transportation use. The Final EIS does not estimate potential losses stemming from a future development scenario where those lands are developed as uses and capacities consistent with the underlying zoning, because scenarios that might be entertained on those affected parcels would involve a high degree of speculation, particularly in terms of scale and timing of development.
42	***Land Use Impacts*** *The following comments relate to Section 3.4:* *Page 3.4-20* An essential public facility (EPF) is allowed in all zones consistent with State Law and pursuant to FWRC 19.105.020. The design has not progressed to a point for specific mitigation to be discussed, but at a minimum land use compatibility measures consistent with Federal Way Revised Code is required. The project is also expected to comply with community design guidelines under FWRC 19.115.	As stated in Section 3.4, Land Use, of the 2023 Draft EIS and this Final EIS, OMF South is generally consistent with the city of Federal Way Comprehensive Plan as well as the intent of the zones that it would occupy within the footprints of the Preferred and South 344th Street alternatives. Sound Transit acknowledges that light rail transit facility uses are explicitly recognized only in the portion of the site zoned Commercial Enterprise (CE). Where the use is not explicitly recognized, Sound Transit would continue to meet zoning code and intent to the extent practicable during the land use approval process.
43	*Page F2-10* • Table F2-4 is incomplete without acknowledging that OMF-South is considered an EPF and will be reviewed under FWRC 19.105.020.	Table H2-3 in Appendix H-2, Land Use Technical Appendix, of the 2023 Draft EIS and this Final EIS include this information.
44	*Page F2-13* • The information presented in Appendix C is not sufficient to justify the finding that the response to LUP14 is accurate or feasible. • With regards to the comment on LUP23, how is a finding that alternative facilities could be developed consistent with the lack of provision of alternative facilities in the conceptual designs presented in Appendix C? One of the alternative stretches from I-5 to 16th Ave. which eliminates the possibility for an alternative facility.	See Section 2.3, Project Alternatives, of the Final EIS for the description of the Preferred Alternative, which reflects design updates made since the 2021 SEPA Draft EIS. The design now includes a replacement of 20th Avenue S by extending 18th Place S between S 336th Street and S 340th Street. The design allows for bicycle use, which would meet the city's intent to provide bicycles lanes on 20th Avenue S. Appendix H2, Land Use Technical Appendix, has also been updated.
45	*Page F2-14* • Comprehensive Plan policies need to be considered in totality. The proposal does not seem consistent with LUP35 or LUP38.	Table H2-5 in Appendix H2, Land Use Technical Appendix, of the 2023 Draft EIS and this Final EIS includes discussion of Land Use Policies 35 and 38.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
46	- With regards to the finding on LUP47, the Neighborhood Business (NB) zone is not proximal to the light rail system.	The reference to LUP47 in Table H2-5 was not included in the 2023 Draft EIS or this Final EIS because it is not relevant to the OMF South project.
47	- With regards to the finding of LUP59, this sentence doesn't makes sense as this policy states that the City development code will have a process for reviewing EPFs as per State law. The policy is not for de facto EPF approval nor is approval of an EPF implementation of this policy.	Table H2-5 of Appendix H-2, Land Use Technical Appendix, was revised in the 2023 Draft EIS and again for this Final EIS to include only what is directly applicable to the proposed project. While true that the OMF is considered an EPF, Sound Transit acknowledges that LUP 59 states that the city is responsible for developing code processes for siting EPFs; LUP 59 does not state that EPFs are automatically approved.
48	***Additional Information – Land Use*** Describe the proposal in enough detail to affirm that adequate room exists for appropriate compatibility between land uses. Deference to complying with code is identified, but a specific landscape buffer and planting schematic is not. The EIS needs to verify that adequate room exists on the site for this buffering after considering construction of lead tracks, securing needs, and guideway clear zone requirements. The conceptual plans are not detail enough for us to concur that mitigation is feasible.	The 2021 Draft EIS analyzed the three build alternatives at a conceptual design level of 10 percent. Sound Transit continues to work with Federal Way to address land use compatibility. The 2023 Draft EIS and this Final EIS include a description of the Preferred Alternative in more detail, including widths of landscape buffers and frontage improvements. See Section 2.3, Project Alternatives, of the Final EIS for the description of the Preferred Alternative. Sound Transit would continue to work with the city to comply with code requirements if the Sound Transit Board selects to build the Preferred or South 344th Street alternative.
49	***Mitigation - Land Use*** EPFs are required to provide mitigation based on the level of impact which will be reviewed as the project develops and information is refined. However, it is noted that FWRC 19.25 requires a 25-foot Type 1 landscaping buffer between industrial uses and residential zoning districts. That provides a baseline as to the level of screening that will be expected for at least a portion of the 336th and 344th St. alternatives. The impact of the guideway clear zone on the ability to meet the planting performance standards must be considered.	Sound Transit is continuing to work with the city of Federal Way to address land use compatibility, including the inclusion of landscape buffers, as the project design progresses for the Preferred Alternative.
50	**Environmental and Water Resources** The DEIS notes that Sound Transit will develop plans to mitigate "the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis." The work is noted as being planned to be done in accordance with Federal, State, and local requirements as well as through consultation with tribal biologists. Similarly, water resources are noted as providing of mitigation through compliance with applicable stormwater permitting requirements. Such a broad statement for purposes of mitigation is hard to refute and we encourage Sound Transit to thoroughly evaluate the feasibility of the path forward for Federal Way sites.	Work is currently underway to identify potential mitigation sites within the watershed and within the city of Federal Way to mitigate the project effects on wetlands, streams, and buffers. Should one of the Federal Way sites be selected by the Sound Transit Board as the project to be built, a comprehensive mitigation plan would be developed for review and approval.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
51	The following comments apply to Section 3.10: • Has the potential need for large, woody debris as part of the stream restoration been evaluated? This could add to any potential flooding complications.	Sound Transit would design and implement mitigation for impacts to aquatic resources to ensure compliance with regulations and permit conditions with local, state, federal, and Tribal authorities. The details of mitigation, including placement of large woody material, if required, would be developed during the permitting process and in coordination with Tribes and agencies with regulatory authority. Sound Transit would also perform hydraulic analyses, including evaluations of potential flood risks, to support permitting reviews. Large woody debris placement is commonly required by state agencies and Tribes for stream restoration proposals to provide in-stream habitats.
52	• Loss of fish habitat and associated identifiable mitigation is not included.	Section 3.10 and Appendix G3, Ecosystem Resources, includes a detailed discussion of potential impacts and mitigation measures to Aquatic Resources.
53	*Page 3.10-6* • This section notes that the West Fork Hylebos Creek Tributary is subject to flooding issues while also noting the plan is to regrade the area constricting the wetland and possibly the stream bed. There doesn't appear to have been adequate hydraulics analysis to assess the feasibility of this work as presented in Appendix C. • It is not clear how City Code will be met as part of regrading and realigning a stream channel.	As the project design advances, Sound Transit will perform detailed hydraulic analyses and ensure compliance with regulations and permit conditions with local, state, federal, and Tribal authorities.
54	*Page 3.10-11* • The S 344th St. site indicates there is a 60-foot culvert in the current designs to accommodate an emergency access road. Under FWRC 19.145 it will be very challenging to meet the requirements to build a new culvert for a stream. Alternative designs must be provided to show there is no other option and convenience is not a justification. The design needs to be updated to remove the culvert.	Section 3.10, Ecosystem Resources, of the 2023 Draft EIS and this Final EIS states that the need for a new culvert at this location is yet to be determined. If the South 344th Street Alternative is selected as the project to be built, Sound Transit would evaluate the site closely to design an emergency access road that could be built without a culvert. If a feasible alternative cannot be found, any new stream crossing structure would be designed and built in compliance with the requirements of local, state, and federal regulations.
55	*The following comments applies to Appendix G3 and is from pages G3-8 and G3-9:* • The Executive Proposed Basin Plan Hylebos Creek and Lower Puget Sound (King County 1991) should be a data source considered.	Appendix G3, Ecosystem Resources Technical Report, was updated for the 2023 Draft EIS to include pertinent information from the Executive Proposed Hylebos Creek and Lower Puget Sound Basin Plan. These updates are reflected in the Final EIS.
56	*The following comment applies to Section 3.11 and is from page 3.11-14:* • Shouldn't the relocation of the existing WSDOT stormwater facility be part of the environmental analysis? No location is identified and it is a result of the proposed project.	The OMF South project would meet stormwater requirements identified as part of the environmental analysis discussed in Section 3.11, Water Resources, in the 2023 Draft EIS and this Final EIS. Sound Transit and WSDOT are coordinating efforts to avoid or minimize impacts to the WSDOT stormwater facility.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
57	**Noise and Visual Impacts** The assessment of visual impacts by the Federal Way site alternatives, which both impact 336th at I-5, did not adequately address the presence of the historic Weyerhauser Campus immediately east. 336th St. and 344th St. site visual impacts need to be considered from former Weyerhauser property along 336th; this would likely change its level of visual impact from medium to medium-high or high.	After reviewing the Weyerhaeuser Headquarters Historic Property Inventory form in the Washington Information System for Architectural and Archaeological Records Data (WISAARD) it does not appear that the OMF South facility or tracks would be prominently visible from the Weyerhaeuser Headquarters building. The orientation of the Weyerhaeuser Headquarters Building, the trees on the campus, and the berm along I-5 would visually screen the OMF South facility and tracks. The facility and tracks would also not be visible from the Headquarters building or reflecting pool to the north of the building. Additionally, the presence of I-5 (constructed prior to the Weyerhaeuser Headquarters campus) is similar in nature to the OMF South facilities, as they are both transportation facilities. This would lessen any potential effect on the eligible building.
58	The following comments pertain to Appendix G2: - What is the source for the projected project noise level? How will this be verified against project completion?	The source noise level is based on measurements of LRVs operating on the existing Sound Transit Link light rail system. The noise levels for each source within the OMF and on the mainline are discussed in Section 3.1 of Appendix G2, Noise and Vibration Technical Report, of the 2023 Draft EIS and this Final EIS.
59	*Page G2-11* - What about bells from the light rail vehicles or other signals at crossings or upon exiting onto the tracks? This is not directly addressed.	There are no at-grade light rail crossings associated with the OMF South mainline track; therefore, there are no bells or signals that would create additional noise. As mentioned in Section 3.9.2.2 of the 2023 Draft EIS and this Final EIS, there could be limited testing of horns or bells during the daytime, but these activities would not be substantial enough to add to the noise from the OMF.
60	**Cumulative Impacts** The Commercial Enterprise (CE) zone is the only light industrial zone in the City of Federal Way and land will be converted for both the OMF-South (should a Federal Way location be selected) and the Tacoma Dome Link Extension. The cumulative impacts section discusses the impacts of light rail in the context of typical mixed-used, transit-oriented development which is not consistent with the current city industrial zoning. TDLE will be building stations in industrially zoned and/or developed lands in Fife and Tacoma (east station). Industrial land is at a premium in the region and if it is challenging for businesses displaced by transit facilities to relocate, it may push them further out to find suitable locations (as previously noted, the vacancy rate is as low as 0.5%). This related action could lead to sprawl or greenfield development and the DEIS should contemplate cumulative impacts of all known Sound Transit projects on industrial land supply based on current zoning.	Chapter 4, Cumulative Effects Analysis, of the 2023 Draft EIS was revised to include further discussion about impacts to industrial land supply not only by Sound Transit but by other developments as well. These updates are reflected in this Final EIS.

City of Federal Way (Communication ID 472867)

Comment ID	Comment Text	Response
61	Section 2.4.1 notes the OMF South and OMF North will have greater capacities than the OMF East and OMF Central. What is the impact of other link extensions? This implies OMF North and South will produce greater externalities. Total capacities of the 4 OMFs is 496 LRVs. As OMF South is being built before OMF North, any reduction in footprint as a result of planned capacity exceeding project capacity will fall on OMF South. Section 4.5 should include a table of the link extensions coming online, such as Lynnwood and East, along with OMF capacities to better highlight the need and impacts of regional light rail extensions within Sound Transit 3.	Chapter 1, Purpose and Need for the Project, of the Final EIS discusses Sound Transit's plans for expansion under Sound Transit 3 and the service lines supported by each current and planned OMF. OMF South would be built in the South Corridor to maintain and store a portion of the LRV fleet for the West Seattle/Ballard to Tacoma Dome service as well as to receive, test, commission, store, maintain, and deploy new LRVs for the entire system. Current planning includes at least 144 and up to 160 LRVs stored at OMF South and approximately 150 at OMF North, which would—along with OMF Central and OMF East—meet the total LRV storage needs of ST 3. The cumulative effects of the expansion of the regional transit system were discussed in the Final Supplemental EIS for the Long-Range Plan (Sound Transit 2014).
62	**Attachment** – Supplemental Appendix G1 comments Add description of existing land uses at each site	This comment refers to the Transportation Technical Report. Please see Final EIS Section 3.4, Land Use, for a description of land uses in the study area.
63	Label 21st Ave S on all figures	The suggested revision was made for the 2023 Draft EIS and is reflected in this Final EIS.
64	5 Lanes	Appendix G1, Transportation Technical Report, of the 2023 Draft EIS was revised to address the comment. This update is reflected in this Final EIS.
65	add dashes	Appendix G1, Transportation Technical Report, of the 2023 Draft EIS was revised to address the comment. This update is reflected in this Final EIS.
66	(Per Federal Way) Please differentiate line colors and or styles better. Too many greens. Please differentiate line colors and or styles better. Too many greens and reds. It is impossible to discern route frequencies on this map.	Figures G1.3-15 and G1.3-16 were updated in Appendix G1, Transportation Technical Report, of the 2023 Draft EIS for clarity. Route frequencies are listed in detail in Table G1.3-14 (Study Areas Transit Service). These updates are reflected in the Final EIS.
67	Bicycle Lanes	The figures were updated for the 2023 Draft EIS to reflect the current bicycle and pedestrian facilities at the time of publication. These updates are reflected in this Final EIS.
68	Is this the correct intersection? Should this be 16th Ave S Collision rates should be provided per city of Federal Way TIA guidelines to identify potential inadequacies, defined as: -A collision rate of more than 1 collision per million entering vehicles at an intersections -A collision rate of more than 10 collisions per million vehicle miles on a roadway segment It's both - the west leg is S 340th Pl	The intersection labels have been updated to reflect the street names on the east side of SR 99. For the safety analysis, each OMF South alternative was analyzed using the same type of data and methodology to allow for equal comparison among alternatives. The 2023 Draft EIS was updated with an analysis of crash data that uses the city of Federal Way's approved methodology. These updates are reflected in the Final EIS.

City of Federal Way (Communication ID 472867)

Comment ID	Comment Text	Response
69	Collision rates should be provided per city of Federal Way TIA guidelines to identify potential inadequacies, defined as: -A collision rate of more than 1 collision per million entering vehicles at an intersection	Each OMF South alternative was analyzed using the same type of data and methodology to allow for an equal comparison among alternatives. The 2023 Draft EIS was updated with an analysis of crash data that uses the city of Federal Way's approved methodology. This update is reflected in the Final EIS.
70	HOV, not BAT	This correction was made to the 2023 Draft EIS and is reflected in the Final EIS.
71	Please provide context for why PM peak hour delay at Intersection #2 decreases from existing to 2042 no-build conditions (changes in PHFs, signal timings, etc?)	Existing conditions were modeled using existing timing card inputs, while the future conditions were modeled using the optimization function within Synchro. The results are similar, indicating that improvements in signal timing could allow some growth in traffic volume while maintaining similar traffic operations. The improvement of intersection operations due to signal optimization is noted in Section 3.2.2.1 of the 2023 Draft EIS and this Final EIS.
72	SB volumes incorrect	The figure from Appendix G1, Transportation Technical Report, was revised to make the correction for the southbound volumes at the SR 99 and S 340th Street intersection in the 2023 Draft EIS. This update is reflected in the Final EIS.
73	Actually, it's out to bid right now.	The 2023 Draft EIS was updated to describe the current and planned bicycle and pedestrian facilities, including those developed since the release of the 2021 Draft EIS. The description of current planned and constructed bicycle and pedestrian facilities has been further updated in this Final EIS. See Section 3.2, Transportation.
74	Please elaborate on trip distribution methodology. Why weren't other sources used (such as local transportation models or census data) A separate trip generation section should be included that provides more detail on methodology. Per the Sound Transit (2020a) report, in addition to employee-related trips, the trip generation should take into account site-related deliveries and existing site uses that will be removed as a result of the project. It is also unclear how the information included in the Sound Transit (2020b) report led to the auto volumes outlined in Table G1.4-7. For example, why would there be so few departures in the AM when the graveyard shift ends right before the AM peak hour begins?	This Final EIS includes a more detailed discussion on trip generation and distribution methodology. See Section 3.2, Transportation, of the Final EIS, and Section 3.2.2.2 in Appendix G1, Transportation Technical Report.
75	Please provide clarification: 450 spaces of 427 spaces?	This was an error between the number of spaces reported in Table G1.4-9 and the text. The number of estimated parking spaces was updated to 480 in the 2023 Draft EIS. This update is reflected in this Final EIS.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
76	Why would this be the case of some no-build improvements are not feasible with projects?	OMF South would include improvements for both motorized and nonmotorized users. Section 4.2.2.6 of the 2023 Draft EIS and this Final EIS describes the bicycle and pedestrian facilities that would be implemented as part of the Preferred Alternative. Section 4.2.3.6 notes that if the South 344th Street Alternative were to be selected as the project to be built, Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street.
77	The closure of 20th Ave S needs to be adequately analyzed. As currently analyzed, existing traffic utilizing the portion of 20th Ave S is not removed and rerouted to other roadways. While this is true, it would impact the usefulness of the 20th Ave extension and limit potential plans for non-motorized connections Closure needs to be evaluated as a Comp Plan amendment, as 20th Avenue S is shown therein as would eliminate an alternative route to SR 99 for failing to meet block perimeter requirements. Impacts to emergency response also need to be addressed. This is also true for the S 344th Alternative. Approval is in no way assured, but realignment may be considered.	As described in Chapter 2, Alternatives Considered, of the 2023 Draft EIS and this Final EIS, after publication of the 2021 Draft EIS, Sound Transit refined the design of the Preferred Alternative to extend 18th Place S to replace the functions of a vacated 20th Avenue S. This Final EIS includes an updated transportation impact analysis that reflects the updated design in Section 3.2, Transportation. Please also see Section 3.4.2, Consistency with Regional and Local Comprehensive Plans and Zoning.
78	This figure should include trip distribution percentages on the map, or separate trip distribution figures should be provided.	The Final EIS includes a more detailed discussion on trip generation and distribution methodology. See Section 3.2, Transportation, and Section 3.2.2.2 in Appendix G1, Transportation Technical Report. The analysis uses actual traffic volumes, not trip distribution percentages, to provide the necessary data.
79	20th Ave S of 336th Street will be closed as part of this project. Existing trips entering and exiting need to be removed and rerouted in order to adequately analyze the impacts of the roadway closure. Some intersections (Intersection #2 in particular) may be impacted by the closure of 20th Ave S. Additional analysis should be provided.	The traffic operations analysis in the Final EIS has been updated to account for the closure of 20th Avenue S between S 336th Street and S 341st Place, the addition of the 18th Place S extension between S 336th Street and S 340th Street, and the extension of 21st Avenue S to S 344th Street.
80	What would these bike lanes connect to? Clarify: Would this be implemented as part of the project?	Section 4.2.2.6 of Appendix G1, Transportation Technical Report, was updated in the 2023 Draft EIS to include more information regarding bike lanes. The extension of 18th Place S includes bicycle lanes. This update is reflected in this Final EIS.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
81	Given that the proposed project does not generate significant trips during the weekday AM and PM peak hours either, is it possible that the two uses will have overlapping peaks at other times? Do the roadway network changes impact the church or other existing uses? For trips removed from intersection #6: volumes should either be: (1) rerouted to other intersections in the network, or (2) if to be removed completely, trips should be removed at other intersections as well and justification should be provided as to why those trips will be removed from the network.	The analysis focuses on impacts during the time periods of highest existing traffic in the study area (AM and PM peak hours). This represents worst-case conditions along the roadway network to determine the impacts of adding more trips from a new development. This is common methodology for traffic impact analyses. There are other times during the day when the proposed OMF South would have higher inbound and outbound volumes than during the AM and PM peak hours. The text in the 2023 Draft EIS was updated to reflect this. The traffic operations analysis in the Final EIS was further updated to account for roadway closures, including redistribution of traffic to and from the Christian Faith Center and other remaining properties that are served by 20th Avenue S.
82	Provide additional detail regarding the function of 20th Ave S under this scenario. Who will be able to use it and at what times? Will the existing church still have access? This figure should include trip distribution percentages on the map, or separate trip distribution figures should be provided.	The 2023 Draft EIS was updated to clarify that 20th Avenue S would serve as public access to the Christian Faith Center property. The analysis uses actual traffic volumes, not trip distribution percentages. This update is reflected in the Final EIS.
83	For trips removed from intersection #6: volumes should either be: (1) rerouted to other intersections in the network, or (2) if to be removed completely, trips should be removed at other intersections as well and justification should be provided as to why those trips will be removed from the network. 20th Ave S of 336th Street will be limited in access as part of the project. Existing trips entering and exiting need to be removed and rerouted in order to adequately analyze the impacts of the roadway closure.	Please see response to Comment ID 79.
84	Some intersections (Intersection #2 in particular) may be impacted by changes to the roadway network. Additional analysis should be provided.	The traffic operations analysis was updated in the 2023 Draft EIS and again for this Final EIS to account for removal of existing trips from parcels being acquired and rerouting of any remaining trips due to roadway closures or relocations.
85	How will the project mitigate these impacts?	Mitigation is discussed in Appendix G1, Transportation Technical Report, and Section 3.2, Transportation, in the 2023 Draft EIS and this Final EIS.
86	Provide a source for the PCE factor. Does it take into account the doubling of truck trips for inbound and outbound trips?	The passenger car equivalent (PCE) factor converts the number of trucks to an estimated number of passenger cars. The text has been revised to attribute the source as the Highway Capacity Manual (HCM), which recommends a range of PCE factors for trucks from 1.1 to 2.5. Using a factor of 2.5 for this analysis provides a reasonable impact estimate for the size and weight of the trucks and allows for an equal comparison across alternatives. The PCE factor was calculated for both inbound and outbound trips.

City of Federal Way (Communication ID 472867)		
Comment ID	**Comment Text**	**Response**
87	Will parking for on-site employees be provided fully on-site or will there be impacts to the surrounding network?	Employee parking is addressed in Appendix G1, Transportation Technical Report in the 2023 Draft EIS and this Final EIS. OMF South would include enough dedicated spaces for employees on site. Section 4.3.1.7, Impacts to On-Street Parking Supply, addresses construction-related parking impacts. For both the Preferred and South 344th Street alternatives, all construction activity, including staging, is expected to occur within the boundaries of project site and no impacts to on-street parking supply are anticipated.

Operations and Maintenance Facility South
Draft EIS
Conceptual Design Review Comments

Organization: Seattle Public Utilities

Date: March 25, 2021

ID	Draft Version	Section/Dwg No.	Page/Sheet No.	Line/Exhibit No.	Comment	Organization / Firm	Commenter's Name
1	Draft	03/10/21 Presentation		N/A	Per ST presentation, ST's Preferred Alternative will not define a Midway option. In selecting a preferred alternative, what will ST assume for the cost and impact at Midway? Will the Midway alternative utilized for preferred alternative selection therefore assume max cost and impact or average cost and impact of the options?	SPU	SPU Team
2	Draft	DEIS	General	N/A	Ground settlement appears to be a primary driver in the selection of Midway Landfill foundation and site preparation alternatives evaluated. All three of the selected alternatives heavily favor mitigating settlement through upfront capital improvements in lieu of mitigation through operation and maintenance. The Preliminary Geotechnical Engineering Services Report (GeoEngineers, May 6, 2019) indicates that abrupt differential settlement over the landfill is unlikely in its current condition. Additionally, actual landfill settlement observed since then has been lower than what was predicted. Site preparation for the Forest Street OMF tracks consisted of mixing 3 to 4 feet of surficial soil with cement, while ongoing settlement of the tracks is managed via hand tamping of the tracks every 3-12 months. The approach to managing track settlement through maintenance has not resulted in impacts to the overhead contact system according to Paul Denison of Sound Transit during the August 13, 2019 Midway Landfill Site Settlement Workshop. Given the high cost of proposed site prep/foundation alternatives at the Midway Landfill, would it be more economical to construct a geosynthetic reinforced subgrade beneath the tracks/parking areas and manage ongoing settlement through maintenance similar to what is done at the Forest Street OMF?	SPU	SPU Team
3	Draft	DEIS	General	N/A	There will be a considerable and varying depth of fill (up to 80 feet or more in some areas) necessary for Options 2 and 3, the full excavation/replace and hybrid options. Recycled soil screened from the landfill will be variable in composition and moisture content, making compaction control difficult to achieve when constructing this embankment. This would be true even if the material was blended with better quality imported soil as was done along I-5. Even under ideal fill and compaction conditions, it is reasonable to expect embankment fills to settle by about ¼ to ½% of their thickness (for an 80-foot thick embankment, this would be about 2 to 5 inches). Fine-grained soil placed at sub-optimum moisture content would probably result in settlement at a higher percentage (perhaps ½ to 1% or even more) of the embankment thickness. Considering that much of the soil within the landfill is fine-grained, this settlement would likely occur for a long period of time after construction, with total settlements approaching a foot and differential settlement on the order of several inches. Given the tight settlement tolerances desired by ST, I suggest investigating self-compression of the fill for Options 2 and 3, and its impact on the performance of these options.	SPU	SPU Team
4	Draft	DEIS	General	N/A	There would likely be no delay or cost due to appeals or lawsuits at Midway, should that be included as a consideration?	SPU	SPU Team
5	Draft	DEIS	General	N/A	Are local traffic impacts generated by the 470 employees considered in the DEIS?	SPU	SPU Team
6	Draft	DEIS	General	N/A	The landfill cap is designed to significantly reduce surface water infiltration if not prevent it. Multiple locations in the EIS text and appendices state that the cap reduces infiltration, but it is designed to prevent it. The description in Page 3.11-12 is the most accurate. Descriptions that say 'low-infiltration cap' should be revised to 'impervious cap'.	SPU	SPU Team
7	Draft	DEIS	2-29	N/A	Costs for real estate and relocation for the Midway alternative seem high. What do they include? What has been assumed regarding purchase and sale of the landfill property from SPU?	SPU	SPU Team

Operations and Maintenance Facility South
Draft EIS
Conceptual Design Review Comments

Organization: Seattle Public Utilities

Date: March 25, 2021

ID	Draft Version	Section/Dwg No.	Page/Sheet No.	Line/Exhibit No.	Comment	Organization / Firm	Commenter's Name
8	Draft	DEIS	2-29	N/A	Why is the annual Operating Est at Midway so much higher than the other alts? If this is for landfill gas system, how does it compare to current landfill O&M costs? Why is the annual operating cost estimate the same for all Midway Landfill options?	SPU	SPU Team
9	Draft	DEIS	3.10-13	N/A	Statement: "Compared with other alternatives, the Midway Landfill Alternative would convert more pervious land cover to impervious" - this is misleading due to the existing landfill cap. The entire Midway Landfill site is currently impervious, due to the existing landfill cap. The grass surface would reduce peak flow, but all runoff ends up in the existing stormwater pond. It may be unlikely significant additional detention would be required in OMFS design.	SPU	SPU Team
10	Draft	DEIS	3.11-11-12	N/A	Midway landfill cap should be treated as existing impervious. 3.11-12 describes that a conservative assumption has been used that the surface is all grass and will have highest amount of conversion to impervious - the section also acknowledges the landfill cap. The assumption of grass and conversion to impervious is inappropriate.	SPU	SPU Team
11	Draft	DEIS	3.11-13	N/A	A slab and beam system in the Hybrid design option wouldn't partially impede long-term monitoring as long as monitoring wells are left accessible or replaced. Also the portion of the statement about improving local groundwater quality and the cover system by bringing it up to current protection standards is not accurate. The cover system is functioning and protective per current standards already. Potential improvement of groundwater quality is not related to improving the cover system. Potential improvement of groundwater quality may be related to refuse excavation of the hybrid and full excavation options.	SPU	SPU Team
12	Draft	DEIS	3.11-13	N/A	The drilled shafts and platform would be designed to prevent downward migration of groundwater and access for landfill gas system O&M. These considerations should not be put forward as risks. Also there is a statement that the project would bring the landfill cap system up to current protection standards. The existing landfill cap meets current protection standards.	SPU	SPU Team
13	Draft	DEIS	3.11-15	N/A	It should be noted that the waste excavation required for the hybrid and full removal alternatives is essentially equivalent. The text makes it sound like there is significantly less excavation for the hybrid.	SPU	SPU Team
14	Draft	DEIS	3.13-10	N/A	Would be appropriate to include discussion of how hazardous materials construction impacts were successfully mitigated at the FWLE here.	SPU	SPU Team
15	Draft	DEIS	3.13-9	N/A	This section talks about risk of potential uncontrolled release of methane gas from the landfill - as designed this will not occur - acknowledgement of the required and planned gas collection system should be added here. The risk of uncontrolled gas release should be different for the different Midway landfill options. Risk of uncontrolled gas release would be eliminated by the full excavation option.	SPU	SPU Team
16	Draft	DEIS	3.16-5	N/A	The text states "no archaeological resources were identified within the Midway Landfill Alternative area of impact", but then the landfill is identified as an archaeological resource on Table 3.16-1. Why?	SPU	SPU Team
17	Draft	DEIS	3-11-15	N/A	The construction impacts related to hazardous material can be mitigated. Transporting materials would be done under strict requirements and columns would be installed in a way to avoid contaminant mobilization.	SPU	SPU Team
18	Draft	DEIS	3-13-10	N/A	Same comment with respect to impacts from drilled shafts - risks can and should be mitigated.	SPU	SPU Team
19	Draft	DEIS	3-13-9	N/A	Vapor intrusion can be mitigated through sound engineering practices.	SPU	SPU Team
20	Draft	DEIS	Fig 3.11-3	N/A	This figure should have a special and different symbol for landfill cap - not a hydrologic soil group	SPU	SPU Team
21	Draft	DEIS App D4	General	N/A	Has the experience with waste removal during the FWLE been taken into consideration for this Human Health Risk Assessment? For example, the environmental professional has been collecting air monitoring data during the waste excavation-these data may be useful in risk assessment.	SPU	SPU Team

Operations and Maintenance Facility South
Draft EIS
Conceptual Design Review Comments

Organization:	Seattle Public Utilities
Date:	March 25, 2021

ID	Draft Version	Section/Dwg No.	Page/Sheet No.	Line/Exhibit No.	Comment	Organization / Firm	Commenter's Name
22	Draft	DEIS App D4	General	N/A	The vapor pathway described in the assessment does not exist if mitigation is competently designed, constructed and maintained. The risk to workers for collisions and contact with energized electrical components is more significant than the vapor exposure pathway. The waste removal options 2 and 3 further reduce risks by removing much of the source material.	SPU	SPU Team
23	Draft	DEIS App D2	14 paragraph 6	N/A	The 22 week construction window does not reflect the work process for the FWLE waste removal. This window can be expanded.	SPU	SPU Team
24	Draft	DEIS App D2	2.1-13	N/A	Why did the assumption that material screening will result in 50% of the landfill material for reuse change from the assumption used for the FWLE that 70% of the material would be reused? The FWLE portion of the landfill towards the east has the deepest refuse. The existing refuse gets shallower towards the west.	SPU	SPU Team
25	Draft	DEIS App D2	2.1-14	N/A	The EIS assumes that all volume in the landfill is refuse for their excavation calculations and that the clean cover material quantity is unknown. Clean cover soils over the landfill cap range~~s~~ from 2 to 4 feet and landfill overburden range~~s~~ from 4-14 feet above the refuse. These are significant enough quantities to be incorporated into the analysis.	SPU	SPU Team
26	Draft	DEIS App D2	2.6.1	N/A	Screened Waste from the FWLE project was shipped in open top 48 foot containers which is much more efficient.	SPU	SPU Team
27	Draft	DEIS App D2	2.7	N/A	The assumptions on density, etc. should reflect the FWLE experience instead of raw estimates.	SPU	SPU Team
28	Draft	DEIS App D2	5.0-45	N/A	Statement 3: "Costs to adjust OMF South design to address compatibility with the FWLE or modify FWLE." This statement should be modified now that OMF South options and FWLE are now compatible.	SPU	SPU Team
29	Draft	DEIS App D2	6.0	N/A	This OMFS/FWLE compatibility section appears to be outdated per comment above.	SPU	SPU Team
30	Draft	DEIS App D2	General	N/A	The assumptions regarding allowable open area 5 acre limit have no basis and lead to inefficiency in the project.	SPU	SPU Team
31	Draft	DEIS App D2	General	N/A	Trucking via 20 foot containers is unlikely and inefficient. For the FWLE project, screened out refuse was transported in 48 foot open top containers.	SPU	SPU Team
32	Draft	DEIS App D2	pg. 25 line 16	N/A	The 22 week construction window does not reflect the work process for the FWLE waste removal. This window can be expanded.	SPU	SPU Team
33	Draft	DEIS App D2	Section 7	N/A	The tolerances for settlement are not realistic. At face value they indicate that there would be no track leveling maintenance required for the first 50 years of facility operation. Many other facility elements will require replacement/renewal in that time frame - why is track leveling different.	SPU	SPU Team
34	Draft	DEIS App D2	Table 2.3	N/A	Truck trips should reflect the actual material data generatred from the FWLE work completed to date.	SPU	SPU Team
35	Draft	DEIS App D3	2.6.2.1	N/A	The text states "The recommendations also concluded that a typical soil column at the Midway landfill could be composed of between 50-70 percent waste, which would correspond to between 30 and 50 percent soil that could be considered for reuse." These percentages should be compared to what was achieved for the FWLE track project.	SPU	SPU Team
36	Draft	DEIS App D3	Section 3.2	N/A	For both excavation options, future methane generation will be negligible and will likely only require a passive vent system to prevent gas migration. Additionally, O&M costs for these options would be much less than for the option in which waste remains in place.	SPU	SPU Team
37	Draft	DEIS App D4	2.1-10	N/A	The existing landfill cap has a geomembrane liner and is designed to prevent surface water infiltration (impermeable) rather than reducing infiltration as stated in this Site Setting section.	SPU	SPU Team

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
1	Per ST presentation, ST's Preferred Alternative will not define a Midway option. In selecting a preferred alternative, what will ST assume for the cost and impact at Midway? Will the Midway alternative utilized for preferred alternative selection therefore assume max cost and impact or average cost and impact of the options?	The Sound Transit Board considered the construction estimate range for all the OMF South alternatives, including the Midway Landfill Alternative and its subsurface construction design options, and did not assume an average or maximum cost. The Board also considered other factors, including the 2021 Draft EIS analysis and comments received, in identifying the South 336th Street Alternative as the Preferred Alternative for the project. The Board will also consider this information in selecting the project to be built.
2	Ground settlement appears to be a primary driver in the selection of Midway Landfill foundation and site preparation alternatives evaluated. All three of the selected alternatives heavily favor mitigating settlement through upfront capital improvements in lieu of mitigation through operation and maintenance. The Preliminary Geotechnical Engineering Services Report (GeoEngineers, May 6, 2019) indicates that abrupt differential settlement over the landfill is unlikely in its current condition. Additionally, actual landfill settlement observed since then has been lower than what was predicted. Site preparation for the Forest Street OMF tracks consisted of mixing 3 to 4 feet of surficial soil with cement, while ongoing settlement of the tracks is managed via hand tamping of the tracks every 3-12 months. The approach to managing track settlement through maintenance has not resulted in impacts to the overhead contact system according to Paul Denison of Sound Transit during the August 13, 2019 Midway Landfill Site Settlement Workshop. Given the high cost of proposed site prep/foundation alternatives at the Midway Landfill, would it be more economical to construct a geosynthetic reinforced subgrade beneath the tracks/parking areas and manage ongoing settlement through maintenance similar to what is done at the Forest Street OMF?	Ground settlement was one of many factors considered when designing the subsurface construction design options. Sound Transit endeavored to use a realistic approach to the challenges posed by the landfill site. Geosynthetic reinforcement can increase the bearing capacity of the soil and reduce settlement, but not eliminate it. The unknown density and type of waste, which would be under the geosynthetic reinforcement, would still require Sound Transit to consider the risk of differential settlement and the effect it would have on maintenance and operations.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
3	There will be a considerable and varying depth of fill (up to 80 feet or more in some areas) necessary for Options 2 and 3, the full excavation/replace and hybrid options. Recycled soil screened from the landfill will be variable in composition and moisture content, making compaction control difficult to achieve when constructing this embankment. This would be true even if the material was blended with better quality imported soil as was done along I-5. Even under ideal fill and compaction conditions, it is reasonable to expect embankment fills to settle by about ¼ to ½% of their thickness (for an 80-foot thick embankment, this would be about 2 to 5 inches). Fine-grained soil placed at sub-optimum moisture content would probably result in settlement at a higher percentage (perhaps ½ to 1% or even more) of the embankment thickness. Considering that much of the soil within the landfill is fine-grained, this settlement would likely occur for a long period of time after construction, with total settlements approaching a foot and differential settlement on the order of several inches. Given the tight settlement tolerances desired by ST, I suggest investigating self-compression of the fill for Options 2 and 3, and its impact on the performance of these options.	Considerations for long-term settlement of placed competent soils over time are valid. The general geotechnical assumption was that much of the potential settlement would occur during placement of successive lifts and that the deeper fills would not have much settlement risk by the time final grades were reached. This concern would need to be further addressed if the Midway Landfill Alternative were selected as the project to be built.
4	There would likely be no delay or cost due to appeals or lawsuits at Midway, should that be included as a consideration?	Typical schedule risks, such as those associated with permitting and construction, were considered. The EIS does not speculate about schedule ramifications associated with unknown appeals and lawsuits.
5	Are local traffic impacts generated by the 470 employees considered in the DEIS?	The potential transportation impacts associated with operation of OMF South are discussed in Section 3.2.2.2, Long-Term Impacts. This section was updated in both the 2023 Draft EIS and this Final EIS to reflect the most recent traffic data and project design.
6	The landfill cap is designed to significantly reduce surface water infiltration if not prevent it. Multiple locations in the EIS text and appendices state that the cap reduces infiltration, but it is designed to prevent it. The description in Page 3.11-12 is the most accurate. Descriptions that say 'low-infiltration cap' should be revised to 'impervious cap'.	An update to the description of the cap was made for the 2023 Draft EIS and is reflected in this Final EIS. Please see Section 3.11, Water Resources.
7	Costs for real estate and relocation for the Midway alternative seem high. What do they include? What has been assumed regarding purchase and sale of the landfill property from SPU?	In estimating real estate and relocation costs for the Midway Landfill Alternative, Sound Transit assumed a lease rather than an acquisition. The assumption was a 99-year lease at a cost of $7.6M. Sound Transit arrived at that number through an independent appraisal. No relocation costs were assumed for the landfill. Note that the total cost for real estate and relocation for the Midway Landfill Alternative includes full and partial acquisition of additional parcels beyond those owned by the city of Seattle.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
8	Why is the annual Operating Est at Midway so much higher than the other alts? If this is for landfill gas system, how does it compare to current landfill O&M costs? Why is the annual operating cost estimate the same for all Midway Landfill options?	The estimated annual operating cost of the Midway Landfill Alternative (under any of the subsurface construction design options) is $13M. The estimated annual operating costs of either the South 336th or South 344th Street alternative is $12M. The additional expense is anticipated for addressing potential risks posed by ground settlement and methane gas over the lifespan of the facility. Ground settlement is a factor whether constructing over waste or the entire volume is new soil, and material used to backfill the site would be a mix of excavated material and borrow fill. While the risk of methane releases from reused material would be low, monitoring would be necessary for both health and regulatory reasons.
9	Statement: "Compared with other alternatives, the Midway Landfill Alternative would convert more pervious land cover to impervious" - this is misleading due to the existing landfill cap. The entire Midway Landfill site is currently impervious, due to the existing landfill cap. The grass surface would reduce peak flow, but all runoff ends up in the existing stormwater pond. It may be unlikely-significant additional detention would be required in OMFS design.	Section 3.10, Ecosystem Resources, of the 2023 Draft EIS was updated to reflect the results of the impervious surface land cover analysis, which is described in more detail in Section 3.11, Water Resources. This update is reflected in this Final EIS.
10	Midway landfill cap should be treated as existing impervious. 3.11-12 describes that a conservative assumption has been used that the surface is all grass and will have highest amount of conversion to impervious - the section also acknowledges the landfill cap. The assumption of grass and conversion to impervious is inappropriate.	The existing impermeable membrane cap at the Midway Landfill Alternative is described in Section 3.11, Water Resources. Table 3.11-2, Study Area Impervious Surface Land Cover Changes Analysis, was revised in the 2023 Draft EIS, to include a footnote to clarify the intent of the impervious surface analysis, which is to consider the greatest potential impacts. However, this assumption should not necessarily be used for later stormwater management design sizing. This update is reflected in this Final EIS.
11	A slab and beam system in the Hybrid design option wouldn't partially impede long-term monitoring as long as monitoring wells are left accessible or replaced. Also the portion of the statement about improving local groundwater quality and the cover system by bringing it up to current protection standards is not accurate. The cover system is functioning and protective per current standards already. Potential improvement of groundwater quality is not related to improving the cover system. Potential improvement of groundwater quality may be related to refuse excavation of the hybrid and full excavation options.	Section 3.11, Water Resources, was updated in the 2023 Draft EIS to clarify that access to the monitoring well network at the Midway Landfill would be maintained. References to improving groundwater quality by bringing the landfill cap up to current standards has been removed. These updates are reflected in this Final EIS.
12	The drilled shafts and platform would be designed to prevent downward migration of groundwater and access for landfill gas system O&M. These considerations should not be put forward as risks. Also there is a statement that the project would bring the landfill cap system up to current protection standards. The existing landfill cap meets current protection standards.	For the Midway Landfill Alternative, drilling and installing shafts through the waste into the competent ground below presents the risk of providing a downward pathway for the migration of contaminants. The 2023 Draft EIS includes a more specific discussion of mitigation through design of the drilled shafts and clarifies that access to the landfill gas monitoring system would be maintained. The statement regarding the protection standards of the landfill cap has been deleted. These updates are reflected in this Final EIS.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
13	It should be noted that the waste excavation required for the hybrid and full removal alternatives is essentially equivalent. The text makes it sound like there is significantly less excavation for the hybrid.	The estimated excavation amounts listed in the 2023 Draft EIS and this Final EIS (Table 2.3-2) are 4.3 million cubic yards of waste excavation for the Hybrid Subsurface Construction Design Option and 4.9 million cubic yards for the Full Excavation Subsurface Construction Design Option.
14	Would be appropriate to include discussion of how hazardous materials construction impacts were successfully mitigated at the FWLE here.	Section 3.13, Hazardous Materials, of the Final EIS has been updated to include a discussion of the Hazardous Materials Response and Sampling Plan prepared by SPU for use during the construction of FWLE and SR 509 at the Midway Landfill.
15	This section talks about risk of potential uncontrolled release of methane gas from the landfill - as designed this will not occur - acknowledgement of the required and planned gas collection system should be added here. The risk of uncontrolled gas release should be different for the different Midway landfill options. Risk of uncontrolled gas release would be eliminated by the full excavation option.	Section 3.13, Hazardous Materials, of the 2023 Draft EIS was updated to acknowledge the required gas collection system at the Midway Landfill Alternative and the differing levels of risk for each subsurface construction design option. This update is reflected in this Final EIS.
16	The text states "no archaeological resources were identified within the Midway Landfill Alternative area of impact", but then the landfill is identified as an archaeological resource on Table 3.16-1. Why?	Section 3.16, Historic and Archaeological Resources, of the 2023 Draft EIS was updated to delete that sentence. This update is reflected in this Final EIS.
17	The construction impacts related to hazardous material can be mitigated. Transporting materials would be done under strict requirements and columns would be installed in a way to avoid contaminant mobilization.	Section 3.13, Hazardous Materials, of the 2023 Draft EIS was updated to include further discussion of avoidance and minimization measures that could be used at Midway Landfill. This update is reflected in this Final EIS.
18	Same comment with respect to impacts from drilled shafts - risks can and should be mitigated.	The Avoidance and Minimization of Impacts discussion in Section 3.11, Water Resources, of the 2023 Draft EIS and this Final EIS acknowledges that concrete-filled drilled shafts or other structures to be installed would need to be designed to prevent the downward migration of more contaminated groundwater or leachate to the aquifer below.
19	Vapor intrusion can be mitigated through sound engineering practices.	Sound Transit agrees that vapor intrusion can be mitigated through sound engineering practices and BMPs. However, the EIS acknowledges that if engineering controls fail, vapor could intrude into indoor air.
20	This figure should have a special and different symbol for landfill cap - not a hydrologic soil group	Figure 3.11-3 was updated in the 2023 Draft EIS to show a different symbol for the landfill cap. This update is reflected in this Final EIS.
21	Has the experience with waste removal during the FWLE been taken into consideration for this Human Health Risk Assessment? For example, the environmental professional has been collecting air monitoring data during the waste excavation-these data may be useful in risk assessment.	The Human Health Risk Assessment was completed before Sound Transit began excavation and waste removal activities within the Midway Landfill for FWLE. If the Board selects the Midway Landfill Alternative as the project to be built, an updated human health risk assessment will be prepared and will draw from the recent FWLE experience.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
22	The vapor pathway described in the assessment does not exist if mitigation is competently designed, constructed and maintained. The risk to workers for collisions and contact with energized electrical components is more significant than the vapor exposure pathway. The waste removal options 2 and 3 further reduce risks by removing much of the source material.	Worker health and safety will always be a consideration in the decision process. While vapor intrusion can be mitigated through sound engineering practices and BMPs, the EIS acknowledges that if engineering controls fail, vapor could intrude into indoor air.
23	The 22 week construction window does not reflect the work process for the FWLE waste removal. This window can be expanded.	The supporting documents in Appendix D were written early in the conceptual design process. The assumptions made were purposefully conservative to account for unknowns. The construction window was assumed to be limited to the 22-week dry season between May 1 and September 30 to reduce the amount of precipitation that could potentially infiltrate into the open area of the landfill, which could further contribute to contaminated groundwater. FWLE was constructed on the edge of the landfill, where waste was relatively shallow. Based on the specific makeup of the excavated waste, the design-builder was able to negotiate an extended construction window with Ecology. If the Board were to select the Midway Landfill Alternative as the project to be built, Sound Transit would conduct additional geotechnical borings to assess the nature of the waste and work with regulatory agencies to set an appropriate construction schedule.
24	Why did the assumption that material screening will result in 50% of the landfill material for reuse change from the assumption used for the FWLE that 70% of the material would be reused? The FWLE portion of the landfill towards the east has the deepest refuse. The existing refuse gets shallower towards the west.	The makeup of waste is different throughout the landfill. In addition, the depth of waste is deeper to the west of the FWLE project. With a varying depth of overburden on the waste, the percentage of soil to waste changes substantially with the depth of waste. West of the FWLE alignment, the waste can be up to 80 feet deep.
25	The EIS assumes that all volume in the landfill is refuse for their excavation calculations and that the clean cover material quantity is unknown. Clean cover soils over the landfill cap ranges from 2 to 4 feet and landfill overburden ranges from 4-14 feet above the refuse. These are significant enough quantities to be incorporated into the analysis.	The available clean cover soils were identified qualitatively, not quantitatively. This was a high-level feasibility study with limited data on clean soil quantity. This method provides a reasonable approach in estimating the quantities and cost of site preparation for the project given the level of project design.
26	Screened Waste from the FWLE project was shipped in open top 48 foot containers which is much more efficient.	Final EIS Appendix D3, Conceptual Landfill Site Reuse Plan, makes an assumption that 20-foot, fully enclosed intermodal containers would be used. The analysis used the conservative assumption that contaminated materials would be transferred from trucks to rail cars at an intermodal facility and taken by rail to an approved disposal site. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
27	The assumptions on density, etc. should reflect the FWLE experience instead of raw estimates.	As noted in Final EIS Appendix D3, Conceptual Landfill Site Reuse Plan, the quality of the landfill material excavated for FWLE is better understood, and the scale of work is substantially smaller than that proposed for OMF South. A number of assumptions, including soil and material density across the landfill, were made to facilitate a relative comparison of the subsurface construction design options and also to compare the Midway Landfill Alternative with the other two build alternatives.
28	Statement 3: "Costs to adjust OMF South design to address compatibility with the FWLE or modify FWLE." This statement should be modified now that OMF South options and FWLE are now compatible.	This comment is on an interim report prepared in February 2020, which has not been updated. The comment is correct in stating that the design of the FWLE project was revised to address compatibility issues with a potential OMF South at the Midway Landfill Alternative. Final EIS Section 2.3.5, Midway Landfill Site Subsurface Construction Design Options, notes the compatibility between the two projects.
29	This OMFS/FWLE compatibility section appears to be outdated per comment above.	Please see the response to Comment ID 28.
30	The assumptions regarding allowable open area 5 acre limit have no basis and lead to inefficiency in the project.	The 5-acre assumption is reasonable at the EIS stage in the planning process. The size would allow for continued control of landfill gas and water infiltration prevention. The actual size would need regulatory approval, and Ecology previously indicated they would allow only small areas to be open at a time. The 5-acre assumption was the basis for hauling transport modeling. Additional space would increase hauling and traffic impacts and could potentially overwhelm any facility receiving the material. The allowable open area would be coordinated with SPU and Ecology during final design if the Midway Landfill Alternative were selected to be built.
31	Trucking via 20 foot containers is unlikely and inefficient. For the FWLE project, screened out refuse was transported in 48 foot open top containers.	Final EIS Appendix D3, Conceptual Landfill Site Reuse Plan, assumed that 20-foot, fully enclosed intermodal containers would be used. The analysis used the conservative assumption that contaminated materials would be transferred from trucks to rail cars at an intermodal facility and taken by rail to an approved disposal site. If the Board selects the Midway Landfill Alternative as the project to be built, Sound Transit would conduct further studies to refine construction requirements.
32	The 22 week construction window does not reflect the work process for the FWLE waste removal. This window can be expanded.	Please see response to Comment ID 23.
33	The tolerances for settlement are not realistic. At face value they indicate that there would be no track leveling maintenance required for the first 50 years of facility operation. Many other facility elements will require replacement/renewal in that time frame - why is track leveling different.	Sound Transit conducts monthly inspections of track at its existing OMFs. Typically, the inspections find little track settlement. Where it does occur, it tends to be at the edge of grade crossings where the track is crossed by large trucks. In these places, periodic adjustments need to be made. It is reasonable to assume that track installed on a fill area would require relatively more settlement adjustment.
34	Truck trips should reflect the actual material data generated from the FWLE work completed to date.	The depth, type, and density of the waste on the east edge of the landfill where FWLE was built is not necessarily representative of the waste throughout the landfill. Due to this, the truck trip estimates were not updated.

Seattle Public Utilities (Communications ID 473810)		
Comment ID	**Comment Text**	**Response**
35	The text states "The recommendations also concluded that a typical soil column at the Midway landfill could be composed of between 50-70 percent waste, which would correspond to between 30 and 50 percent soil that could be considered for reuse." These percentages should be compared to what was achieved for the FWLE track project.	The soil on top of the cap can be reused. However, the soil mixed with the waste may be contaminated and not available for reuse. Due to the uncertainty of the contamination or toxicity, it is reasonable to assume that all or most of the soil must be removed. As noted in Final EIS Appendix D3, Conceptual Landfill Site Reuse Plan, the quality of the landfill material excavated for FWLE is better understood, and the scale of work is substantially smaller than that proposed for OMF South.
36	For both excavation options, future methane generation will be negligible and will likely only require a passive vent system to prevent gas migration. Additionally, O&M costs for these options would be much less than for the option in which waste remains in place.	The Hybrid and Full Excavation subsurface construction design options assumed only a passive system would be required, reducing capital redevelopment and operational costs.
37	The existing landfill cap has a geomembrane liner and is designed to prevent surface water infiltration (impermeable) rather than reducing infiltration as stated in this Site Setting section.	The description of the existing landfill cap was updated in Section 3.11, Water Resources, in the 2023 Draft EIS. This update is reflected in this Final EIS.

From: Johnson, Rep. Jesse <Jesse.Johnson@leg.wa.gov>
Sent: Tuesday, March 9, 2021 10:46 AM
To: OMF South <OMFsouth@soundtransit.org>
Subject: Public Comment

Good morning,

When will the public comment on this project be held? After hearing from constituents in my district, I ask that this project not be considered in Federal Way. Thank you!

Best,

Jesse E. Johnson
State Representative | 30th Legislative District
369 John L O'Brien Building | Olympia, WA 98504 | 206-333-2989
Pronouns: He/Him/His
Jesse.Johnson@leg.wa.gov
Proudly serving: Algona, Auburn, Des Moines, Federal Way, Milton, Pacific & Unincorporated King County
Sign up for email updates here: https://housedemocrats.wa.gov/johnson/

Washington State Representative, 30th Legislative District, Jesse E. Johnson (Communication ID 471610)		
Comment ID	**Comment Text**	**Response**
1	When will the public comment on this project be held?	A public comment period was held for the SEPA Draft EIS from March 5 through April 19, 2021, and a public comment period was held for the 2023 Draft EIS from September 22 to November 6, 2023.
2	After hearing from constituents in my district, I ask that this project not be considered in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Businesses and Community Groups

April 19, 2021

VIA EMAIL & U.S. MAIL

Email: OMFSouth@soundtransit.org

Mail: Hussein Rehmat
OMF South Project
Sound Transit
401 S. Jackson Street
Seattle WA, 98104

Re: Sound Transit OMF South Project: Draft Environmental Impact Statement (DEIS) – Comments From Christian Faith Center (CFC)

Dear Mr. Rehmat:

On behalf of our client Christian Faith Center (CFC), we submit these comments for review in the EIS process. As you know, the CFC Campus is identified in two of the three alternatives for the South OMF Project. The South 336th Street Alternative would take all of the CFC Campus. The South 344th Street Alternative would take approximately half of the CFC Campus. Our primary comments on the DEIS at this time are:

1. CFC would prefer to not be any alternative for the OMF South Project. Any comments below are for the sole purpose of informing Sound Transit of the consequences and impacts to CFC from the two alternatives noted above and are not an express or implied consent to any selection of CFC as the preferred site for the OMF South Project.

2. The DEIS has not adequately understood and analyzed the CFC Campus, which has led to a flawed analysis of, in particular, the South 344th Street Alternative. More on this comment follows below.

Background.

CFC's story begins in 1980 with the formation of CFC to pursue its mission of spreading the word of Jesus. CFC had a vision of a future campus for its ministry with a place of convening for worship, a school, a day care facility, a college, and associated facilities. That vision became reality in the early 2000's with the acquisition of its campus property and associated land use approvals, specifically the Concomitant & Development Agreement & Development Plan (City of Federal Way, Ordinance 04-461, July 20, 2004). A copy of this 107 document is attached hereto and shall be referred to as the Campus Approval.[1]

As is evident from the Campus Approval, the CFC Campus would develop in Phases, but the necessary development infrastructure for the entire site would be integrated and planned up front. By way of example only and not meant to be exhaustive, some of the important elements include:

- Planned recreational areas. Campus Approval at Section 9.1.5.4
- Extensive traffic mitigation, including multiple points of ingress and egress. Campus Approval at Section 9.4.
- Surface mitigation/storm water detention facilities. Campus Approval at Section 9.6.
- Wetland Mitigation. Campus Approval at Section 9.7.

Impacts to CFC.

Ever since CFC's Campus has been identified as a potential site for the OMF South Project, CFC has essentially been "stuck" in place and time. CFC has halted the planning and implementation of additional projects. CFC cannot grow and expand its ministry. This is true for both the South 336th Street Alternative and the South 344th Street Alternative.

CFC's selection as a site for the South OMF facility has created uncertainty and anxiety for tis members. Is their spiritual "home" going to be taken from them? Where will they go?

If the South 336th Street Alternative becomes the final site, then CFC will be forced to lose its Campus as a whole under eminent domain or the treat of eminent domain and find a new campus location and start a new multi-year development process anew. This is no easy task.

If the South 344th Street Alternative becomes the final site, CFC's situation becomes even worse. The DEIS simply and incorrectly assumes that the current site could be severed or bifurcated and somehow CFC could continue to operate on the remainder parcel.

---

[1] A copy of the enclosure is available at https://docs.cityoffederalway.com/WebLink/DocView.aspx?id=192244&page=1&dbid=0&repo=CityofFederalWay

Because the Campus Approval is an integrated plan for the entire CFC Property, taking a significant portion for the South 344th Street Alternative disrupts the entire plan and creates a situation where CFC would be in violation of its approvals. Again, by way of example only and not to be exhaustive, taking the eastern portion of the CFC Campus for the South 344th Street Alternative Project means:

- The remainder parcel no longer has a required storm water facility for its surface water management.
- CFC's required access points no longer exist, because the DEIS assumes, incorrectly, that CFC uses only one access point. It is required to have multiple.
- CFC's required recreational areas disappear.

Beyond, the physical, land use, and environmental impacts are fiscal impacts. CFC has long term financing for its current Campus. Taking a significant portion of the property would impair the lender's collateral. Its loan would be called. With the remainder of the property now a non-conforming and non-compliant property, no lender would extend credit. The City of Federal Way could commence code enforcement action requiring CFC to come into compliance with storm water, access, and recreational facilities requirements, which CFC could not meet.

CFC respectfully requests that Sound Transit carefully review the 107 page Campus Approval document to refine its analysis of impacts associated with the South 344th Street Alternative.

Thank you for considering these comments. CFC reserves the right to provide supplemental comments (whether within or external to the EIS process) as appropriate.

Very truly yours,

JAMESON PEPPLE CANTU PLLC

By: Brian Lawler
Of Counsel

Enclosure

cc: P. Rogoff, CEO, Sound Transit (By mail)
S. Ramachandra, OMF South Project Staff (By email only
sagar.ramachandra@soundtransit.org)
James Ferrell, Mayor, City of Federal Way (By email only
Jim.Ferrell@cityoffederalway.com)

ORDINANCE NO. 04-461

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF FEDERAL WAY, WASHINGTON, RELATING TO LAND USE, ADOPTING AMENDMENTS TO THE CITY'S GROWTH MANAGEMENT ACT COMPREHENSIVE PLAN AND ADOPTING AMENDMENTS TO THE CITY'S ZONING MAP, CHANGING THE COMPREHENSIVE PLAN DESIGNATION AND ZONING FOR 49.97 ACRES LOCATED SOUTH OF S. 336TH STREET BETWEEN PACIFIC HIGHWAY SOUTH AND INTERSTATE 5 FROM BUSINESS PARK (BP) TO MULTIFAMILY RESIDENTIAL 3600 (RM 3600), AND ADOPTING AN ASSOCIATED CONCOMITANT AND DEVELOPMENT AGREEMENT AND DEVELOPMENT PLAN.

WHEREAS, the Growth Management Act of 1990, as amended, (Chapter 36.70A RCW or "GMA") requires the City of Federal Way to adopt a comprehensive plan which includes a land use element (including a land use map), housing element, capital facilities plan element, utilities element, and transportation element (including transportation system map[s]); and

WHEREAS, the GMA also requires the City of Federal Way to adopt development regulations implementing its comprehensive plan; and

WHEREAS, the Federal Way City Council adopted its comprehensive plan with land use map (the "Plan") on November 21, 1995, and adopted development regulations and a zoning map implementing the Plan on July 2, 1996; and subsequently amended the comprehensive plan, land use map, and zoning map on December 23, 1998, September 14, 2000, and November 1, 2001; and March 27, 2003; and

WHEREAS, under RCW 36.70A.130, by December, 2004, all jurisdictions within Washington State must take action to review and, if needed, revise its comprehensive plan and development regulations to ensure that they comply with the GMA; and

WHEREAS, the City may consider Plan and development regulation amendments pursuant to Article IX, Chapter 22 of the *Federal Way City Code* (FWCC); and

WHEREAS, under RCW 36.70A.130, the Plan and development regulations are subject to continuing review and evaluation, but the Plan may be amended no more than one time per year; and

WHEREAS, the Council shall be considering three separate actions to amend the Plan, all of which will be acted upon simultaneously in order to comply with RCW 36.70A.130; and

WHEREAS, these actions include adoption of a Potential Annexation Area (PAA) Subarea Plan, which will replace Chapter 8, Potential Annexation Areas of the Federal Way Comprehensive Plan and address certain comprehensive plan text changes pertaining to the Community Business (BC) comprehensive plan designation and zoning; and

WHEREAS, these actions include deletion of the planned extension of Weyerhaeuser Way South, north of South 320th Street, shown on Map III-27B from the Comprehensive Plan and deletion of this project from Table III-19 (Regional CIP Project List); and

WHEREAS, these actions include a change in comprehensive plan designation and zoning from Business Park (BP) to Multifamily Residential 3600 (RM 3600) through adoption of an associated concomitant and development agreement and development plan for 49.97 acres located south of S. 336th Street between Pacific Highway South and Interstate 5, referred to herein as the Christian Faith Center Property; and

WHEREAS, in 2000, the City of Federal Way accepted requests for amendments to the text and maps of the comprehensive plan and applications for site-specific changes to the Plan's land use map and the City's zoning map, and considered amendments to the text and maps of the comprehensive plan and to the Plan's land use map and the City's zoning map, including a request to change the Christian Faith Center Property from Business Park (BP) to Multifamily Residential 3600 (RM 3600); and

WHEREAS, on July 4, 2001, the City SEPA Responsible Official issued a Determination of Nonsignificance on the proposed Plan and zoning map amendment; and

WHEREAS, Pursuant to FWCC Section 22-1660, development agreements associated with a comprehensive plan designation and related zoning change may be used at the City Council's discretion, where the project is larger in scope and has potentially larger impacts than normal, or where the City Council may desire to place certain restrictions on the proposal; and

WHEREAS, A Concomitant Agreement and Development Agreement has been prepared for the proposed project on the Christian Faith Center Property (the "Project") in order to fully address and mitigate all identified impacts associated with the project, and the Concomitant Agreement allows for a rezone of the property but limits the allowable use of the property to a church, a school, and accessory uses, and the Agreement is accompanied by a Development Plan (*Exhibit B* to the Agreement) as required by FWCC Section 22-1669, and prepared in accordance with FWCC Section 22-1664; and

WHEREAS, Pursuant to the State Environmental Policy Act (SEPA), the City issued Draft and Final Environmental Impact Statements (EIS) for the Project on November 18, 2003, and March 3, 2004, and EIS Addenda on April 16, 2004 and May 21, 2004, and four public meetings were conducted during the environmental review process for the proposed Project which included an EIS Scoping Meeting on August 27, 2002, Neighborhood Traffic Meeting on May 8, 2003, Draft Environmental Impact Statement (DEIS) hearing on December 12, 2003, and City Council EIS briefing on March 15, 2004; and

WHEREAS, the proposed Plan and zoning map changes address all of the goals and requirements set forth in the GMA; and

WHEREAS, the proposed Concomitant and Development Agreement and Development Plan address all of the goals and requirements set forth in the FWCC; and

WHEREAS, the City of Federal Way, through its staff, Planning Commission, City Council committees, and full City Council has received, discussed, and considered the testimony, written comments, and material from the public, as follows:

1. The City's Planning Commission considered the request for amendment to the comprehensive plan at public hearings held on July 18, 2001, August 15, 2001, and September 19, 2001, following which it forwarded a recommendation to the City Council; and

2. The Land Use and Transportation Committee of the Federal Way City Council considered the proposed site-specific changes to the Plan's land use map and the City's zoning map on October 1, 2001 at which time it requested a development agreement and development plan be prepared for the Project; and

3. The full City Council considered the proposed change to the Plan's land use map and the City's zoning map and the associated Concomitant and Development Agreement and Development Plan on May 24, 2004, and June 15, 2004; and

WHEREAS, the City Council desires to adopt the changes to the Plan's land use map and City's zoning map and associated Concomitant and Development Agreement and Development Plan;

NOW, THEREFORE, the City Council of the City of Federal Way, Washington, does hereby ordain as follows:

Section 1. Findings and Conclusions.

A. The proposed amendment to the comprehensive plan land use map, as set forth in Exhibit A hereto, reflects new or updated information developed since the initial adoption of the comprehensive plan. It bears a substantial relationship to public health, safety, and welfare; is in the best interest of the residents of the City; and is consistent with the requirements of RCW 36.70A, the King County Countywide Planning Policies, and the unamended portion of the Plan. The amendment, as mitigated, is compatible with adjacent land uses and surrounding neighborhoods and will not negatively affect open space, streams, lakes or wetlands, or the physical environment in general. It will allow for growth and development consistent with the Plan's overall vision and with the Plan's land use element household and job projections, and/or will allow reasonable use of property subject to constraints necessary to protect environmentally sensitive areas. It therefore bears a substantial relationship to public health, safety, and welfare; is in the best interest of the residents of the City; and is consistent with the requirements of RCW 36.70A, the King County Countywide Planning Policies, and the unamended portion of the Plan.

B. The proposed amendment to the Zoning Map, set forth in Exhibit B, attached hereto, adopted pursuant to the concomitant agreement, is consistent with the applicable provisions of the comprehensive plan and the comprehensive plan land use map proposed to be amended in Section 2 below, bears a substantial relation to public health, safety, and welfare, and is in the best interest of the residents of the City.

C. The Concomitant and Development Agreement and Development Plan, as set forth in Exhibit C, attached hereto, is consistent with RCW 36.70B, RCW 43.21C, and FWCC Chapter 22, Article XXI.

D. Additional Findings and Conclusions are attached as Exhibit D and incorporated herein by this reference as if set forth in full.

Section 2. Comprehensive Plan Amendments Adoption. The 1995 City of Federal Way comprehensive plan, as thereafter amended in 1998, 2000, 2001, and 2003, including its land use element map, copies of which are on file with the Office of the City Clerk, hereby are and shall be amended as set forth in Exhibit A attached hereto and is hereby incorporated by this reference as if set forth in full.

Section 3. Zoning Map Amendments Adoption. The 1996 City of Federal Way Official Zoning Map, as thereafter amended in 1998, 2000, 2001, and 2003 is hereby amended as set forth in Exhibit B, pursuant to the Concomitant and Development Agreement, and is hereby incorporated by this reference as if set forth in full.

Section 4. Concomitant and Development Agreement and Development Plan Adoption. The Concomitant and Development Agreement and Development Plan, attached as Exhibit C, is hereby adopted and incorporated herein by this reference as if set forth in full.

Section 5. Amendment Authority. The adoption of Plan amendments is pursuant to the authority granted by Chapters 36.70A and 35A.63 RCW, and pursuant to FWCC Section 22-541. The adoption of the Concomitant and Development Agreement and Development Plan is pursuant to the authority granted by Chapter 36.70B RCW and pursuant to FWCC Chapter 22, Article XXI.

Section 6. Severability. The provisions of this ordinance are declared separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section, or portion of this ordinance, or the invalidity of the application thereof to any person or circumstance, shall not affect the validity of the remainder of the ordinance, or the validity of its application to other persons or circumstances.

Section 7. Savings Clause. The 1995 City of Federal Way Comprehensive Plan, and 1996 Zoning Map, as thereafter amended in 1998, 2000, 2001, and 2003 shall remain in full force and effect until the amendments thereto become operative upon the effective date of this ordinance.

Section 8. Ratification. Any act consistent with the authority and prior to the effective date of this ordinance is hereby ratified and affirmed.

Section 9. Effective Date. This ordinance shall take effect and be in force five (5) days from and after its passage, approval, and publication, as provided by law.

PASSED by the City Council of the City of Federal Way this **20th** day of **July**, 2004.

CITY OF FEDERAL WAY

Dean McColgan

Mayor, Dean McColgan

ATTEST:

N. Christine Green

City Clerk, N. Christine Green, CMC

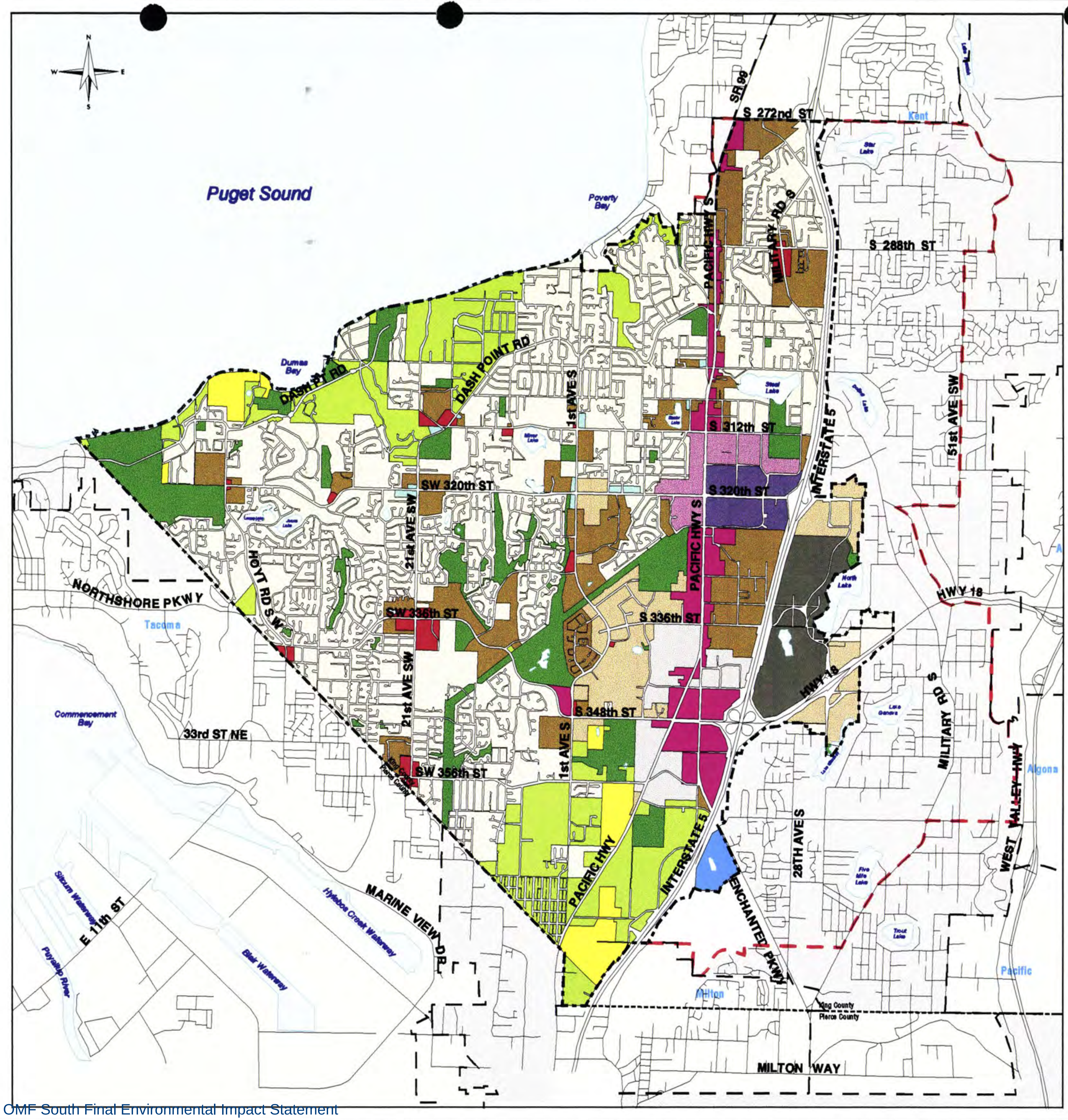
APPROVED AS TO FORM:

Pat A. Richardson

City Attorney, Patricia A. Richardson

FILED WITH THE CITY CLERK:	06/28/04
PASSED BY THE CITY COUNCIL:	07/20/04
PUBLISHED:	07/24/04
EFFECTIVE DATE:	07/29/04
ORDINANCE NO:	04-461

K:\CFC\Documents\AdoptionOrdinance


N
W
E
S
Puget Sound
Poverty Bay
Dumas Bay
Kent
Star Lake
SR 99
S 272nd ST
S 288th ST
PACIFIC HWY S
MILITARY RD S
DASH PT RD
DASH POINT RD
1st AVE S
Steel Lake
S 312th ST
SW 320th ST
S 320th ST
INTERSTATE 5
51st AVE SW
21st AVE SW
HOYT RD SW
NORTHSHORE PKWY
Tacoma
North Lake
SW 336th ST
S 336th ST
HWY 18
PACIFIC HWY S
Commencement Bay
33rd ST NE
S 348th ST
SW 356th ST
Lake Geneva
MILITARY RD S
WEST VALLEY HWY
Algona
PACIFIC HWY
INTERSTATE 5
ENCHANTED PKWY
28TH AVE S
Five Mile Lake
Trout Lake
MARINE VIEW DR
Hylebos Creek Waterway
Blair Waterway
Sitcum Waterway
Puyallup River
E 11th ST
Milton
King County
Pierce County
Pacific
MILTON WAY

COMPREHENSIVE PLAN DESIGNATIONS

- Federal Way City Limits
- Potential Annexation Area
- ■ City Center Core
- ■ City Center Frame
- ■ Corporate Park
- ■ Office Park
- ■ Professional Office
- ■ Commercial/Recreation
- ■ Business Park
- ■ Neighborhood Business
- ■ Community Business
- ■ Parks and Open Space
- ■ Multi-Family
- ■ Single Family-High Density
- ■ Single Family-Medium Density
- ■ Single Family-Low Density

EXHIBIT "A"

0 1 Mile

Map printed June 2004

/users/erike/opmaps/oplanb2lrg.aml

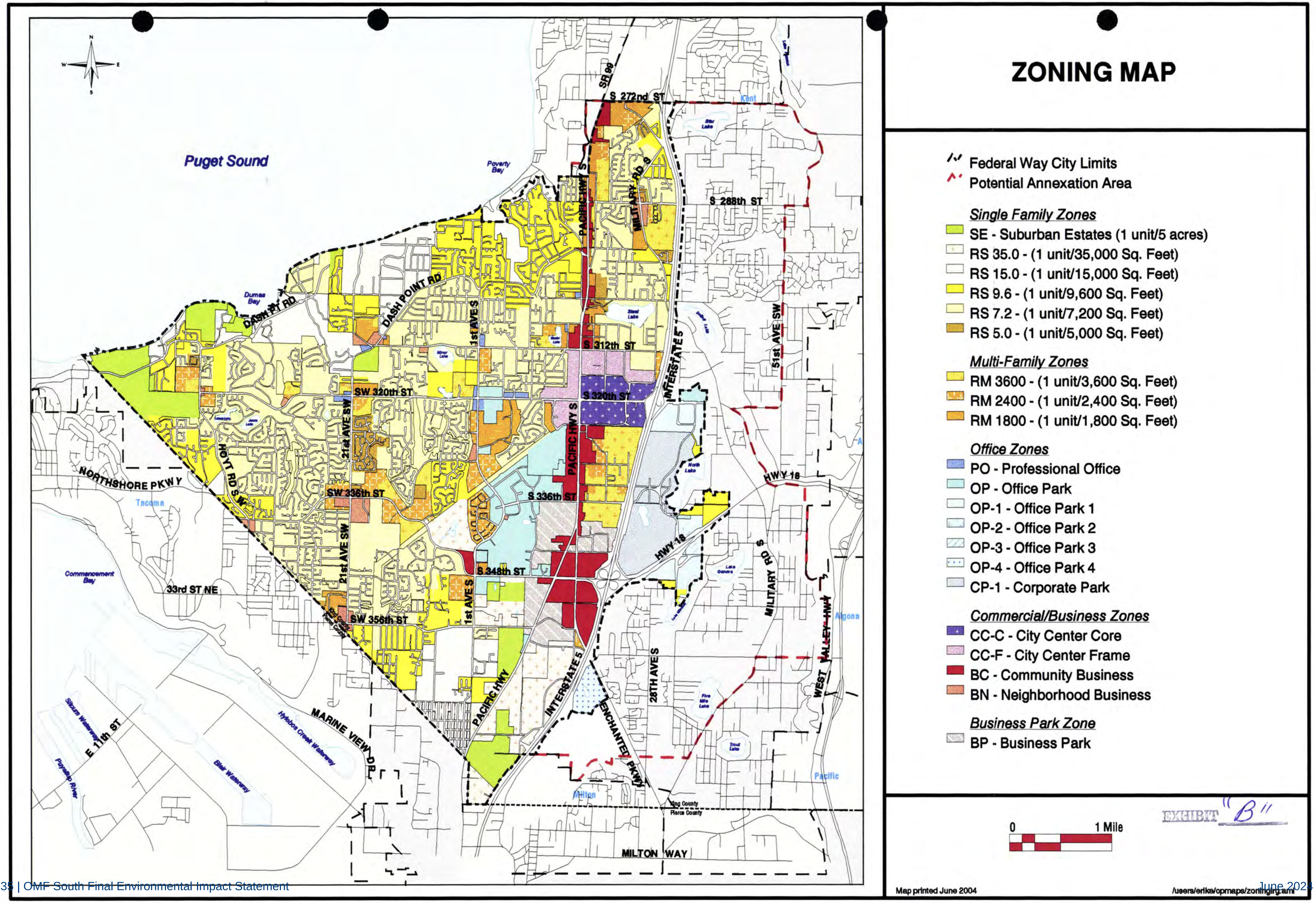

ZONING MAP
Federal Way City Limits
Potential Annexation Area
Single Family Zones
SE - Suburban Estates (1 unit/5 acres)
RS 35.0 - (1 unit/35,000 Sq. Feet)
RS 15.0 - (1 unit/15,000 Sq. Feet)
RS 9.6 - (1 unit/9,600 Sq. Feet)
RS 7.2 - (1 unit/7,200 Sq. Feet)
RS 5.0 - (1 unit/5,000 Sq. Feet)
Multi-Family Zones
RM 3600 - (1 unit/3,600 Sq. Feet)
RM 2400 - (1 unit/2,400 Sq. Feet)
RM 1800 - (1 unit/1,800 Sq. Feet)
Office Zones
PO - Professional Office
OP - Office Park
OP-1 - Office Park 1
OP-2 - Office Park 2
OP-3 - Office Park 3
OP-4 - Office Park 4
CP-1 - Corporate Park
Commercial/Business Zones
CC-C - City Center Core
CC-F - City Center Frame
BC - Community Business
BN - Neighborhood Business
Business Park Zone
BP - Business Park
0
1 Mile
EXHIBIT "B"
Map printed June 2004
/users/erike/opmaps/zoningrg.aml
Puget Sound
Poverty Bay
Dumas Bay
Commencement Bay
Tacoma
Kent
Milton
Pacific
Algona
N
S
E
W
S 272nd ST
S 288th ST
S 312th ST
S 320th ST
SW 320th ST
SW 336th ST
S 336th ST
S 348th ST
SW 356th ST
SR 99
PACIFIC HWY S
MILITARY RD S
INTERSTATE 5
DASH POINT RD
DASH PT RD
1st AVE S
21st AVE SW
HOYT RD SW
NORTHSHORE PKWY
33rd ST NE
51st AVE SW
HWY 18
28TH AVE S
ENCHANTED PKWY
PACIFIC HWY
WEST VALLEY HWY
MARINE VIEW DR
E 11th ST
MILTON WAY
Hylebos Creek Waterway
Blair Waterway
Sitcum Waterway
Puyallup River
King County
Pierce County

EXHIBIT C

CONCOMITANT AND DEVELOPMENT AGREEMENT AND DEVELOPMENT PLAN

CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

BETWEEN THE CITY OF FEDERAL WAY AND THE CHRISTIAN FAITH CENTER FOR DEVELOPMENT OF CHURCH AND PRIVATE SCHOOL

JULY 20, 2004

The City of Federal Way ("City") and the Christian Faith Center ("CFC"), a Washington nonprofit corporation, collectively referred to herein as "the Parties", enter into the following concomitant agreement and development agreement ("Agreement") regarding the rezoning of certain property and the scope of permissible development, use, and mitigation of environmental impacts associated with the campus development of a church and private school ("Project"), through construction of the buildings and related improvements on the CFC property.

The agreement is both a concomitant agreement and a development agreement. The concomitant agreement allows for a rezone of certain property subject to development standards and conditions governing the use of the property. The development agreement provides the developer with certainty regarding the local regulations and mitigation requirements that will govern development for a specified project. The concomitant agreement is a condition to and limitation upon the rezone of the property, if adopted by the City Council. That is, if the site is rezoned subject to concomitant agreement, its use and development is restricted both by the regulations applicable to the new zoning classification and the provisions of the concomitant agreement, and where development standards in the agreement are more restrictive, they govern property development. The development of the property is conditioned and limited by both the development agreement and concomitant agreement, and they have been combined into one document.

1. **Location.** CFC is the owner of certain real property situated in Federal Way, Washington, located south of South 336th Street between SR-99 and Interstate 5 (the "Property"). The Property is more particularly described on Exhibit A attached hereto and incorporated herein by this reference.

2. **Project Description.** The Project consists of development of a 218,500 square foot building for church sanctuary/school auditorium/administrative services a 101,526 square foot private school building, and associated parking and recreational and athletic fields as depicted on the Development Plan, attached hereto as Exhibit B and incorporated herein by this reference (the "Plan" or "Development Plan").

3. **Concomitant Agreement.** If the Property is rezoned from Business Park (BP) to RM 3600 by the Federal Way City Council, CFC and the City agree that the Property may be developed only in accordance with the standards and mitigation set forth in the Agreement. The Property shall be developed as described in the Agreement, and as depicted in the Development Plan. The allowable use of the property shall be limited to that described in the Agreement. All development standards, including mitigation, identified in the Agreement shall apply to Property development. No development on the Property shall be inconsistent with the Agreement or City Code. The Property is subject to the Agreement, and shall be developed only in accordance with the development standards identified within the Agreement, including the Development Plan (except for minor modifications permitted by Section 10 of the Agreement), unless and until the Agreement is amended or rescinded, as authorized by the City.

4. **Development Agreement.** The Agreement is authorized by RCW 36.70B.170 through .210 and FWCC 22-1660 through 22-1680. It addresses Project development standards, which are defined in the statute to include, for example, impact fees, mitigation, design standards, phasing issues, review procedures, vesting issues, and any other appropriate development requirements.[1] The Agreement provides the City and CFC with certainty as to the type of Project that will be built, the type of mitigation that will be provided, and the development regulations to which the Project will vest.

The Project is consistent with current local regulatory requirements.[2] As authorized by state statute,[3] the Agreement identifies mitigation under City codes and the State Environmental Policy Act (Chapter 43.21C RCW, "SEPA") required for the project.

5. **Vesting.** City development regulations, as found in the Federal Way City Code (FWCC) or otherwise legislatively adopted[4], and the mitigation measures adopted herein shall govern the Project for a period of five years, dating from execution of the Agreement. Any amendments or additions made to City development regulations during the five year period shall not apply to or affect the development, except as otherwise provided, or if other county, state or federal laws preempt the City's authority to vest regulations. The City reserves the authority to impose new or different officially adopted regulations to the extent required by a serious threat to the public health and safety.[5] After the five-year period, amendments or additions made by the City to these development regulations and the mitigation measures adopted herein shall apply to any subsequent or further development of the Property. Otherwise, the Property and the uses thereof that are developed consistent with this Agreement shall be deemed legal, nonconforming uses. Provisions of the Agreement, including specifically identified development standards and mitigation measures, do not terminate after the five-year period and continue to restrict development of the Property unless and until amended by the City.

6. **Project Mitigation Under SEPA.** The Project has been subject to detailed environmental review. A Final Environmental Impact Statement ("FEIS") was issued on March 3, 2004 and addenda were issued April 16, 2004 and May 21, 2004. Mitigation of significant adverse environmental impacts imposed under SEPA, through the City's SEPA regulations, is incorporated into the Agreement.

7. **Development of CFC Property.**

7.1 Permitted Uses. CFC covenants and agrees that it will limit any use of the Property to the church and school uses, as depicted in the Development Plan, attached as Exhibit B. Both the church and school are classified as principal uses for application of FWCC Sections 22-671 and 22-674. Accessory uses shall be limited to those approved as a part of this Agreement and shown on the attached Plan or List of Permitted Accessory Uses, attached as Exhibit C, or any accessory use determined by the Director of Community Development Services to be allowed, or analogous to an allowed accessory use, in the RM 3600 zone.

7.2 Relationship Between City Development Regulations and Development Standards Identified in Agreement. Development Regulations include all provisions of the Federal Way City Code (FWCC), including without limitation FWCC Chapters 18 through 22. The Development Regulations for the Property include those applicable to the RM 3600 zone and as set forth in the Agreement. The Agreement establishes site specific development standards, including mitigation. Property development shall be consistent with both development regulations and the development standards identified in the Agreement. Where the development standards in the Agreement are more restrictive, they shall govern development of the Property, as specified herein.

---

[1] RCW 36.70B.170(3).

[2] RCW 36.70B.170(1).

[3] RCW 36.70B.170(3)(c).

[4] Legal requirements include legislatively adopted standards governing development, such as zoning, building and development regulations, impact fees, SEPA regulations and substantive SEPA policies, and other laws, ordinances or policies.

[5] See RCW 36.70B.170(4).

7.3 Construction Phasing. Project construction shall be limited to two phases. Phase One shall comprise construction of the building for the church sanctuary, auditorium, meeting rooms and administrative offices, and the first 81,323 square feet of the school building, together with all on-site and off-site improvements required by this Agreement and by the conditions of any related permit approval. Phase Two shall comprise construction of a future second-story 20,203 square foot addition to the school building. Each phase, with the exception of improvements completely within the interior of a building, must be substantially completed within twenty-four (24) months of issuance of the building permit for that phase, except for delays beyond the control of CFC and approved by the Director of Community Development Services which approval shall not be unreasonably withheld. Project construction shall be completed within five years of the execution of this Agreement, except for delays beyond the control of CFC and approved by the Director of Community Development Services which approval shall not be unreasonably withheld.

8. Settlement Agreement. The Parties shall be bound by the Settlement Agreement between the City of Federal Way and Federal Way Industrial Park, Inc., dated February 5, 1996, attached hereto as Exhibit D and incorporated herein by this reference. The Settlement Agreement provides certain development standards and other provisions applicable to use and development of the Property, which are consistent with the terms of this Agreement. The terms of this Agreement shall control over any inconsistent terms in the Settlement Agreement.

9. Development Standards, Including Mitigation. The Project shall be consistent with all specified development standards. CFC shall construct, install or implement, as part of Project Construction, all mitigation required by the Agreement. The City Council has reviewed the EIS and the record. Mitigation has been developed based on these documents.

9.1 Project Design and Site Configuration.

9.1.1 Building Setback. All site improvements shall be setback from South 336th Street a minimum of 50 feet. The property bordering South 336th Street shall be deemed the front yard for purposes of this Agreement. Remaining rear and side setbacks for the church building shall be 30 feet from any property line or right-of-way. Remaining side and rear setbacks for the school building, ball fields, and any playground equipment shall be 50 feet from any property line or right-of-way.

9.1.2 Building Height. The maximum allowed height of single-story elements of the church building is 35 feet above average building elevation (ABE), with up to three additional feet allowed for articulated cornices; the maximum allowed height for second-story elements containing offices, classrooms, library and similar uses is 40 feet above ABE. The maximum height of the school building is 40 feet above ABE with up to three additional feet allowed for articulated cornices. The maximum allowed height for the church sanctuary/school auditorium portion of the building and the gymnasium is 55 feet above ABE.

9.1.3 Landscaping. CFC shall provide an approved landscape plan, prior to issuance of the Phase One building permit, incorporating the following features. The landscape plan shall be prepared by a landscape architect in consultation with a habitat biologist, whose recommendations shall be incorporated into the plan.

9.1.3.1 Perimeter Landscaping. CFC shall provide a combination of existing and new native landscaping to accomplish Type III landscaping along all property lines and public rights-of-way and access easements. Along South 336th Street, landscaping shall be 50 feet in width consisting of 25 feet of a combination of Existing Native and Type III landscaping and 25 feet of Type IV landscaping. Along all other property lines associated with that portion of the Property containing the church, landscaping shall be 15 feet in width consisting of 10 feet of a combination of Existing Native and Type III landscaping and 5 feet of Type IV landscaping. Wetlands and wetland buffers which are vegetated in accordance with a City approved wetland mitigation plan and landscape plan and which are in excess of fifty (50) feet between the development and the property line shall be deemed to have satisfied the landscaping requirements of that property line.

9.1.3.2 Detention Pond Landscaping. Landscaping around detention ponds shall comply with the approved landscape plan and include at a minimum provision for dense bank cover and trees larger than the minimum required by FWCC to provide shade and reduce water temperature. For purposes of this Agreement, the term "larger" means deciduous trees larger than 3 inch caliper and evergreen trees taller than eight feet.

9.1.3.3 Habitat Retention. CFC shall provide a fifty (50) foot wide wildlife corridor from the west wetland to the east wetland with small animal culvert crossings under proposed roads and water ponding areas along the wildlife corridor, at a spacing of approximately 200 feet, to provide drinking areas for small animals.

9.1.4 Parking.

9.1.4.1 Setback. Parking shall be permitted within the required side and rear yards, but not within 10 feet of any property line associated with the school or within 15 feet of any property line associated with the church or within any required buffer.

9.1.4.2 Number of Stalls. CFC shall provide a minimum of 1,406 parking stalls and a maximum of 1,540 parking stalls.

9.1.4.3 Parking Dimensions. Maximum parking lot and stall dimensional requirements shall be equivalent to corresponding minimum FWCC requirements except as modified by the attached Exhibit E.

9.1.4.4 Overflow Parking/Special Events. Overflow parking shall be permitted only pursuant to a parking plan approved by the Director of Public Works. CFC shall develop and submit a plan for approval by the Director of Public Works prior to special events to manage overflow parking through an arrangement with an appropriate transit provider or local hosts for shared use of additional off-site parking spaces and shuttle transportation connecting the overflow parking areas and the site during special events or in the event of recurring overflow parking conditions. CFC shall be responsible for all costs associated with traffic control including, but not limited to, flaggers, police officers, signs, and shuttle transportation.

9.1.5 Size Limitation.

9.1.5.1 School. The school structure shall be limited to 101,526 square feet, including 81,323 square feet in Phase One and 20,203 square feet in Phase Two, as depicted in the attached Conceptual Floor Plan, Exhibit F. The day care shall be located in the main church/sanctuary/administration building and shall be limited to 33,000 square feet. Based on these maximum square footages, total enrollment of the school and daycare shall be limited to a maximum of 900 full-time students.

9.1.5.2 Sanctuary. Sanctuary occupancy shall conform to all applicable local, state and federal laws and regulations and shall not exceed 4,500 occupants.

9.1.5.3 College. The Dominion College shall be considered an accessory use to the church and as such shall primarily serve CFC students and staff and members of the CFC congregation. The Dominion College shall be limited to 23,000 square feet as depicted in the attached Conceptual Floor Plan, Exhibit F. Based on this square footage, enrollment shall be limited to a maximum of 225 students.

9.1.5.4 Recreation Areas. Exterior recreation and play areas shall be provided in a minimum amount of 27,026 square feet in the school yard, a minimum 100,000 square feet in the recreation/sports field, and 4,613 square feet in the church day care area. Such minimum areas shall be permanently maintained as recreation and play areas.

9.2 Operational Limitations. CFC operations shall be consistent with the schedule and restrictions listed below. Changes in the below schedule, which was provided by the applicant, shall be reviewed under FWCC 22-1680 to ensure that the project remains consistent with the review completed under SEPA and the FWCC. Minor modifications may be approved by the Director of Community Development Services, as specified in FWCC 22-1680.

9.2.1 Church Service Hours. Church services shall be limited to one weekday evening service (typically on Wednesdays) which shall not begin before 6:30 p.m. and Sunday church services shall be separated by at least one and one/half hours between services.

9.2.2 Dominion College Hours. Dominion College classes shall not be held on weekends or between the hours of noon and 6:30 p.m. weekdays.

9.2.3 Bible Study Hours. Bible Study classes shall be held only weekdays before noon.

9.2.4 School Hours. School classes shall be completed no later than 3:30 p.m. daily.

9.2.5 Holiday Services/Special Events. Holiday services and special events shall be scheduled consistent with the approved Traffic Management Plan (TMP) required by 9.4.12 and consistent with 9.1.4.4.

9.3 Construction Mitigation.

9.3.1 Erosion Sediment Control. CFC shall designate and provide an onsite Erosion Sediment Control (ESC) Supervisor approved by the Director of Public Works, who possesses a Construction Site Erosion and Sediment Control Certification by the Washington State Department of Transportation (WSDOT). This ESC Supervisor shall be available for the duration of the project. The qualifications and responsibilities of the ESC Supervisor are outlined in the 1998 King County Surface Water Design Manual (KCSWDM) and City of Federal Way Addendum. The Director of Public Works may further limit clearing and grading activities on the site based on recommendations from the ESC Supervisor and requirements of the KCSWDM.

9.3.2 Stormwater Pollution Prevention Plan. A construction Stormwater Pollution Prevention Plan (SWPPP) shall be provided by CFC and reviewed and approved by the Director of Public Works prior to issuance of any construction permits or authorizations. Construction phasing shall be included in this plan. CFC has proposed several BMP's which shall be captured in the SWPP plan including, but not limited to, confining refueling and equipment maintenance to a hard-surface staging area with spill containment features and a spill clean-up kit, and pipe slope drains used to convey storm water over steep slopes.

9.3.3 Clearing and Grading. Clearing and grading shall be allowed only pursuant to a phased construction plan approved by the Director of Public Works. Clearing and grading shall occur only between May 1 and September 30 unless otherwise approved by the Director of Public Works.

9.4 Traffic Mitigation. CFC shall perform, as part of Project construction and prior to issuance of certificate of occupancy unless otherwise noted, the following traffic mitigation as required and approved by the Director of Public Works.

9.4.1 CFC shall reconstruct 18th Avenue South from the existing berm to S 344th Street to a modified street section, consisting of 24 foot wide street with vertical curb and gutter, 5-foot sidewalks, and two additional street lights mounted on existing power poles, consistent with the attached Exhibit G-1. Traffic calming elements shall be installed, including 2 speed humps, 1 crosswalk, bulb outs at the intersection of 18th Avenue South and S 341st Street and 18th Avenue South and S 344th Street to narrow the throat width of 18th Avenue South to 20 feet, and street signage shall be installed to address no through truck traffic, children playing, speed humps, crosswalk and speed limit.

9.4.2 CFC shall improve S 344th Street from 16th Avenue S to 18th Avenue S consistent with the attached Exhibit G-2. Construction shall consist of Type R Street. The north side shall consist of a 40 foot wide street with curb and gutters, 4 foot planter strip with street trees, 6 foot sidewalk, and street lights. The improvements shall be tied into the existing improvements to the west end of S 344th Street to the east side of the intersection of S 344th Street and 16th Avenue S. On the south side, only curb and gutter shall be required. CFC shall construct improvements within existing right-of-way.

9.4.3 CFC shall improve S 344th Street through the intersection of 16th Avenue S and shall signalize the intersection of S 344th/16th Ave S consistent with the attached Exhibit G-3. CFC shall construct improvements within existing right-of-way.

9.4.4 CFC shall construct street improvements consistent with the attached Exhibit G-4 to signalize the intersection of SR 99 and S 344th Street and provide a westbound-to-southbound left-turn lane within existing right-of-way. If delays beyond the control of CFC and the City prevent the completion of these improvements by the time of issuance of certificate of occupancy, CFC may obtain a certificate of occupancy subject to the Public Works Director requiring temporary traffic control measures for up to one hour following the end of each Sunday service until such time that the traffic signal is operational.

9.4.5 CFC shall perform a sight distance study, propose a conceptual intersection plan for the intersection of 20th Avenue S at S 341st Street to be approved by the Director of Public Works, and construct improvements as determined by the Director of Public Works.

9.4.6 CFC shall construct street improvements along S 336th Street consistent with the attached Exhibits G-5 and G-6. The improvements shall be consistent with Type M street between SR 99 and 20th Avenue S, consisting of an 18-foot half-street with curbs and gutter, 6-foot planter strip with street trees, 8-foot sidewalk, street lights, underground utilities, and 3-foot utility strip. Improvements will be consistent with Type K street between 20th Avenue S and I-5, consisting of a 22-foot half-street with curb and gutter, 6-foot planter strip with street trees, 8 foot sidewalk, street lights, underground utilities, and 3-foot utility strip. A continuous two-way left-turn lane shall be provided between SR 99 and Forest Lane Town Homes frontage. Curbs and gutter, planter strip, and sidewalk shall also be provided on the north side between South Garden Court condominiums and Forest Lane Town Homes to tie into the existing improvements. An eastbound right-turn lane shall be provided on S 336th Street at 20th Avenue S, consisting of a 100-foot storage length and 50-foot taper length. These improvements may be modified by the Director of Public Works to minimize impacts to wetlands or minimize right-of-way acquisition.

9.4.7 CFC shall improve 20th Avenue S for a distance of 225 feet (175 feet of storage and 50 foot taper) to the North of the intersection of S 336th Street and signalize the intersection consistent with the attached Exhibit G-7.

9.4.8 CFC shall construct an eastbound right turn lane from S. 336th Street to 20th Avenue S.

9.4.9 CFC shall construct traffic calming elements on 20th Avenue S from S 336th Street to S 330th Street, including traffic circles at S 330th Street and S 332nd Street and an island diverter at S 336th Street to prevent northbound and southbound through movements, and construct a sidewalk on the east side of 20th Avenue S from S 336th

Street to tie in to the existing sidewalk, consistent with the attached Exhibits G-7 and G-8. CFC shall construct improvements within existing right-of-way.

9.4.10 CFC shall provide two transit shelters, shelter footings, litter receptacle pads, landing pads and benches, one located on 20th Avenue S in the existing location north of S 336th Street and one located on S 336th Street as determined by City staff with input from King County Metro and Pierce Transit.

9.4.11 Upon a one time request of the Director of Public Works, CFC shall develop and implement Sunday peak hour timing plans, based on turning movement counts for signal timing plans collected by CFC for the intersections of 20th Avenue S and S 336th Street, SR 99 and S 324th Street, SR 99 and S 330th Street, SR 99 and S 336th Street, SR 99 and S 340th Street, 16th Avenue S and S 344th Street, and SR 161 and S 348th Street.

9.4.12 CFC shall implement a Traffic Management Plan (TMP) for the Project as approved by the Director of Public Works.

9.4.13 CFC shall pay to the City Three Hundred Fifty Thousand and No/100 Dollars ($350,000.00) to expand the City's existing project at the intersection of S 348th Street and SR 161 to provide for the construction of a second northbound right-turn lane with 550 feet of storage. Payment shall be made one year after receipt of the Certificate of Occupancy for Phase One of the Project or upon award of the bid to construct the turn lane whichever shall occur first.

9.4.14 CFC shall pay to King County its pro rata share contribution to the King County Transportation Improvement Plan (TIP) project at South 320th Street and Military Road in the amount of Six Hundred Forty-Seven and No/100 Dollars ($647.00).

Except as provided above, CFC shall use its best efforts to acquire any and all right-of-way necessary to complete the improvements described in this Agreement. If, through no fault of CFC, CFC is unable to acquire right-of-way necessary to complete the improvements described, the City and CFC agree to meet and confer on possible alternatives. The Director of Public Works may modify the required improvements as necessary provided impacts are mitigated.

9.5 Payment of Pro Rata Share. CFC shall pay, prior to issuance of the certificate of occupancy for Phase One of its construction as defined in this Agreement, its pro rata share contribution to impacted City Transportation Improvement Plan (TIP) projects, identified and calculated below:

- S 348th Street: 9th Ave S – SR 99: $60,500
- S 356th St: 1st Ave S – SR 99: $50,200
- S 348th St @ 1st Ave S: $13,100
- S 336th St @ 1st Way S: $3000
- 12th Ave SW / SW 344th St Extension: SW Campus Dr – 21st Ave SW: $38,700
- 1st Ave S: S 320th St – S 330th St: $7600
- 21st Ave SW Extension: SW 356th St – 22nd Ave SW: $2800
- SR 18 @ SR 161: $24,800
- S 336th St @ 9th Ave S: $1100

- S 320th St @ I-5: $34,100

Total $235,900

9.6 Surface Water Mitigation. The following storm water mitigation, as required and approved by the Director of Public Works, shall be designed by CFC prior to issuance of construction permits or authorizations and constructed by CFC prior to issuance of certificate of occupancy.

9.6.1 CFC shall design and construct the east basin storm water detention pond to meet Level 2 flow control standards.

9.6.2 Consistent with the Process IV Hearing Examiner Decision, CFC shall design and construct all runoff from the Sanctuary roof for the 2 year storm event to be collected and dispersed through percolation trenches to maintain wetland hydrology in the westerly wetland.

9.6.3 CFC shall design and construct all surface water treatment facilities from the East and West 1 subcatchments to include the use of Stormwater Management® filter vault systems which meet or exceed Resource Stream Protection standards.

9.6.4 CFC shall design and construct storm water discharge facilities entering into wetlands or buffers as percolation or infiltration trenches and discharges to wetland buffers in a dispersed manner consistent with the Process IV Hearing Examiner Decision and as approved by the Director of Public Works.

9.6.5 CFC shall provide, prior to issuance of Building Permit, an Integrated Pest Management Plan as described in the Ecology Stormwater Manual (Ecology 2001). This source control BMP shall outline control of fertilizer and pesticide application, soil erosion, and site debris, and include the use of pesticides/herbicides only as a last resort.

9.7 Wetland Mitigation. CFC shall comply with all conditions contained in the Process IV Hearing Examiner Decision dated April 23, 2004 and attached hereto as Exhibit H.

10. Other Project Review Processes and Minor Modifications.

10.1 Other Project Review Processes. The Project will be subject to building permit review and other applicable review processes. The final design of the buildings and other improvements, precise location of building footprints, location of utilities, determination of access points, and other design issues will be determined during that process and must be consistent with the Agreement.

10.2 Modifications. Minor modifications to the Plan may be approved by the Director of Community Development Services and processed in accordance with FWCC 22-1680. Factors to be considered by the Director of Community Development Services when determining if a modification to the Plan is minor include but are not limited to the following.:

a. Activity changes (excluding change of use of the principal use or expansion of accessory uses as specified herein) or increases in square footage of gross floor area as defined by

FWCC section 22-1 that do not result in significant additional or modified trip generation or distribution.

b. Changes in the location or number of access points that do not impact traffic safety or modify trip distribution.
c. Requests for modification of landscaping pursuant to FWCC 22-1570.
d. Removal of significant trees in conjunction with other actions deemed minor.
e. Addition of fewer than twenty parking stalls outside of areas containing "significant trees" as defined by FWCC.
f. Exterior changes that do not significantly add to or alter approved architectural design.
g. Actions that do not result in impacts to the environment pursuant to the State Environmental Policy Act requiring issuance of a mitigated threshold determination of nonsignificance.
h. Actions that do not require review by the hearing examiner.

A modification is not minor if the Director of Community Development Services determines that there will be substantial changes in the impacts on the neighborhood or the city as a result of the change. Modifications that are not minor modifications are major modifications and shall require City Council approval pursuant to FWCC 22-1680.

11. Waiver and Mutual Release of Claims of Invalidity. The City and CFC acknowledge and represent that the terms of this Agreement have been jointly negotiated and that each party enters into this Agreement voluntarily. Further, CFC and the City agree that this Agreement is authorized under law and each party waives any claim that the Agreement is invalid or illegal. The agreements and representations in this Section are material to this Agreement and are being relied upon by both parties.

12. General Provisions.

12.1 Binding on Successors.

12.1.1 The Agreement shall bind and inure to the benefit of the Parties and their successors in interest, and may be assigned to any successor in interest to the Project property.

12.1.2 This Agreement is intended to protect the value of, and facilitate the use and development of, the Property and to protect the public health, safety, and welfare of the City. Therefore, the covenants set forth herein shall be construed to and do touch and concern the Property and the benefits and burdens inuring to CFC and to the City from this Agreement shall run with the land and shall be binding upon CFC, its heirs, successors, and assigns, and upon the City.

12.2 Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Washington. Venue for any action to enforce the terms of this Agreement shall be in King County Superior Court.

12.3 Severability. The provisions of this Agreement are separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section, or portion or the invalidity of the application thereof to any person or circumstance, shall not affect the validity of the remainder of this Agreement, or the validity of its application to other persons or circumstances.

12.4 Authority. The City and CFC each represents and warrants to the other that it has the respective power and authority, and is duly authorized, to execute and deliver this Agreement and that the persons signing on its behalf are duly authorized to do so. CFC further represents and warrants that it is the fee owner of the Property, that it has authority to agree to the covenants and provisions contained herein, and that there are no other persons, entities, or parties with any fee interest in the Property.

12.5 Amendment. This Agreement may be modified only by written instrument authorized by the City Council and duly executed by the City Manager and CFC, and their successors and assigns consistent with FWCC 22-1679; provided, however, notwithstanding the provisions of this Agreement to the contrary, the City of Federal Way may, without the agreement of CFC, adopt and impose upon the Property restrictions and development regulations different than those set forth herein, if required by a serious threat to public health and safety. Moreover, as provided in Section 5 of the Agreement, five years after the date of the execution of the Agreement, the City may elect, without the agreement of CFC, to apply development regulations in effect at that time to any development within the scope of the Agreement that has not been completed at that time.

12.6 Exhibits. All exhibits attached hereto are incorporated herein by this reference as if fully set forth herein.

12.7 Headings. The headings in this Agreement are inserted for reference only and shall not be construed to expand, limit or otherwise modify the terms and conditions of this Agreement.

12.8 Integration; Scope of Agreement. This Agreement and its exhibits represent the entire agreement of the Parties with respect to the subject matter hereof. There are no other agreements, oral or written, except as expressly set forth herein. This Agreement does not set forth all conditions applicable to the Project to the extent that additional conditions may be imposed as part of any permit issued by the City, as required by the Federal Way City Code as determined by the discretion of the Directors of the Departments of Community Development Services and/or Public Works.

12.9 Enforcement. Subject to the notice and cure provisions of this section, in the event either party fails to satisfy any of its obligations under this Agreement, the other party shall have the right to enforce this Agreement by an action at law for damages or in equity for specific performance. The Parties acknowledge that damages are not an adequate remedy for breach by either party. In addition to the remedies set forth herein, in the event of a breach of this Agreement by CFC, the City may enforce this Agreement under the enforcement provisions of the Federal Way City Code in effect at the time of the breach and/or it may terminate this Agreement and take action to amend the Comprehensive Plan and zoning designation of the Property. No party shall be in default under this Agreement unless it has failed to perform its duties or obligations under this Agreement for a period of thirty (30) days after written notice of default from the other party. A notice of default shall specify the nature of the alleged default and the manner in which the default may be cured. If the nature of the default is such that it cannot be reasonably cured within thirty (30) days, then a party shall not be deemed in default if the party commences a cure within thirty (30) days and, thereafter, diligently pursues completion of the cure.

12.10 Attorneys Fees. In any action brought to enforce this Agreement or for damages resulting from a breach thereof, the prevailing party as determined by the court, shall be entitled to recover its reasonable attorneys' fees.

12.11 Police Power. Nothing in this Agreement shall be construed to diminish, restrict or limit the police powers of the City granted by the Washington State Constitution or by general law. This Agreement is an exercise of the City's police powers, the authority granted under RCW 36.70B.170-.210, and other laws.

12.12 Recording; Assignment. The Agreement shall be recorded with the Real Property Records Division of the King County Records and Elections Department.

12.13 No Third Parties. The Agreement is made and entered into for the benefit of the parties hereto and their successors and assigns. No other person or entity is an intended third party beneficiary. No other person or entity shall have any right of action under this Agreement.

IN WITNESS WHEREOF the parties have hereunto placed their hand and seals on the day and year indicated.

CITY OF FEDERAL WAY,
a Washington municipal corporation

BY: ______________________________
David H. Moseley, City Manager

Date: __________________________

CHRISTIAN FAITH CENTER,
a Washington nonprofit corporation

BY: ______________________________
Casey Treat, President

Date: __________________________

ATTEST: This ____ day of ________________, 2004.

____
N. Christine Green, CMC
Federal Way City Clerk

Approved as to Form
for City of Federal Way:

____
City Attorney, Patricia A. Richardson

Approved as to Form
for Christian Faith Center:

____
Brian Lawler
Lawler Burroughs & Baker, PC

STATE OF WASHINGTON)
)ss.
COUNTY OF KING)

On this day, personally appeared before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, Casey Treat to me known to be the President of CHRISTIAN FAITH CENTER, a Washington non-profit corporation, the corporation that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she is authorized to execute said instrument on behalf of said corporation.

Given under my hand and official seal this _____ day of ___________, 2004.

____
(notary signature)

____
(typed/printed name of notary)
Notary Public in and for the State
of Washington.
My commission expires:___________

K:\CFC\documents\cfcdevagr072004

EXHIBIT A

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

LEGAL DESCRIPTIONS OF PROPERTY

PER CHICAGO TITLE CO. ORDER #553764

PARCELS 1-6,8-9,11,12-13 & TAX LOT #59 IN THE NORTH 1/2 OF THE NW 1/4 OF SEC. 21, T21N, R4E, W.M., KING COUNTY, WASHINGTON

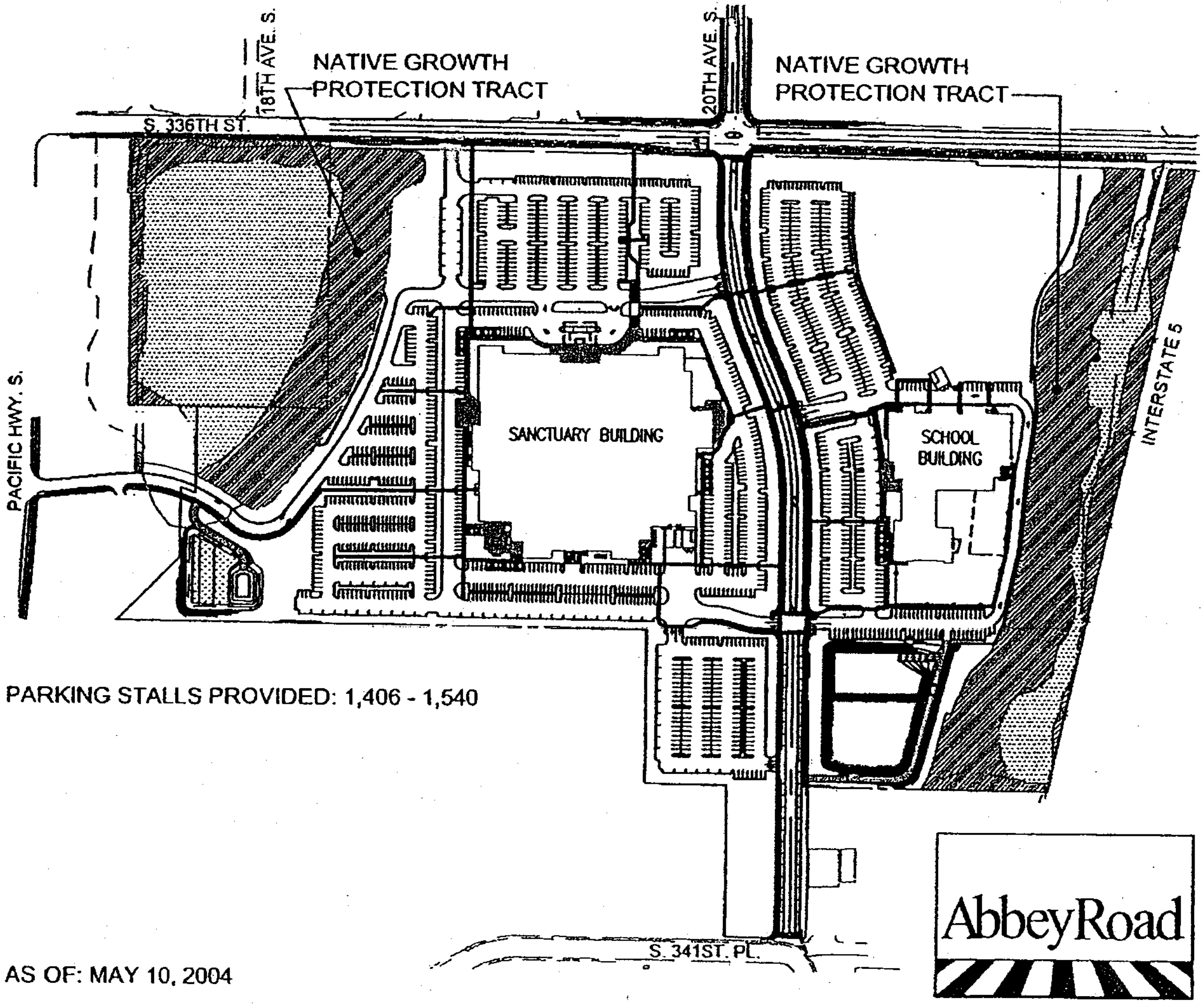
TAX LOT #59
PER STATUTORY WARRANTY DEED
REC. #9706091592

THE NORTHEAST QUARTER OF THE WEST HALF OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 21, TOWNSHIP 21 NORTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON; EXCEPT THE SOUTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR SOUTH 341 ST. PLACE BY INSTRUMENT RECORDED UNDER NUMBER 8410170757, SAID INSTRUMENT BEING A RE-RECORD OF INSTRUMENT RECORDED UNDER RECORDING NUMBER 8111020670.

EXHIBIT B

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CHRISTIAN FAITH CENTER
DEVELOPMENT PLAN


18TH AVE. S.
NATIVE GROWTH PROTECTION TRACT
20TH AVE. S.
NATIVE GROWTH PROTECTION TRACT
S. 336TH ST.
PACIFIC HWY. S.
SANCTUARY BUILDING
SCHOOL BUILDING
INTERSTATE 5
S. 341ST. PL.
AbbeyRoad

PARKING STALLS PROVIDED: 1,406 - 1,540

AS OF: MAY 10, 2004

EXHIBIT C

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

LIST OF PERMITTED ACCESSORY USES

Christian Faith Center - Chart of Uses

SANCTUARY FIRST FLOOR			SF
Sanctuary/School Auditorium (Includes Stage) 4,500 Seats			42,586.43
Multi-purpose rooms			8,817.94
Bookstore with Café			3,702.16
Youth Church (Multi-purpose rooms/chapel)			14,095.82
Children's Church (Chapels, classrooms)	33,054	=	15,489.99
Daycare		=	17,563.60
Music Area - Choir Room (Room behind stage)			1,772.37
Other Areas (Storage facilities, mechanical rooms, computer/phone room, TV/audio department, baptismal, kitchen, distribution center, hallways, facilities offices, wedding chapel, meeting room, bathrooms, etc.)			60,292.97
Dominion College (Classrooms, offices)			2,581.72
	1st Floor Sub-total		166,903.00
SANCTUARY 2nd FLOOR			**SF**
Dominion College (Future multi-purpose rooms, classrooms, library and staff offices)			21,062.82
Administrative Offices			18,288.96
Other Areas (Storage facilities, Hallways, Bathrooms, etc.)			12,245.22
	2nd Floor Sub-total		51,597.00
	Grand Total		218,500.00
CHRISTIAN FAITH SCHOOL			**SF**
Christian Faith School (Private School) 900 Students			101,526.00
	Sub-total		101,526.00
	Total		101,526.00

EXHIBIT D

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

SETTLEMENT AGREEMENT

SETTLEMENT AGREEMENT

THIS AGREEMENT ("Agreement") made this 5th day of February, 1996, by and between the CITY OF FEDERAL WAY, a municipal corporation, hereinafter referred to as "CITY", and FEDERAL WAY INDUSTRIAL PARK, INC., a Washington corporation, hereinafter referred to as "FWIP".

WHEREAS, CITY commenced a Petition for Condemnation in the King County Superior Court under cause #95-2-19577-6; and

WHEREAS, the parties hereto have reached an agreement settling all claims in that condemnation action;

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The CITY OF FEDERAL WAY shall be granted an irrevocable, exclusive and permanent easement in the form attached hereto as Exhibit "I" and incorporated herein by this reference ("Easement") granting to the City the free and uninterrupted use over, across and through certain real property ("Property") located in Federal Way, King County, Washington and legally described in Exhibit "A" to the Easement. The City's rights shall be exercised upon that portion of the Property legally described in Exhibit "B" to the Easement ("Easement Area.")

2. In consideration of the grant of the Easement by FWIP to the CITY and upon execution of this Agreement and satisfaction of the contingencies set forth in Paragraph 17, the CITY shall pay to FWIP the sum of Five Thousand and no/100 Dollars ($5,000.00) simultaneously with the recording of the Easement.

COPY OF ORIGINAL

Exhibit "II", attached hereto, and by this reference fully incorporated ("Wetland Buffer Area"). The Wetland Buffer Area shall be applicable to all future developments on the Property.

5. FWIP shall be allowed by the CITY to handle storm water retention/detention for any project on the Property, by constructing, in compliance with then-applicable codes (which as of this date are found in the King County Surface Water Design Manual) and at its expense, such conveyance systems as are reasonably necessary to provide for direct gravity flow drainage of storm water from the Property, to the storm water facility which the CITY is constructing on the Easement Area, so as to eliminate the need for storm water retention/detention on those portions of the Property which naturally drain to the Easement Area. FWIP'S right to allow such drainage shall be limited to waters which currently naturally drain to the Easement Area and shall be limited to the initial development of the Property and shall not be extended to any redevelopment of the Property. "Initial development" shall mean the initial development of each phase of all of the Property.

6. The CITY agrees that the Easement Area may, at the option of FWIP, be included in any calculation of open space required for the development of the Property. The Easement Area may, at the option of FWIP, also be included in computing maximum lot coverage for development of the Property. Nothing herein shall relieve FWIP from complying with the City's landscape or other requirements for development.

7. The CITY shall pay all costs related to obtaining approval for and developing the Easement Area, as a storm water

request shall be reasonable in comparison to other similar proposals, such that the request is not used to circumvent the spirit of this provision.

11. CITY staff will support a proposal through lot line imination to combine lot 2 and lot 3 of the short plat recorded nder King County Auditor #8110300869 so as to be considered as one 1) lot for development purposes.

12. CITY staff will support an application by FWIP to extend the parking lot improvements on lot 4 of the short plat recorded under King County Auditor #8110300869 into the Wetland Buffer Area up to the western toe of the slope of the berm forming the western boundary of the retention/detention facility, provided, that appropriate mitigation, determined pursuant to City codes, such as planting on the edge of the berm, is provided by FWIP. To the extent that the City staff requests mitigation for the loss of Wetland Buffer, said request shall be reasonable in comparison to other similar proposals, such that the request is not used to circumvent the spirit of this provision.

13. CITY staff will support a variance, pursuant to City codes, from the required lot size for lot 4 of the short plat recorded under King County Auditor #8110300869 to allow development of building improvements on said lot due to the limitations on the ability to combine lot 4 with other lots of the short plat.

14. CITY staff will support parking lot improvements in the portion of the Wetland Buffer Area south of the roadway of lot 2 of the short plat recorded under Auditor #8110300869 with appropriate mitigation costs, pursuant to City codes, to be provided by FWIP.

17. The obligations under this Agreement are conditioned upon and subject to final approval of this Agreement by the City Council of Federal Way.

18. This Agreement shall constitute the entire agreement between these parties. Any prior understanding or representation of any kind preceding the date of this Agreement shall not be binding on either party except to the extent incorporated in this document.

19. It is agreed that this Agreement will be governed by, construed and enforced in accordance with the Laws of the State of Washington.

20. Any modification of this Agreement or additional obligation assumed by either party in connection with this Agreement shall be binding only if evidenced by a writing signed by each party or an authorized representative of each party.

21. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original, but all of which together shall constitute but one and the same instrument.

22. Except as otherwise expressly set forth in this Agreement, the rights and obligations of the parties shall be binding upon and inure to the benefit of their respective successors in interest and assigns.

23. In the event either of the parties defaults on the performance of any terms of this Agreement or either party places the enforcement of this Agreement in the hands of an attorney, or files a lawsuit, each party shall pay all its own attorney's fees,

INC., a Washington corporation, who executed the foregoing ument, and acknowledged the said instrument to be the free and ntary act and deed of said corporation, for the uses and oses therein mentioned, and on oath stated that he was horized to execute the said instrument and that the seal affixed the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

EILEEN ROBINSON
1-29-98

Eileen Robinson

NOTARY PUBLIC in and for the State of Washington, residing at Federal Way.
My appointment expires on 1-29-98.

STATE OF WASHINGTON)
) ss.
COUNTY OF ~~PIERCE~~ KING)

On this 23rd day of February, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Kenneth E. Nyberg to me known to be the City Manager, ~~respectively~~ of the CITY OF FEDERAL WAY, a municipal corporation, who executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

EILEEN ROBINSON
1-29-98

Eileen Robinson

NOTARY PUBLIC in and for the State of Washington, residing at Federal Way.
My appointment expires on 1-29-98.

STATE OF WASHINGTON)
) ss.
COUNTY OF ~~PIERCE~~ King)

On this 8 day of FEBRUARY, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Helmut Wallenfels, to me known to be the Senior Legal Counsel of WEYERHAEUSER COMPANY, a Washington corporation, who executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the

FILED FOR RECORD AT REQUEST OF:

Federal Way Industrial Park
(Applicant's Name)

THIS SPACE RESERVED FOR
RECORDER'S USE:

MAIL TO:
CITY OF FEDERAL WAY
33530 1st Way South
FEDERAL WAY, WA 98003
ATTN: Londi K. Lindell

PERMANENT/EXCLUSIVE EASEMENT

For and in consideration of One Dollar ($1.00) and other valuable consideration, the receipt of which is hereby acknowledged, Federal Way Industrial Park ("FWIP"), a Washington corporation ("Grantor"), grants, conveys and warrants to the CITY OF FEDERAL WAY, a Washington municipal corporation ("Grantee") for the purposes hereinafter set forth a perpetual, exclusive and permanent easement under, across and over certain real property (the "Property") located in Federal Way, Washington, legally described as follows:

> Legal Description of Property attached hereto as Exhibit "A" and incorporated herein by this reference.

Except as may be otherwise set forth herein, Grantee's rights shall be exercised upon that portion of the Property ("Easement") legally described as follows:

> Legal Description of Easement attached hereto as Exhibit "B" and incorporated herein by this reference.

1. Purpose. Grantee and its agents, designees and/or assigns shall have the perpetual, exclusive and permanent right, without prior notice to Grantor, at such times as deemed necessary by Grantee, to enter upon the Property to inspect, design, construct, reconstruct, operate, maintain, repair, replace, remove, grade, excavate, and enlarge all surface water facilities including, but not limited to, underground facilities and/or systems upon and/or under the Easement, together with all appurtenances thereto, including without limitation, outlet structures, control structures, pipes, catchbasins, manholes, retention and detention facilities, ponds, biofiltration swales, water quality treatment facilities, vaults and ditches ("Facilities"). Following the initial construction of the Facilities, Grantee may from time to time construct such additional facilities or improvements as it may require. Grantee shall have the right to flood the Easement. In addition to the foregoing, Grantee shall have the right to engage in any and all activities as if Grantee owned fee title to the Easement.

2. Access. If reasonable access to the Easement is not otherwise available, Grantee shall have the right of access to the Easement over and across the Property to enable Grantee to exercise its rights hereunder.

3. Obstructions; Landscaping. Grantee may remove any and all vegetation, trees, or other obstructions within the Easement, and may level and grade the Easement.

4. Grantor's Use of Easement. Except as hereafter provided, this Easement shall be exclusive to Grantee; provided, however, Grantor reserves the right to use the Easement in order to comply with City code requirements for open space, greenbelt or maximum lot coverage; provided, however, that such right does not include complying with the City's landscape code or other code requirements. Grantor may install, at its expense and in compliance with all applicable laws, such facilities as are reasonably necessary to provide for direct discharge of storm water from the Property to the Easement after obtaining all necessary permits. Grantor's right to use the Easement for purposes of calculating open space, green belts or maximum lot coverage shall not entitle Grantor to enter upon or disturb the Easement for any reason. Except as necessary to provide drainage facilities from the Property to the Easement, Grantor shall not perform digging, tunnelling or other form of construction activity on the Property, which would disturb the compaction or unearth the Facilities on the Easement, or endanger the lateral support to the Facilities. Grantor shall not blast within fifteen (15) feet of the Easement. Provided further as to the area described as "The East 175.5 feet of the North 30 feet of tract X of King County Short Plat No. 281074 and the South 30 feet of the Easement area of Lot 3 of the Plat," this Easement shall be non-exclusive and Grantor or its successors or assigns may construct a road and connect to existing utilities in said area, if done in compliance with applicable codes.

5. Indemnification. Grantor agrees to waive any and all claims relating to any damage to the Easement, including those resulting from surface water flooding and further to indemnify and hold Grantee, its elected officials, officers, employees, agents, and volunteers harmless from any and all claims, demands, losses, actions and liabilities (including costs and all attorney fees) to or by any and all persons or entities, including, without limitation, their respective agents, licensees, or representatives, arising from, resulting from, or connected with Grantor or Grantor's agents', employees', or invitees' negligent actions.

6. Successors and Assigns. The rights and obligations of the parties shall inure to the benefit of and be binding upon their respective successors in interest, heirs and assigns; provided, however, that Grantor's right to discharge storm water to the Easement shall be limited to waters which currently naturally drain to the Easement and shall only apply to the initial development of the Property and not to any redevelopment of the Property. All such redevelopment will be required to comply with all applicable laws and codes. "Initial development" shall mean the initial development of each phase of all of the Property.

7. No Encumbrances. Grantor shall maintain the Easement free of all encumbrances and defects and is prohibited from recording or taking any action which results in the recording of any lien, encumbrance or other defect against the Easement.

DATED THIS ________ day of ____________________, 1996.

GRANTOR

FEDERAL WAY INDUSTRIAL PARK

By: ____________________________

Its: ____________________________

WEYERHAEUSER COMPANY

By: ____________________________
Helmut Wallenfels
Its: Senior Legal Counsel

GRANTEE

CITY OF FEDERAL WAY

By: ____________________________
Kenneth E. Nyberg
Its: City Manager

APPROVED AS TO FORM:

____
Londi K. Lindell, City Attorney

STATE OF WASHINGTON)
) ss.
COUNTY OF ____________)

On this _____ day of ____________________, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared ______________________________________, to me known to be the _________________ of FEDERAL WAY INDUSTRIAL PARK, INC., the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument and that the seal affixed, if any, is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

____

____
(typed/printed name of notary)
Notary Public in and for the State of Washington.
My commission expires: ________________________.

STATE OF WASHINGTON)
) ss.
COUNTY OF ____________)

On this _____ day of ____________________, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Kenneth E. Nyberg, to me known to be the City Manager of the City of Federal Way, a Washington municipal corporation, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

____

____
(typed/printed name of notary)
Notary Public in and for the State of Washington.
My commission expires: ________________________.

STATE OF WASHINGTON)
) ss.
COUNTY OF ____________)

On this _____ day of ____________________, 1996, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Helmut Wallenfels, to me known to be the Senior Legal Counsel of WEYERHAEUSER COMPANY, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument and that the seal affixed, if any, is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

____

____
(typed/printed name of notary)
Notary Public in and for the State of Washington.
My commission expires: ________________________.

EXHIBIT "A" TO
PERMANENT/EXCLUSIVE EASEMENT

PARCEL A:

Lot 3, King County Short Plat No. 281074, according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

PARCEL B:

Lot 4 of King County Short Plat No. 281074 according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

PARCEL C:

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89°13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 261.26 feet;
thence south 00°14'39" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00°14'39" west a distance of 546.02 feet;
thence south 89°13'33" east a distance of 399.45 feet;
thence north 00°14'39" east a distance of 546.02 feet to the said south right of way margin of South 336th Street;
thence north 89°13'33" west along said south right of way margin a distance of 399.44 feet to the TRUE POINT OF BEGINNING.

PARCEL D:

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:
Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89°13'33" seconds east along the north line of said northwest quarter of the northwest quarter a distance of 813.80 feet;
thence south 00°14'58" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00°14'58" west a distance of 670.67 feet;
thence north 89°16'45" west a distance of 153.10 feet;
thence north 00°14'39" east a distance of 670.81 feet to the said south right of way margin of South 336th Street;
thence south 89°13'33" east along said south right of way margin a distance of 153.10 feet to the TRUE POINT OF BEGINNING;
EXCEPT that portion deeded to King County for South 336th Street under Recording Number 8609030322.

LEGAL DESCRIPTIC
PROPOSED EASEMENT ACQUISITIONS ON
STRANICK-JOHNSON PARCEL NO. 212104-9084

That part of Lot 3, King County Short Plat No. 281074, according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

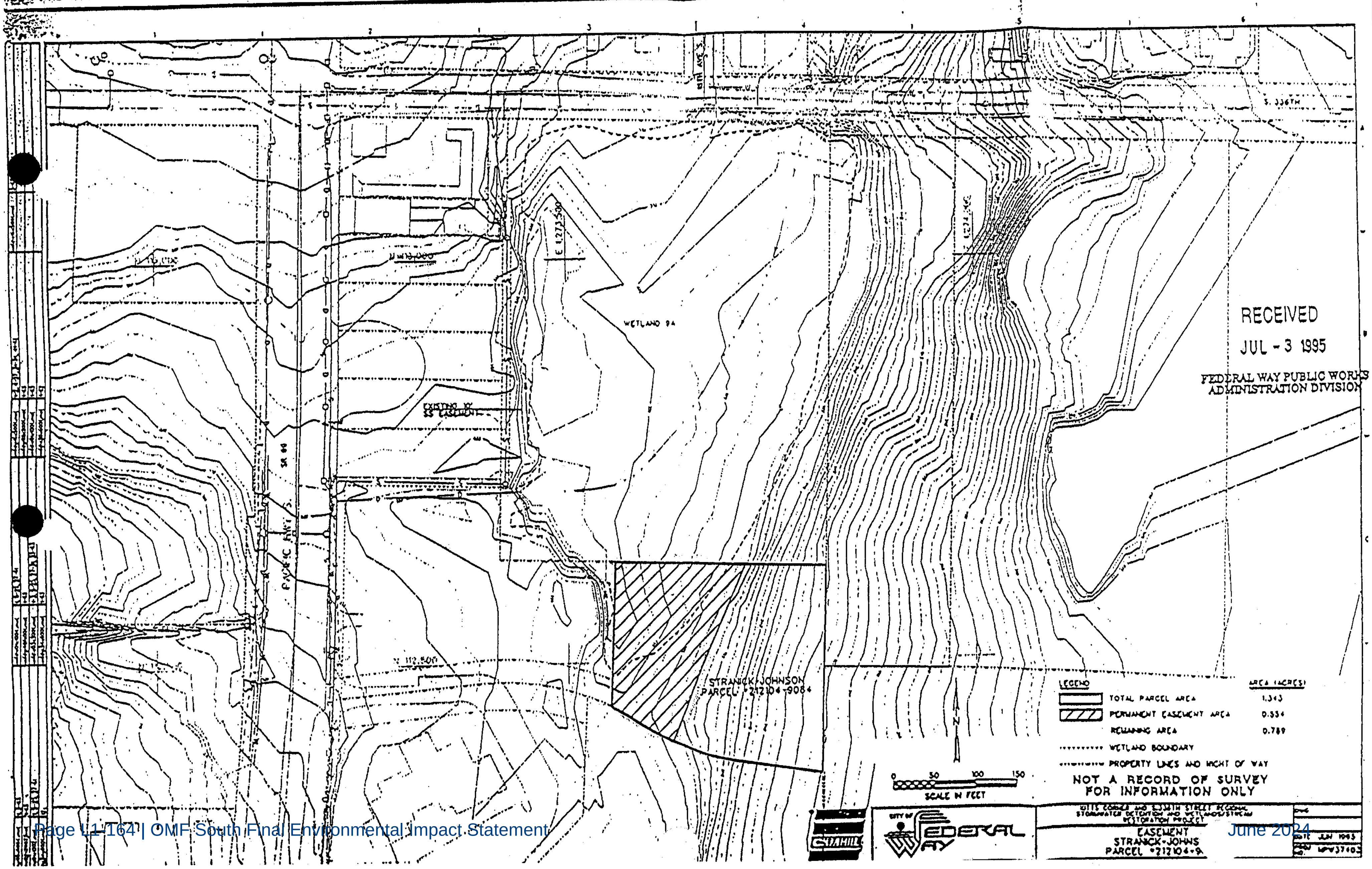
Being described as follows:

Beginning at the northwest corner of said Lot 3 and the TRUE POINT OF BEGINNING;
thence south 88° 15'52" east a distance of 162.06 feet;
thence south 23°35'30" west a distance of 231.61 feet to a point on a non-tangent curve having a radius of 300.00 feet;
thence along said curve to the right 32.63 feet through a central angle of 06° 13'56";
thence north 59°09'15" west a distance of 27.40 feet to the beginning of a curve having a radius of 300.00 feet;
thence along said curve to the left 25.27 feet through a central angle of 04°49'33";
thence north 01°44'08" east a distance of 175.99 feet to the TRUE POINT OF BEGINNING.

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

Pg. 2 of 8



18TH AVE S.
S. 336TH
WETLAND 94
E 1,273,500
N 113,000
EXISTING 10' SS EASEMENT
SR 99
PACIFIC HWY S.
N 112,500
STRANICK-JOHNSON
PARCEL #212104-9084
N
0
50
100
150
SCALE IN FEET
LEGEND
AREA (ACRES)
TOTAL PARCEL AREA
1.343
PERMANENT EASEMENT AREA
0.554
REMAINING AREA
0.789
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
NOT A RECORD OF SURVEY
FOR INFORMATION ONLY
CH2MHILL
CITY OF FEDERAL WAY
CITY CORNER AND S.336TH STREET REGIONAL STORMWATER DETENTION AND WETLANDS/STREAM RESTORATION PROJECT
EASEMENT
STRANICK-JOHNS
PARCEL #212104-9
DWG
DATE JUN 1995
DRAW NO. MPW37403

RECEIVED
JUL - 3 1995
FEDERAL WAY PUBLIC WORKS
ADMINISTRATION DIVISION

LEGAL DESCRIPTI[illegible]
PROPOSED EASEMENT ACQUISITIONS ON STRANICK-JOHNSON PARCEL NO. 212104-9026

That part of Lot 4 of King County Short Plat No. 281074 according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

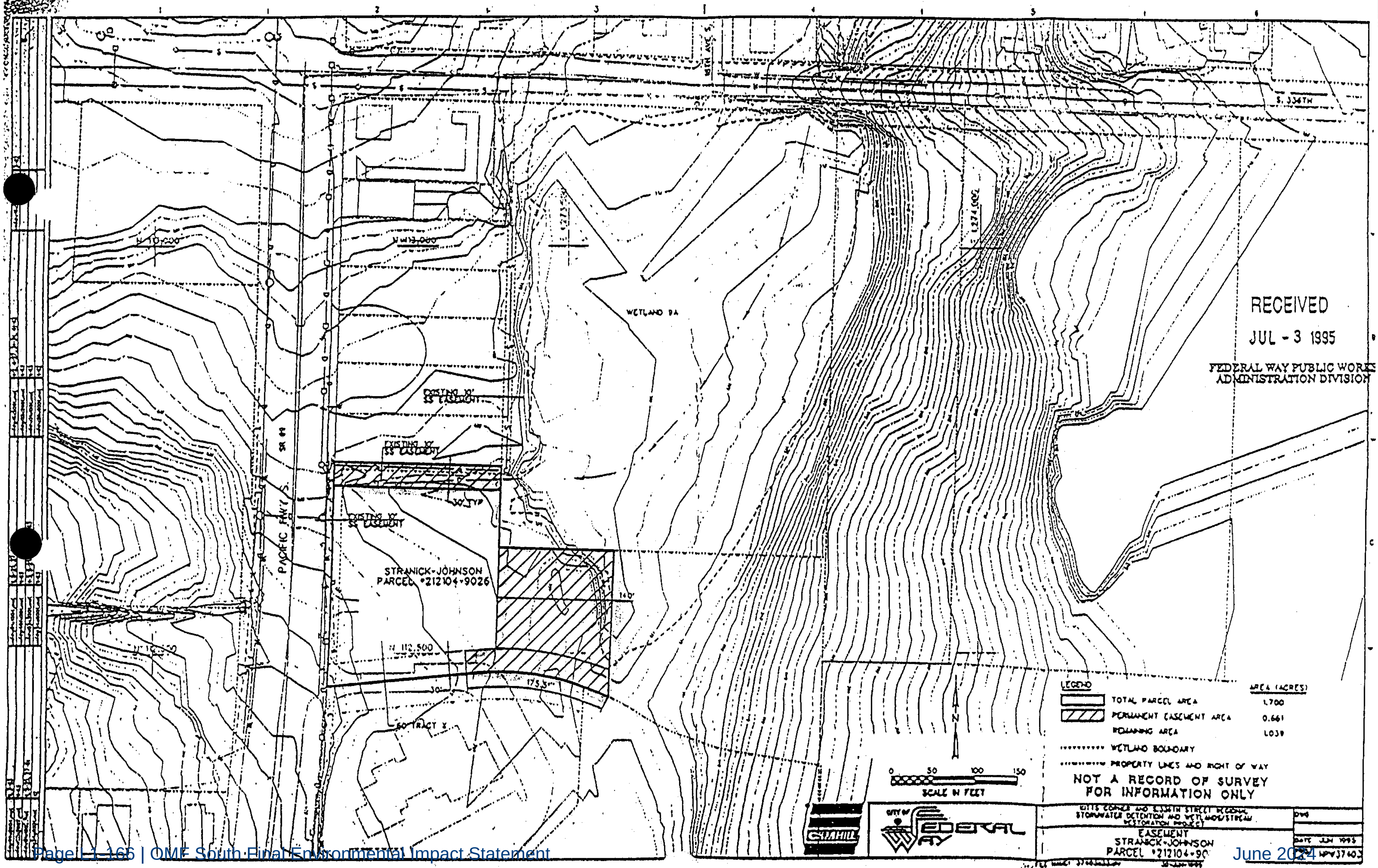
Being described as follows:

The North 30 feet of said Lot 4
Also
The East 140 feet of said Lot 4
Also
The East 175.50 feet of the North 30 feet of Tract X of said short plat No. 281074.

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

Pg. 4 of 8


S. 336TH
18TH AVE S.
WETLAND 9A
N 10,000
N 113,000
E 1,273,500
E 1,274,000
EXISTING 10' SS EASEMENT
EXISTING 10' SS EASEMENT
30' TYP
EXISTING 10' SS EASEMENT
SR 99
PACIFIC HWY S
STRANICK-JOHNSON
PARCEL #212104-9026
140'
N 112,500
N 112,250
175.5'
30'
60' TRACT X
N
LEGEND
TOTAL PARCEL AREA
PERMANENT EASEMENT AREA
REMAINING AREA
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
AREA (ACRES)
1.700
0.661
1.039
0
50
100
150
SCALE IN FEET
CH2MHILL
CITY OF FEDERAL WAY
KITTS CORNER AND S. 336TH STREET REGIONAL STORMWATER DETENTION AND WETLAND/STREAM RESTORATION PROJECT
EASEMENT
STRANICK-JOHNSON
PARCEL #212104-90
DWG
DATE JUN 1995
NPW37403

NOT A RECORD OF SURVEY
FOR INFORMATION ONLY

RECEIVED
JUL - 3 1995
FEDERAL WAY PUBLIC WORKS
ADMINISTRATION DIVISION

LEGAL DESCRIPTION
PROPOSED EASEMENT ACQUISITIONS ON STRANICK-JOHNSON PARCEL NO. 212104-9067

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89° 13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 813.80 feet;
thence south 00° 14'58" west a distance of 30.00 feet to the south right of way margin of South 336th Street;
thence north 89° 13'33" west along said south right of way margin a distance of 100.82 feet and the TRUE POINT OF BEGINNING;
thence south 00° 14'58" west a distance of 181.30 feet;
thence south 22° 37'48" west a distance of 137.29 feet;
thence north 00° 14'58" east to the south right of way margin a distance of 308.73 feet;
thence south 89° 13'33" east along said south right of way margin a distance of 52.29 feet to the TRUE POINT OF BEGINNING.;
EXCEPT that portion deeded to King County for South 336th Street under Recording Number 8609030322.

Being a portion of the following described property:

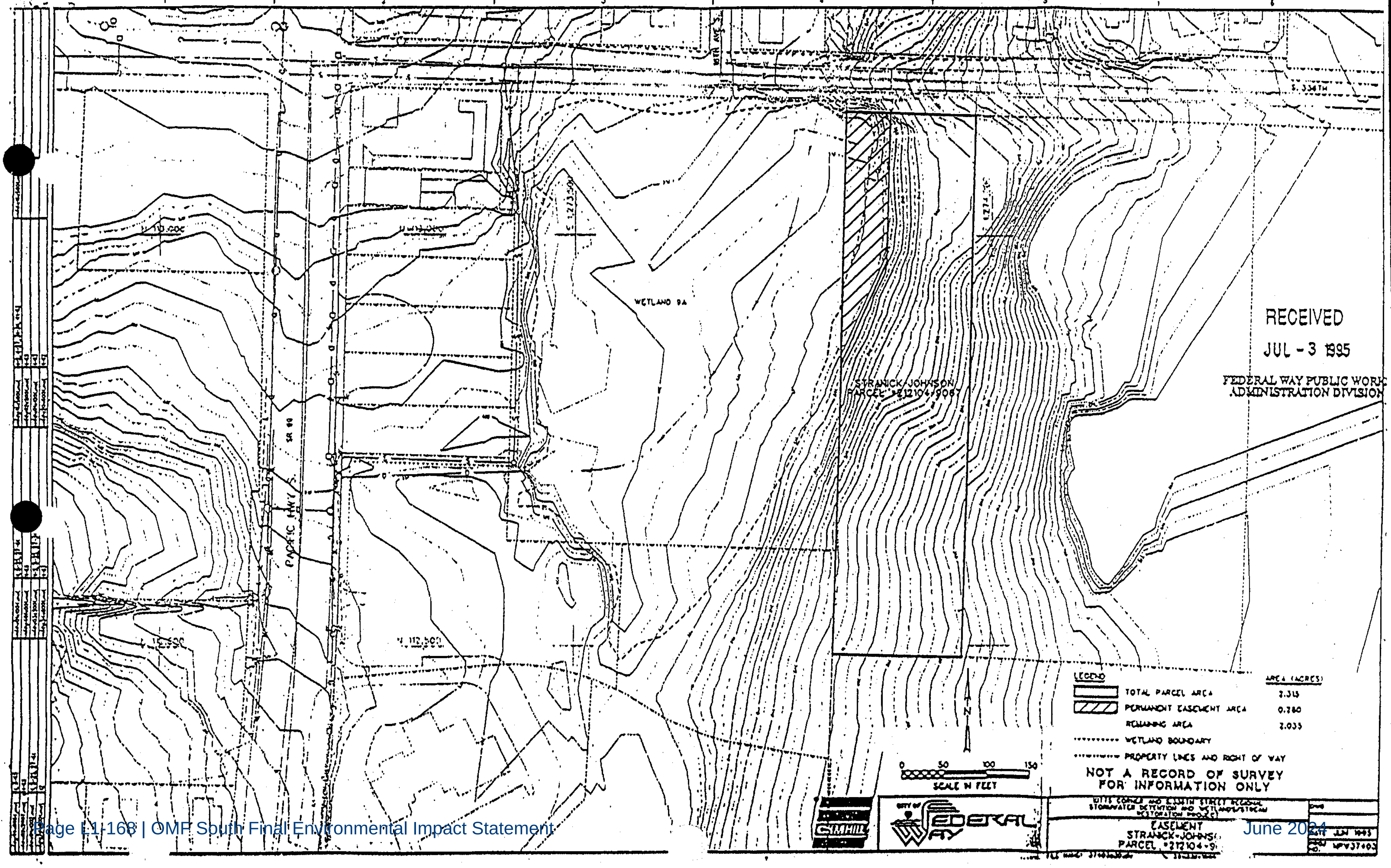
That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89° 13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 813.80 feet;
thence south 00° 14'58" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00° 14'58" west a distance of 670.67 feet;
thence north 89° 16'45" west a distance of 153.10 feet;
thence north 00° 14'39" east a distance of 670.81 feet to the said south right of way margin of South 336th Street;
thence south 89° 13'33" east along said south right of way margin a distance of 153.10 feet to the TRUE POINT OF BEGINNING;
EXCEPT that portion deeded to King County for South 336th Street under Recording Number 8609030322.

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

Pg. 6 of 8

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT


S. 336TH
16TH AVE S.
PACIFIC HWY S.
SR 99
WETLAND 9A
STRANICK-JOHNSON
PARCEL #212104-9067
N 113,000
N 112,500
N 110,000
N
0 50 100 150
SCALE IN FEET
LEGEND
AREA (ACRES)
TOTAL PARCEL AREA 2.315
PERMANENT EASEMENT AREA 0.280
REMAINING AREA 2.035
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
NOT A RECORD OF SURVEY
FOR INFORMATION ONLY
CH2MHILL
CITY OF FEDERAL WAY
KITTS CORNER AND S. 336TH STREET REGIONAL STORMWATER DETENTION AND WETLAND/STREAM RESTORATION PROJECT
EASEMENT
STRANICK-JOHNSON
PARCEL #212104-9
JUN 1995
NPV37403

RECEIVED
JUL - 3 1995
FEDERAL WAY PUBLIC WORKS
ADMINISTRATION DIVISION

LEGAL DESCRIPTI
PROPOSED EASEMENT ACQUISITIONS ON
STRANICK-JOHNSON PARCEL NO. 212104-9069

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89° 13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 261.26 feet;
thence south 00° 14'39" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00° 14'39" west a distance of 546.02 feet;
thence south 89° 13'33" east a distance of 302.06 feet;
thence north 22° 37'48" east a distance of 255.66;
thence north 00° 14'39" east a distance of 308.73 feet to the said south right of way margin of South 336th Street;
thence north 89° 13'33" west along said south right of way margin a distance of 399.44 feet to the TRUE POINT OF BEGINNING.

Being a portion of the following described property:

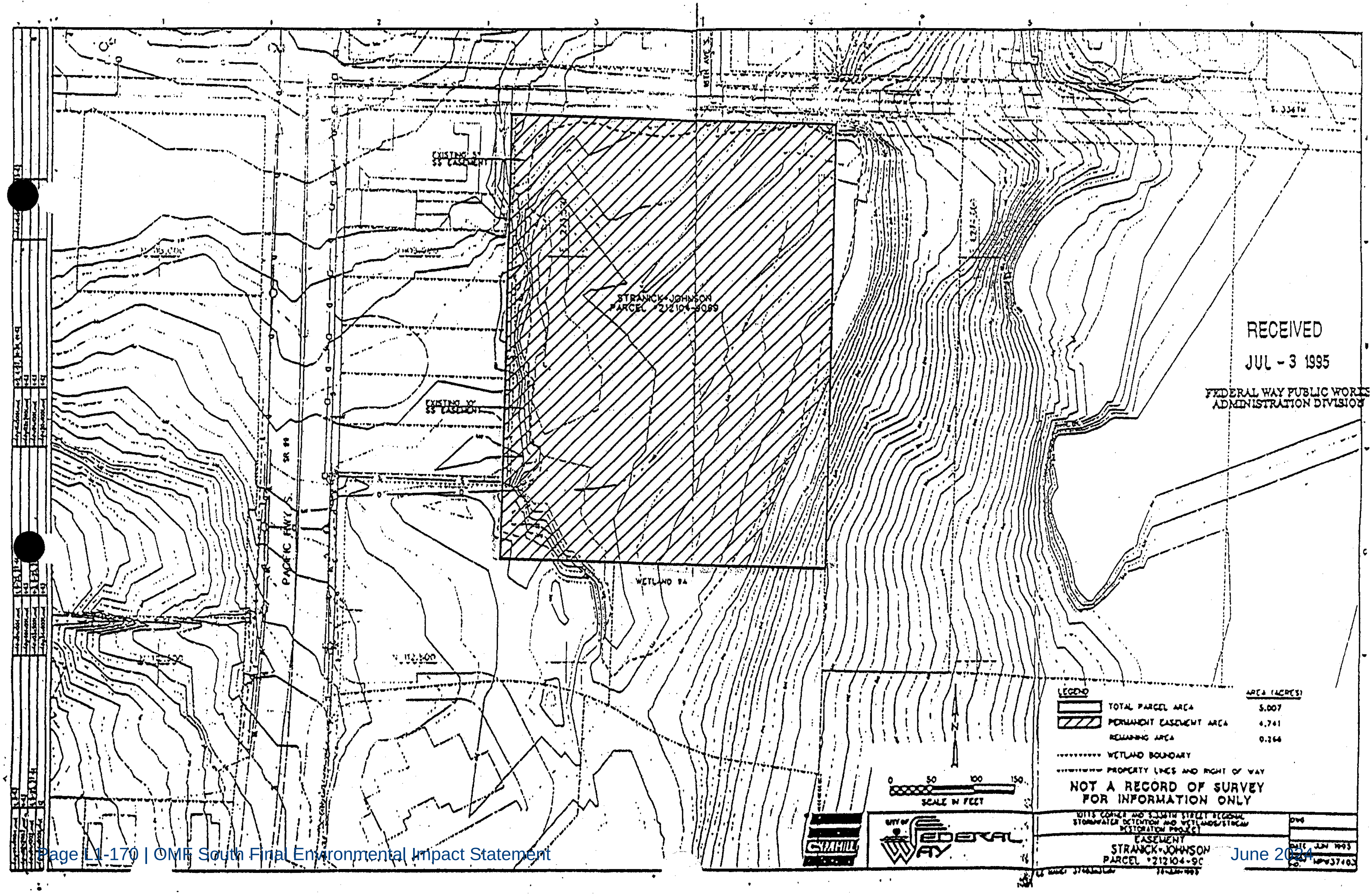
That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89° 13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 261.26 feet;
thence south 00° 14'39" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00° 14'39" west a distance of 546.02 feet;
thence south 89° 13'33" east a distance of 399.45 feet;
thence north 00° 14'39" east a distance of 546.02 feet to the said south right of way margin of South 336th Street;
thence north 89° 13'33" west along said south right of way margin a distance of 399.44 feet to the TRUE POINT OF BEGINNING.

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

EXHIBIT "B" TO
PERMANENT/EXCLUSIVE EASEMENT

Pg. 8 of 8


EXISTING 5' SS EASEMENT
EXISTING 10' SS EASEMENT
STRANICK-JOHNSON PARCEL #212104-9059
PACIFIC HWY S.
SR 99
WETLAND 8A
S. 336TH
LEGEND
AREA (ACRES)
TOTAL PARCEL AREA 5.007
PERMANENT EASEMENT AREA 4.741
REMAINING AREA 0.266
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
NOT A RECORD OF SURVEY
FOR INFORMATION ONLY
0 50 100 150
SCALE IN FEET
N
CH2M HILL
CITY OF FEDERAL WAY
KITTS CORNER AND S. 336TH STREET REGIONAL STORMWATER DETENTION AND WETLANDS/STREAM RESTORATION PROJECT
EASEMENT
STRANICK-JOHNSON
PARCEL #212104-90
DATE JUN 1995

RECEIVED
JUL - 3 1995
FEDERAL WAY PUBLIC WORKS
ADMINISTRATION DIVISION

LEGAL DESCRIPTION
WETLAND AND SETBACK
STRANICK-JOHNSON PARCEL NO. 212104-9084

That part of Lot 3, King County Short Plat No. 281074, according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

Being described as follows:

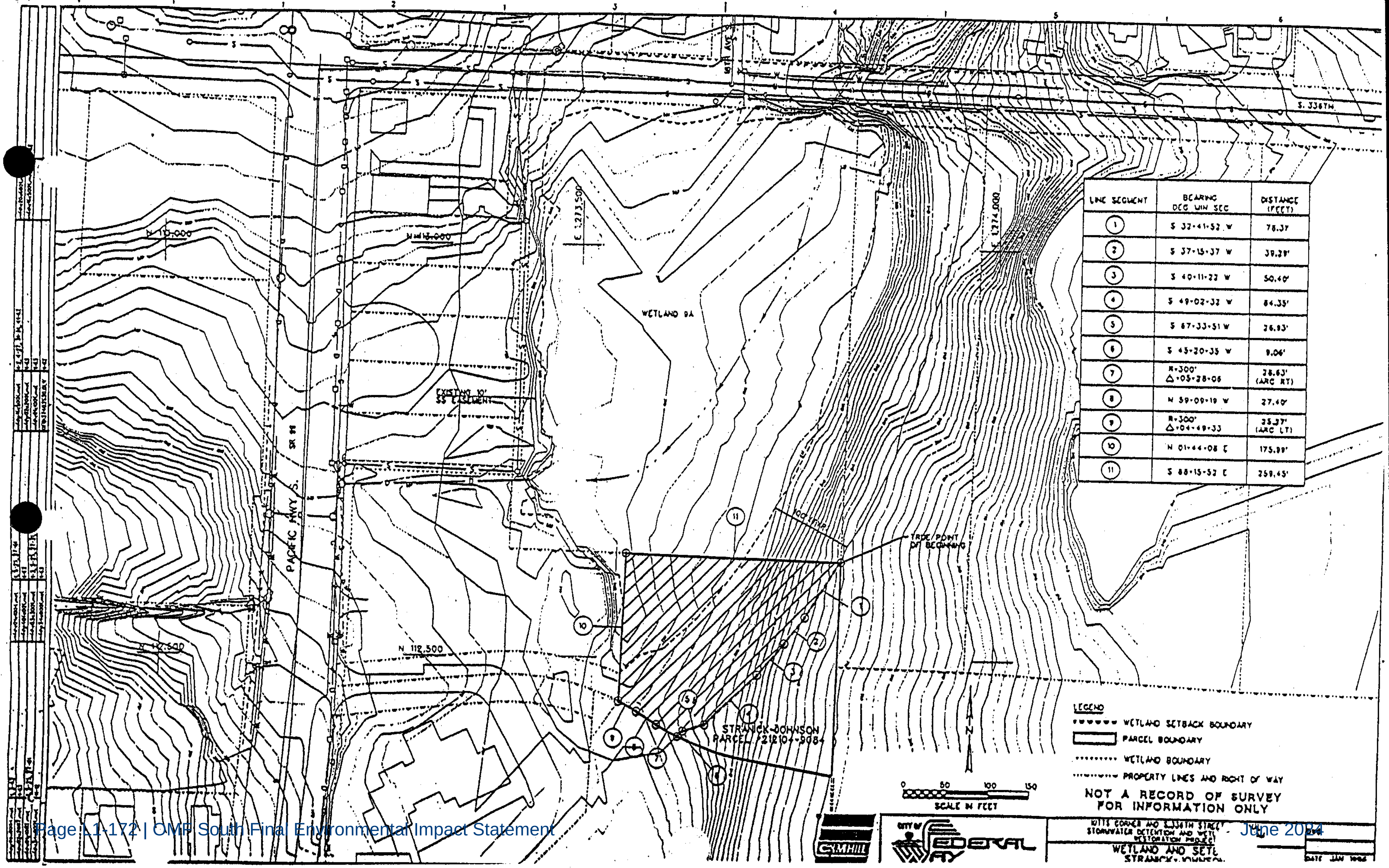
Beginning at the northeast corner of said Lot 3 and the TRUE POINT OF BEGINNING;
thence south 32°41'52" west a distance of 78.31 feet;
thence south 37°15'37" west a distance of 39.29 feet;
thence south 40°11'22" west a distance of 50.40 feet;
thence south 49°02'32" west a distance of 84.35 feet;
thence south 67°33'51" west a distance of 26.93 feet;
thence south 45°20'35" west a distance of 9.06 feet to the south line of said Lot 3 and a point on a non-tangent curve from which the radius point bears north 25°22'36" east;
thence along said south line through a 300 foot radius curve to the right, with a central angle of 05°28'06", an arc length of 28.63 feet;
thence north 59°09'19" west a distance of 27.40 feet;
thence along a 300 foot radius curve to the left, with a central angle of 04°49'33", an arc length of 25.27 feet to the west line of said Lot 3;
thence along said west line, north 01°44'08" east a distance of 175.99 feet to the north line of said Lot 3;
thence along said north line, south 88°15'52" east a distance of 259.45 feet to the TRUE POINT OF BEGINNING.
Containing an area of 0.864 acres.

EXPIRES 9/2/96

fwld9084.wp5

EXHIBIT "II" TO SETTLEMENT AGREEMENT

Pg. 2 of 9



LINE SEGMENT	BEARING DEG MIN SEC	DISTANCE (FEET)
①	S 32-41-52 W	78.37'
②	S 37-15-37 W	39.29'
③	S 40-11-22 W	50.40'
④	S 49-02-32 W	84.35'
⑤	S 67-33-51 W	26.83'
⑥	S 45-20-35 W	9.06'
⑦	R=300' Δ=05-28-06	28.63' (ARC RT)
⑧	N 59-09-19 W	27.40'
⑨	R=300' Δ=04-49-33	25.27' (ARC LT)
⑩	N 01-44-08 E	175.99'
⑪	S 88-15-52 E	259.45'

LEGEND

- WETLAND SETBACK BOUNDARY
- PARCEL BOUNDARY
- WETLAND BOUNDARY
- PROPERTY LINES AND RIGHT OF WAY

NOT A RECORD OF SURVEY
FOR INFORMATION ONLY

S. 336TH
10TH AVE S.
PACIFIC HWY S.
SR 99
N 110,000
N 113,000
N 112,500
E 1,273,500
E 1,274,000
WETLAND 9A
EXISTING 10' SS EASEMENT
100' WETLAND SETBACK
TRUE POINT OF BEGINNING
STRANICK-JOHNSON PARCEL #212104-9084
N
0
50
100
150
SCALE IN FEET
CH2MHILL
CITY OF FEDERAL WAY
KITTS CORNER AND S.336TH STREET STORMWATER DETENTION AND WETLAND RESTORATION PROJECT
WETLAND AND SETBACK STRANICK-JOHNSON
DATE JAN 1996

LEGAL DESCRIPTION
WETLAND AND SETBACK
STRANICK-JOHNSON PARCEL NO. 212104-9026

That part of Lot 4 of King County Short Plat No. 281074 according to short plat recorded under King County Recording Number 8110300869, being a portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington.

Being described as follows:

Commencing at the northwest corner of said Lot 4;
thence along the north line of said Lot 4, south 88°15'53" east a distance of 116.96 feet to the TRUE POINT OF BEGINNING;
thence along the north line of said Lot 4, south 88°15'53" east a distance of 82.96 feet;
thence along the east line of said Lot 4, south 01°12'17" west a distance of 100.00 feet;
thence along the north line of said Lot 4, south 88°15'53" east a distance of 140.00 feet;
thence along the east line of said Lot 4, south 01°44'08" west a distance of 175.99 feet to the south line of said Lot 4 and a point on a non-tangent curve from which the radius point bears south 26°01'09" west;
thence along said south line through a 300 foot radius curve to the left, with a central angle of 21°00'20", an arc length of 109.98 feet to a point on a non-tangent curve from which the radius point bears north 70°49'35" east;
thence through a 100 foot radius curve to the right, with a central angle of 38°16'07", an arc length of 66.79 feet;
thence north 45°55'34" west a distance of 40.72 feet to a point on a non-tangent curve from which the radius point bears north 07°40'45" east;
thence through a 100 foot radius curve to the right, with a central angle of 88°34'17", an arc length of 154.59 feet;
thence north 06°05'23" east a distance of 49.78 feet to the TRUE POINT OF BEGINNING.
Containing an area of 0.716 acres.

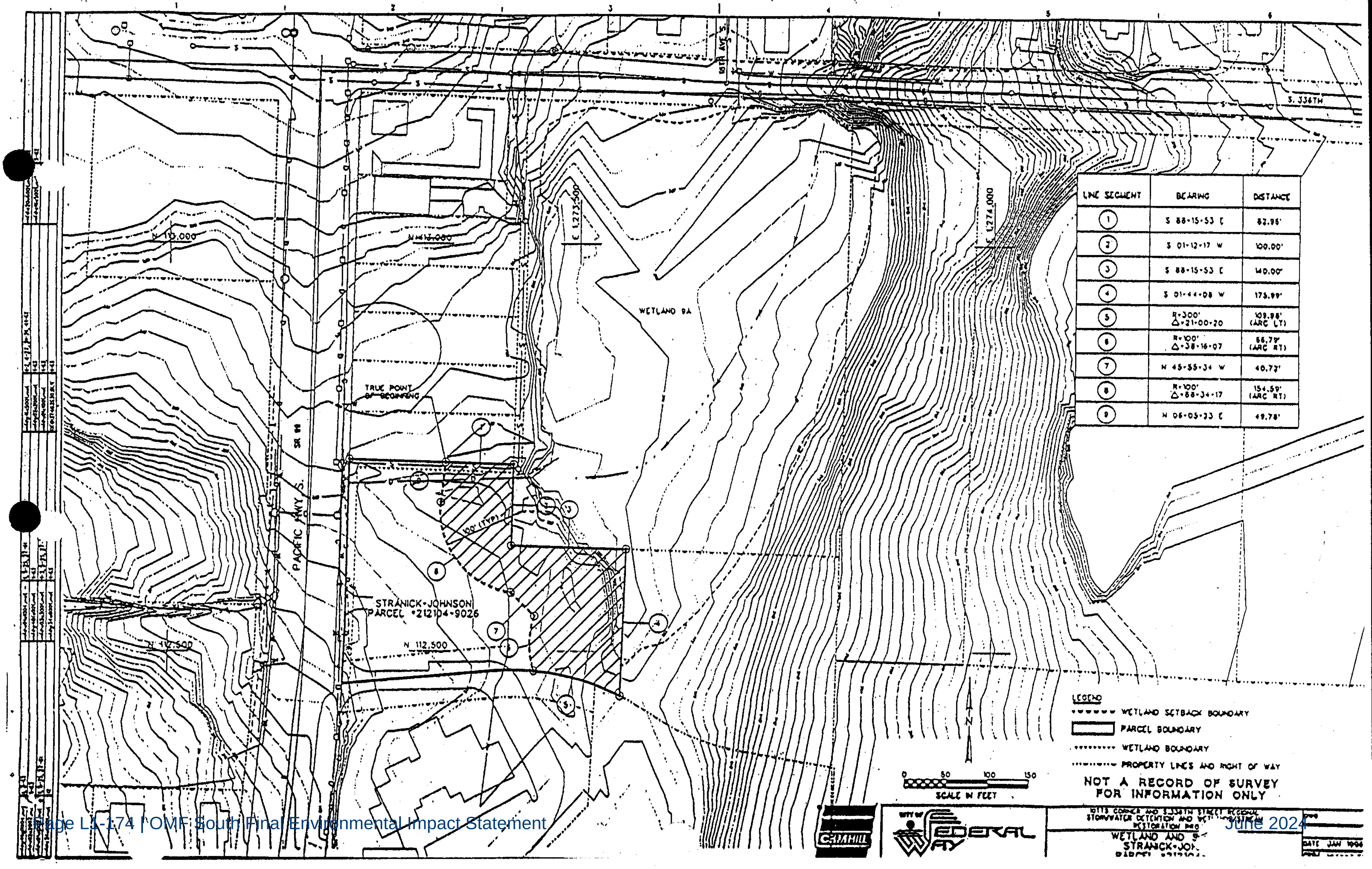
JERRY G. MORRIS
STATE OF WASHINGTON
17573
REGISTERED PROFESSIONAL LAND SURVEYOR
EXPIRES 9-2-96

fwld9026.wp5

EXHIBIT "II" TO
SETTLEMENT AGREEMENT

Pg. 4 of 9

EXHIBIT "II" TO
SETTLEMENT AGREEMENT



PACIFIC HWY S.
SR 99
16TH AVE S
S. 336TH
N 113,000
N 112,500
E 1,273,500
E 1,274,000
WETLAND 9A
TRUE POINT OF BEGINNING
STRANICK-JOHNSON PARCEL #212104-9026
100' (ARC)
1
2
3
4
5
6
7
8
9
N
0 50 100 150
SCALE IN FEET
LEGEND
WETLAND SETBACK BOUNDARY
PARCEL BOUNDARY
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
NOT A RECORD OF SURVEY
FOR INFORMATION ONLY
CH2MHILL
CITY OF FEDERAL WAY
10TH CORNER AND S.336TH STREET REGIONAL STORMWATER DETENTION AND WETLAND/STREAM RESTORATION PROJ
WETLAND AND S
STRANICK-JOH
DATE JAN 1996

LINE SEGMENT	BEARING	DISTANCE
①	S 88-15-53 E	82.95'
②	S 01-12-17 W	100.00'
③	S 88-15-53 E	140.00'
④	S 01-44-08 W	175.99'
⑤	R=300' Δ=21-00-20	109.98' (ARC LT)
⑥	R=100' Δ=38-16-07	66.79' (ARC RT)
⑦	N 45-55-34 W	40.72'
⑧	R=100' Δ=88-34-17	154.59' (ARC RT)
⑨	N 06-05-33 E	49.78'

LEGAL DESCRIPTION
WETLAND AND SETBACK
STRANICK-JOHNSON PARCEL NO. 212104-9067

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89°13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 813.80 feet;
thence south 00°14'58" west a distance of 30.00 feet to the south right of way margin of South 336th Street;
thence north 89°13'33" west along said south right of way margin a distance of 27.58 feet to the TRUE POINT OF BEGINNING;
thence south 12°03'08" east a distance of 40.46 feet
thence south 07°31'30" west a distance of 41.08 feet
thence south 04°45'10" west a distance of 57.84 feet
thence south 10°37'22" west a distance of 52.16 feet
thence south 16°21'59" west a distance of 56.28 feet
thence south 10°58'46" west a distance of 43.83 feet
thence south 23°54'07" west a distance of 14.53 feet
thence south 07°11'32" west a distance of 38.28 feet
thence south 21°58'46" west a distance of 37.77 feet
thence south 08°31'59" west a distance of 41.88 feet
thence south 24°20'39" west a distance of 91.29 feet
thence south 31°04'46" west a distance of 32.34 feet
thence south 19°31'25" west a distance of 20.75 feet
thence north 00°14'39" east a distance of 546.07 feet to the south right of way margin of South 336th Street;
thence south 89°13'33" east along said south right of way margin a distance of 125.52 feet to the TRUE POINT OF BEGINNING;
EXCEPT that portion deeded to King County for South 336th Street under Recording Number 8609030322.
Containing an area of 1.053 acres.

Being a portion of the following described property:

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89°13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 813.80 feet;

EXHIBIT "II" TO
SETTLEMENT AGREEMENT

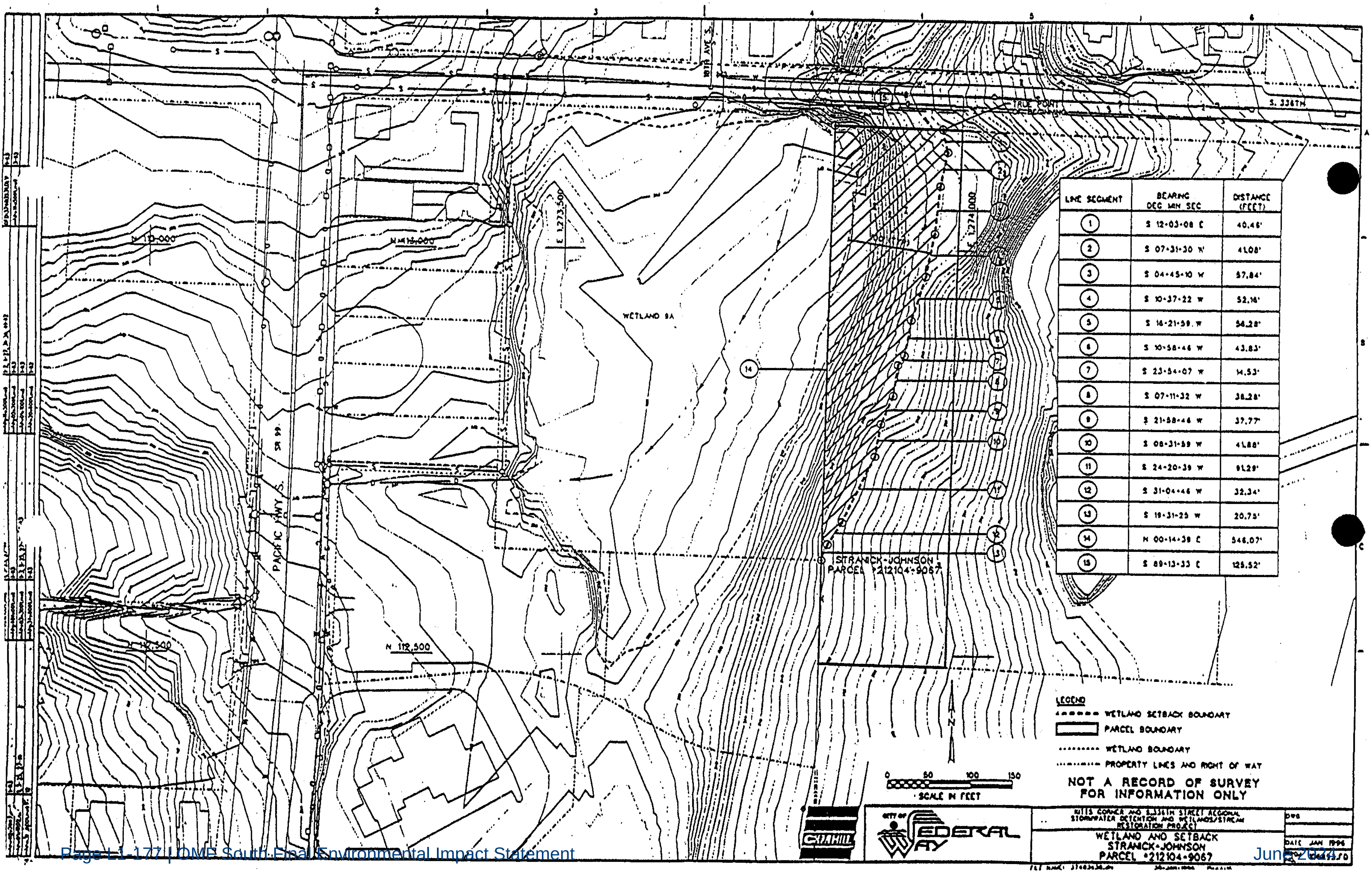
thence south 00°14'58" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00°14'58" west a distance of 670.67 feet;
thence north 89°16'45" west a distance of 153.10 feet;
thence north 00°14'39" east a distance of 670.81 feet to the said south right of way margin of South 336th Street;
thence south 89°13'33" east along said south right of way margin a distance of 153.10 feet to the TRUE POINT OF BEGINNING;
EXCEPT that portion deeded to King County for South 336th Street under Recording Number 8609030322.
Containing an area of 2.313 acres.

JERRY G. MORRIS

EXPIRES 9/2/96

EXHIBIT "II" TO
SETTLEMENT AGREEMENT

Pg. 7 of 9


S. 336TH
18TH AVE S.
TRUE POINT OF BEGINNING
N 113,000
N 113,000
E 1,273,500
E 1,274,000
WETLAND 9A
PACIFIC HWY S.
SR 99
STRANICK-JOHNSON
PARCEL #212104-9067
N 112,500
N
0 50 100 150
SCALE IN FEET
CITY OF FEDERAL WAY
CH2M HILL

LINE SEGMENT	BEARING DEG MIN SEC	DISTANCE (FEET)
①	S 12-03-08 E	40.46'
②	S 07-31-30 W	41.08'
③	S 04-45-10 W	57.84'
④	S 10-37-22 W	52.16'
⑤	S 16-21-59 W	54.28'
⑥	S 10-58-46 W	43.83'
⑦	S 23-54-07 W	14.53'
⑧	S 07-11-32 W	38.28'
⑨	S 21-58-46 W	37.77'
⑩	S 08-31-59 W	41.88'
⑪	S 24-20-39 W	91.29'
⑫	S 31-04-46 W	32.34'
⑬	S 19-31-25 W	20.75'
⑭	N 00-14-39 E	546.07'
⑮	S 89-13-33 E	125.52'

LEGEND

▬ ▬ ▬	WETLAND SETBACK BOUNDARY
▭	PARCEL BOUNDARY
·········	WETLAND BOUNDARY
·-·-·-·	PROPERTY LINES AND RIGHT OF WAY

NOT A RECORD OF SURVEY
FOR INFORMATION ONLY

KITTS CORNER AND S. 336TH STREET REGIONAL STORMWATER DETENTION AND WETLANDS/STREAM RESTORATION PROJECT

WETLAND AND SETBACK
STRANICK-JOHNSON
PARCEL #212104-9067

DWG

DATE JAN 1996

LEGAL DESCRIPTION
WETLAND AND SETBACK
STRANICK-JOHNSON PARCEL NO. 212104-9069

That portion of the northwest quarter of the northwest quarter of Section 21, Township 21 North, Range 4 East, W.M., in King County, Washington, described as follows:

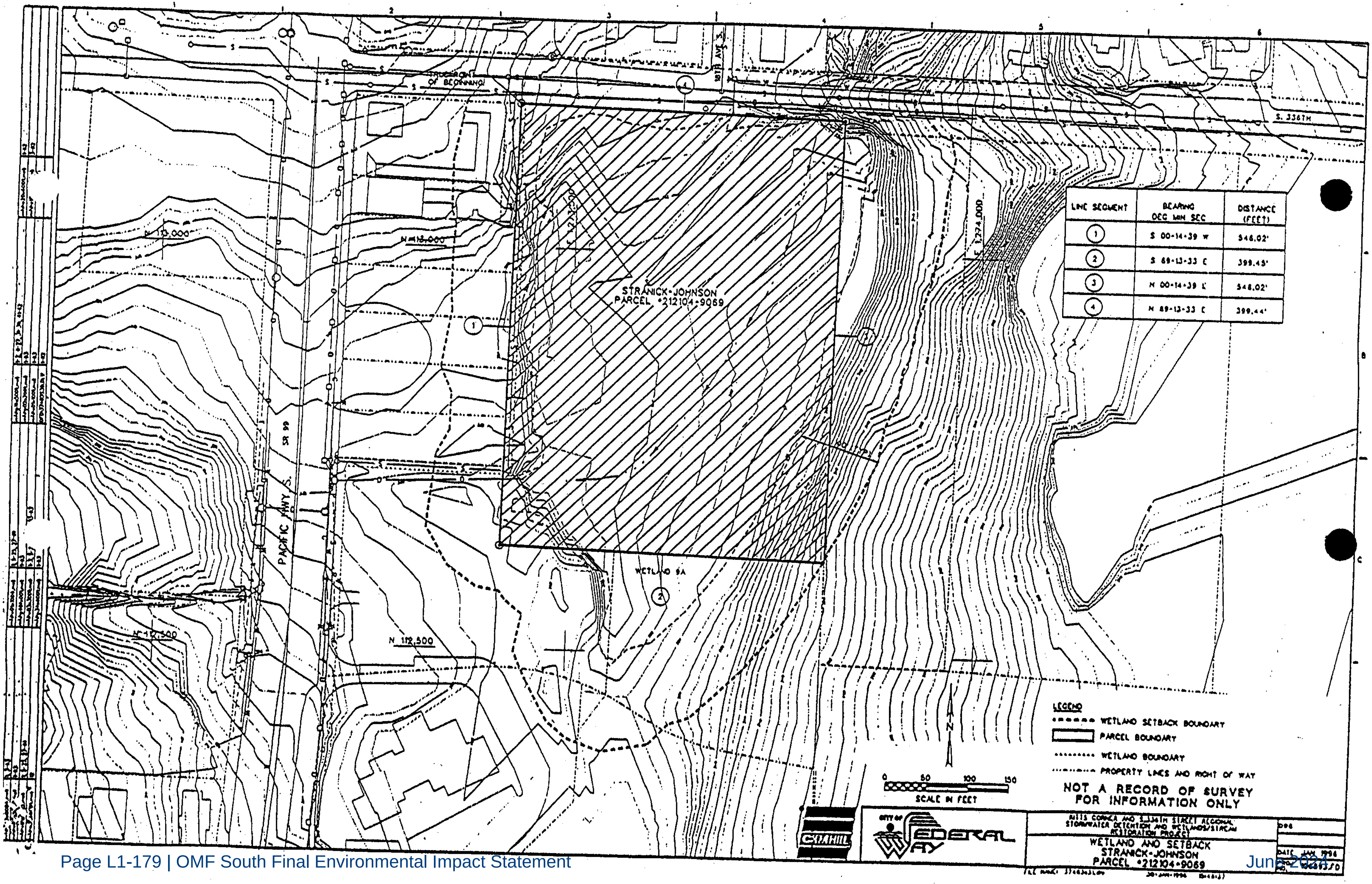
Commencing at the northwest corner of said northwest quarter of the northwest quarter;
thence south 89°13'33" east along the north line of said northwest quarter of the northwest quarter a distance of 261.26 feet;
thence south 00°14'39" west a distance of 30.00 feet to the south right of way margin of South 336th Street and the TRUE POINT OF BEGINNING;
thence continuing south 00°14'39" west a distance of 546.02 feet;
thence south 89°13'33" east a distance of 399.45 feet;
thence north 00°14'39" east a distance of 546.02 feet to the said south right of way margin of South 336th Street;
thence north 89°13'33" west along said south right of way margin a distance of 399.44 feet to the TRUE POINT OF BEGINNING.
Containing an area of 5.007 acres.

JERRY G. MORRIS
STATE OF WASHINGTON
17673
REGISTERED PROFESSIONAL LAND SURVEYOR
EXPIRES 9/2/96

fwld9069.wp5

Pg. 9 of 9

EXHIBIT "II" TO SETTLEMENT AGREEMENT


POINT OF BEGINNING
S. 336TH
10TH AVE S.
PACIFIC HWY S.
SR 99
N 113,000
N 113,000
N 112,500
N 112,500
E 1,274,000
STRANICK-JOHNSON PARCEL #212104-9069
WETLAND 9A
LEGEND
WETLAND SETBACK BOUNDARY
PARCEL BOUNDARY
WETLAND BOUNDARY
PROPERTY LINES AND RIGHT OF WAY
0 50 100 150
SCALE IN FEET
N
CH2M HILL
CITY OF FEDERAL WAY
MILS CORNER AND S. 336TH STREET REGIONAL STORMWATER DETENTION AND WETLANDS/STREAM RESTORATION PROJECT
WETLAND AND SETBACK STRANICK-JOHNSON PARCEL #212104-9069
DATE JAN 1996

LINE SEGMENT	BEARING DEG MIN SEC	DISTANCE (FEET)
①	S 00-14-39 W	546.02'
②	S 89-13-33 E	399.45'
③	N 00-14-39 E	546.02'
④	N 89-13-33 E	399.44'

NOT A RECORD OF SURVEY
FOR INFORMATION ONLY

EXHIBIT E

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

JUNE 12, 2003 PARKING LETTER

CITY OF FEDERAL WAY
CITY HALL
33530 1st Way South
PO Box 9718

(253) 661-4000
Federal Way, WA 98063-9718

June 12, 2003

Gil Hulsmann
Abbey Road Group, LLC
PO Box 207
Puyallup, WA 98371

FILE COPY

RE: ***Christian Faith Center (City File No. 02-102271-UP)***
Your request dated 5/8/03 concerning drive aisle width and vehicle overhang

Dear Mr. Hulsmann:

City staff have reviewed the above referenced request with the following responses.

Drive aisle width

The Director of Community Development Services will allow the requested 24-foot drive aisle width in place of the city's typical width of 25 feet, but only at locations where the adjacent stall dimensions are 9 feet by 18 feet, irrespective of overhangs. Drive aisles serving compact-sized stalls or reduced-length stalls resulting from overhang allowances must have a 25-foot width. Per city standards, up to 25% of the total stalls on the site may be designated as compact, with a stall dimension of 8 feet by 15 feet (served by a 25 foot drive aisle).

The City will allow the requested 24-foot drive aisles, as described above, on a "demonstration" basis and in the interest of reducing pervious surface and increasing landscaping along with other low impact development techniques the City has recommended and the applicant is considering for the project. It should also be noted that this decision is consistent with the three example codes you submitted, where a 24-foot drive aisle is permitted when adjacent stall dimensions are 9 feet by 18 feet or greater. It is also consistent with parking standards contained in the 1990 handbook of the American Association of State Highways and Transportation Officials (AASHTO).

Vehicle overhang

The requested vehicle overhang into landscaping is already permitted by code and requires no modification. However, per code, wherever a parking stall will be reduced in length by vehicle overhang into landscaping, the required width of the landscaping must be maintained. In addition, any overhang into a sidewalk area must maintain a 5-foot unobstructed sidewalk width. Therefore, the width of landscape areas and sidewalks shall be increased accordingly where necessary to meet this standard. For example, a 2-foot overhang into a required 10-foot landscape strip would require the landscape strip to be increased to a width of 12 feet. Likewise, a 2-foot overhang into a 5-foot sidewalk would require the sidewalk to be increased to a width of 7 feet. Full-sized stalls against required landscaping or a sidewalk must incorporate wheel stops to prevent overhang.

Please let me know if you have any further questions or concerns on these topics.

Sincerely,

Lori Michaelson, AICP
Senior Planner

c: Kathy McClung, Director of Community Development Services
Cary Roe, Director of Public Works
Ken Miller, Deputy Director of Public Works
Greg Fewins, Deputy Director of Community Development Services
Jim Femling, Development Services Manager

EXHIBIT F

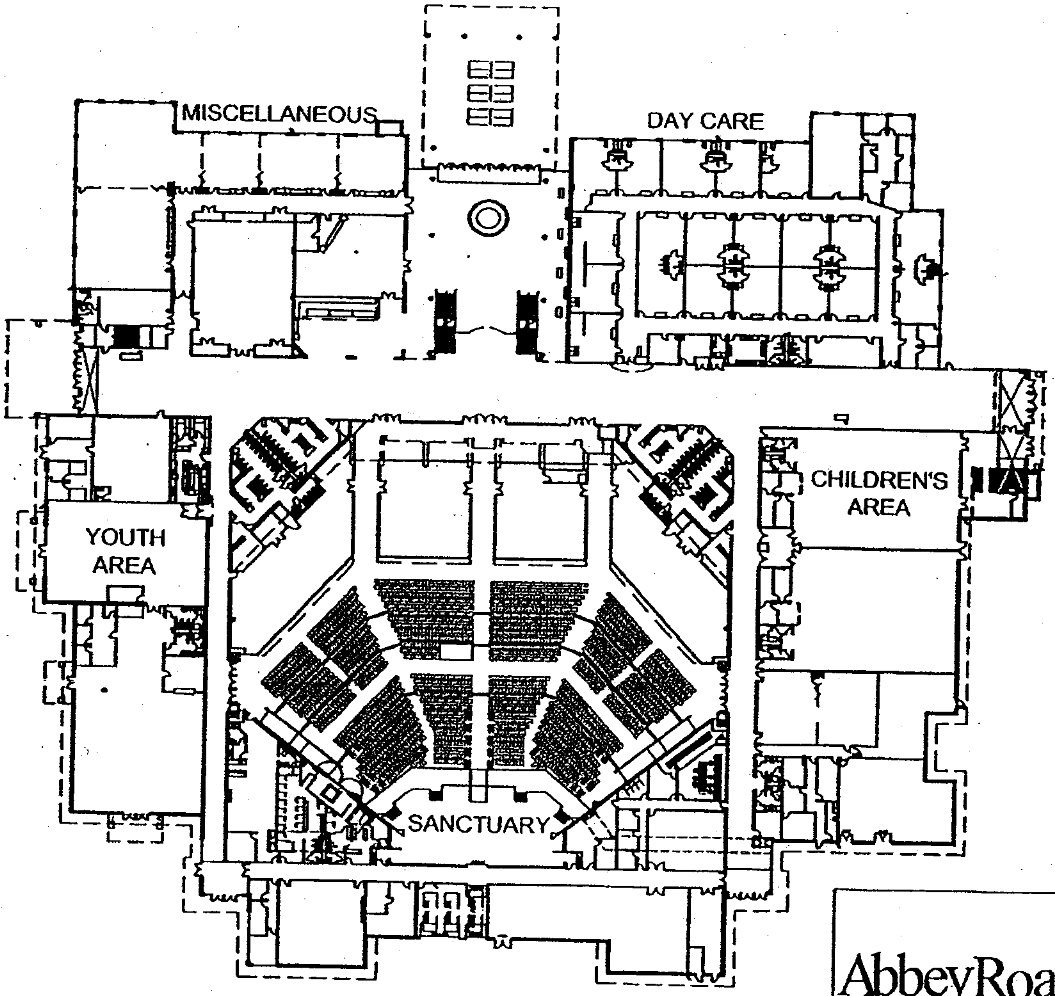
TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CONCEPTUAL FLOOR PLAN

EXHIBIT F-1

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CONCEPTUAL SANCTUARY BUILDING FIRST FLOOR PLAN


MISCELLANEOUS
DAY CARE
CHILDREN'S AREA
YOUTH AREA
SANCTUARY

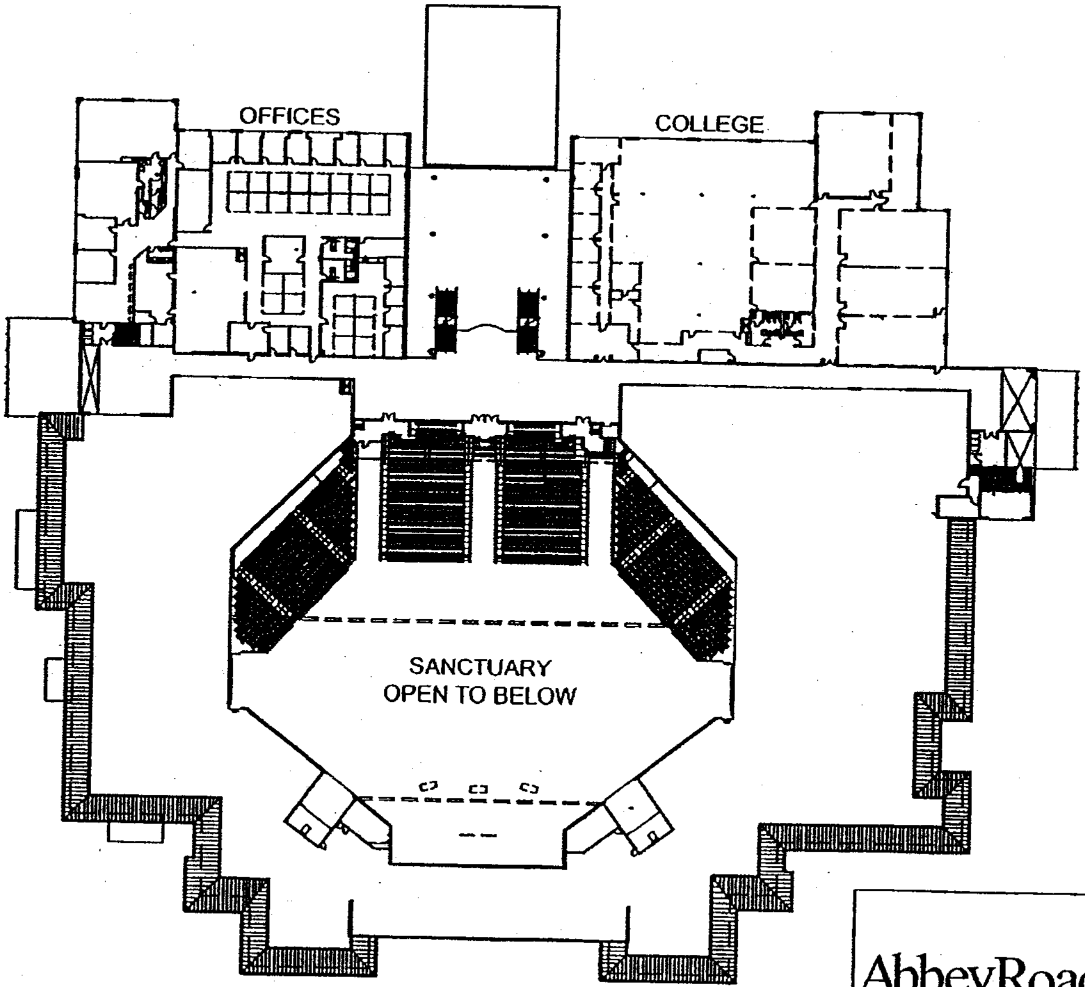
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT F-2

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CONCEPTUAL SANCTUARY BUILDING SECOND FLOOR PLAN


OFFICES
COLLEGE
SANCTUARY
OPEN TO BELOW

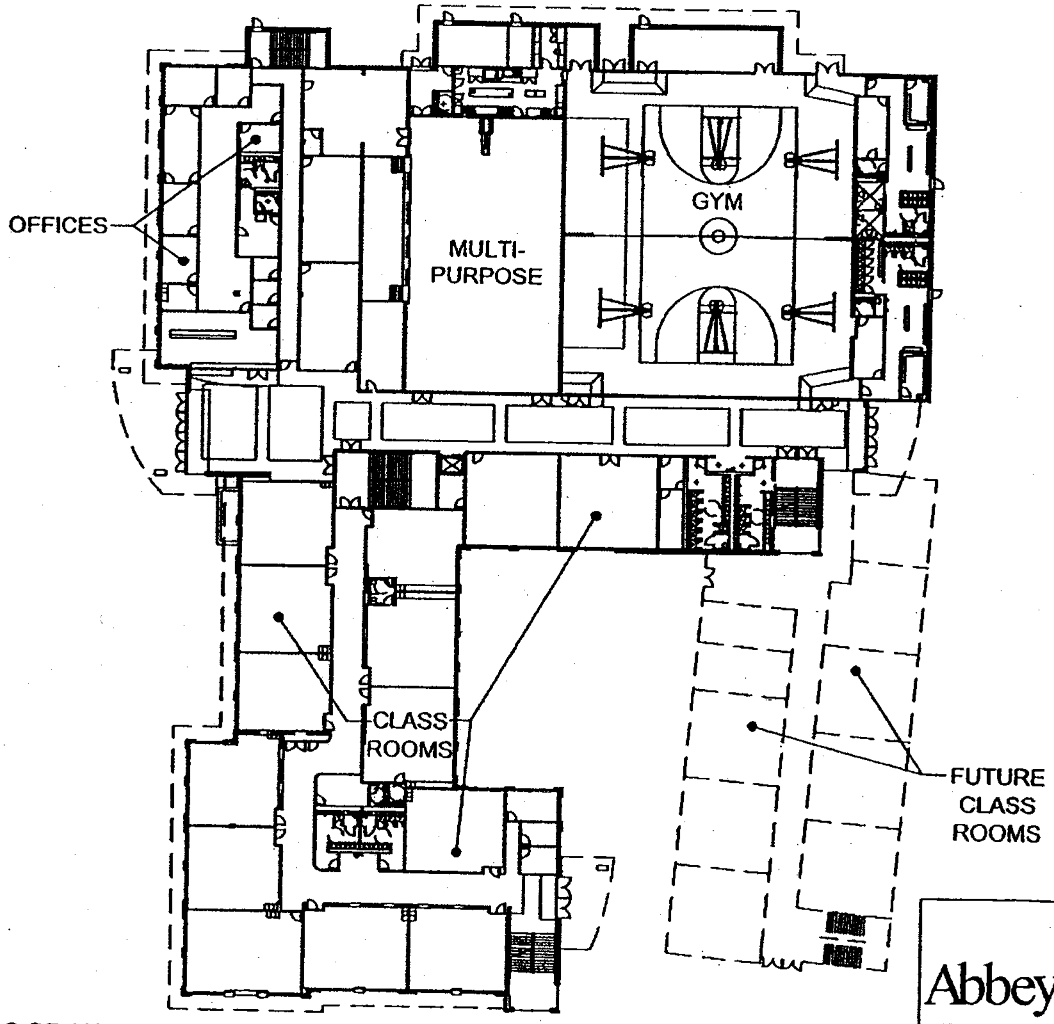
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT F-3

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CONCEPTUAL SCHOOL BUILDING FIRST FLOOR PLAN


OFFICES
MULTI-PURPOSE
GYM
CLASS ROOMS
FUTURE CLASS ROOMS

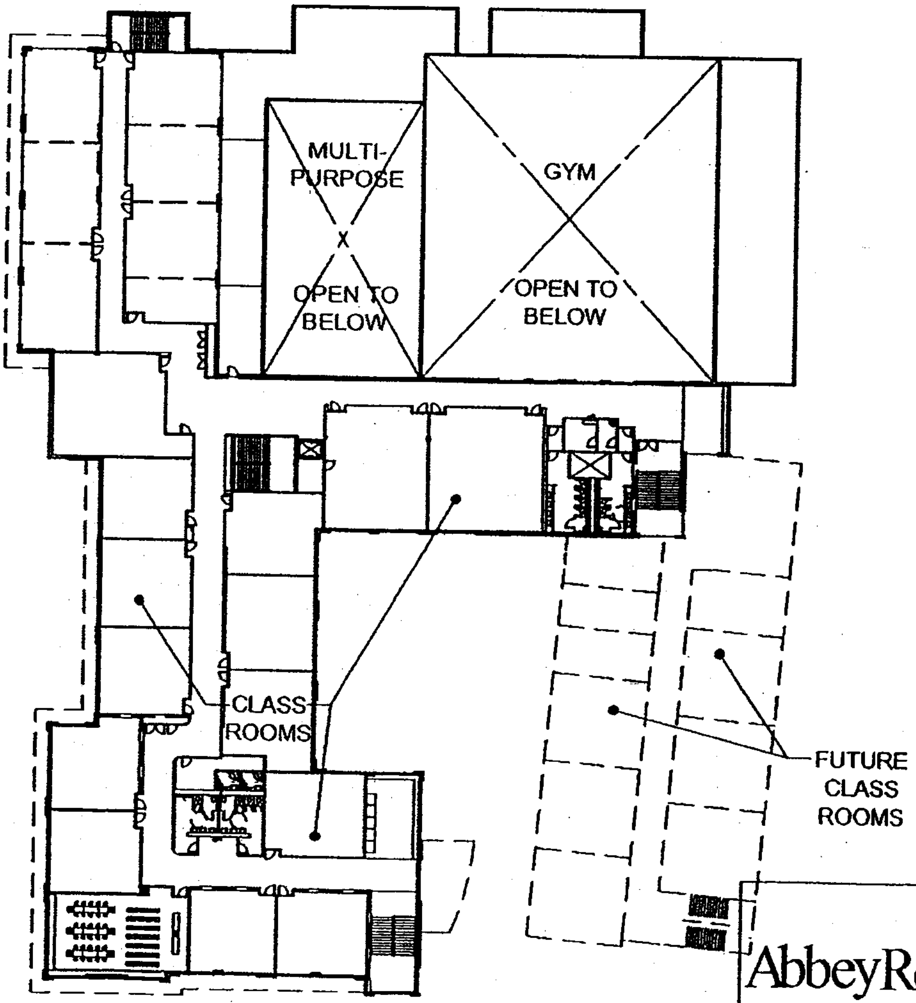
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT F-4

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

CONCEPTUAL SCHOOL BUILDING FIRST FLOOR PLAN


MULTI-PURPOSE
OPEN TO BELOW
GYM
OPEN TO BELOW
CLASSROOMS
FUTURE CLASS ROOMS

AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

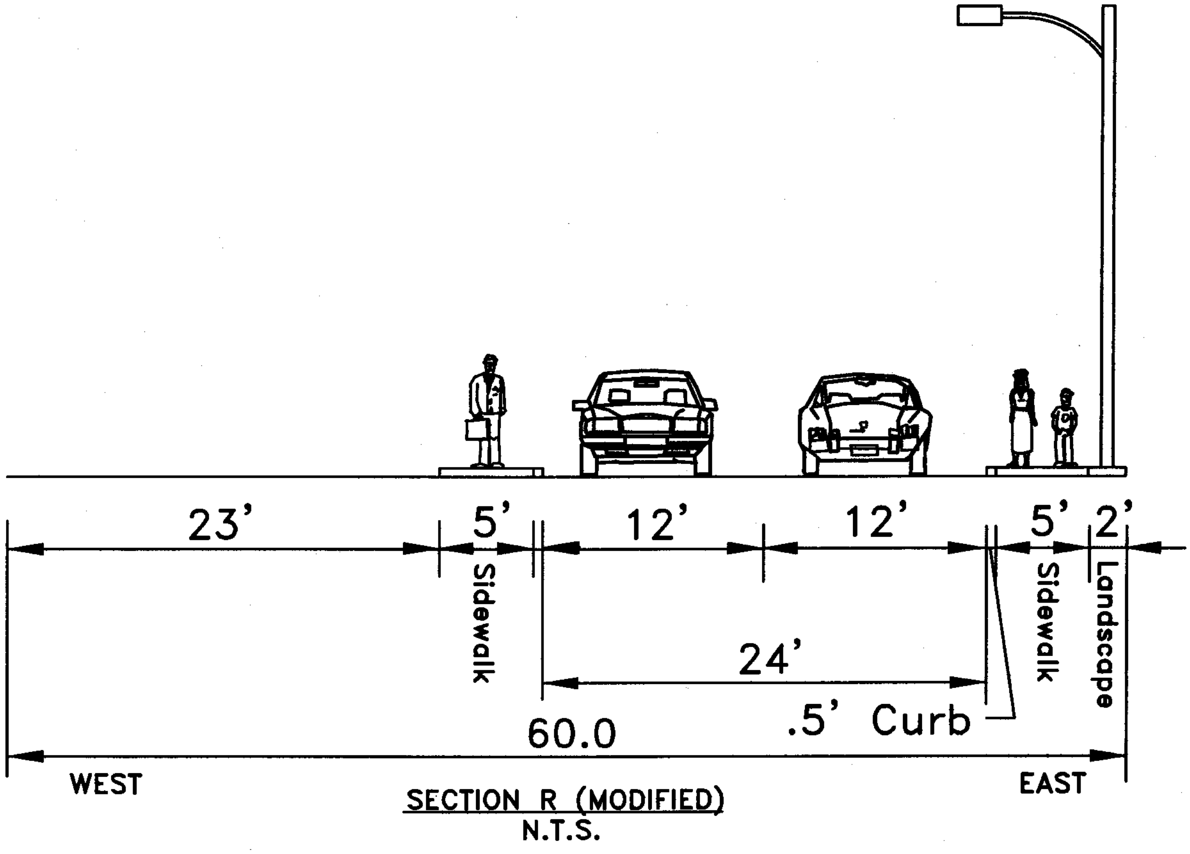
SECTION 9.4 TRAFFIC PLANS

G-1 18th Ave S
G-2 S 344th from 16th to 18th
G-3 34th/16th
G-4 SR 99/S 344th
G-5 336th from Hwy 99 to 20th
G-6 336th from 20th to I-5
G-7 20th Ave/336th
G-8 20th Avenue S traffic calming

EXHIBIT G-1

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

18TH PLACE SOUTH IMPROVEMENTS


23'
5'
Sidewalk
12'
12'
5'
2'
Sidewalk
Landscape
24'
.5' Curb
60.0
WEST
EAST

SECTION R (MODIFIED)
N.T.S.

NOTE:
UTILITIES WILL REMAIN ABOVE GROUND.

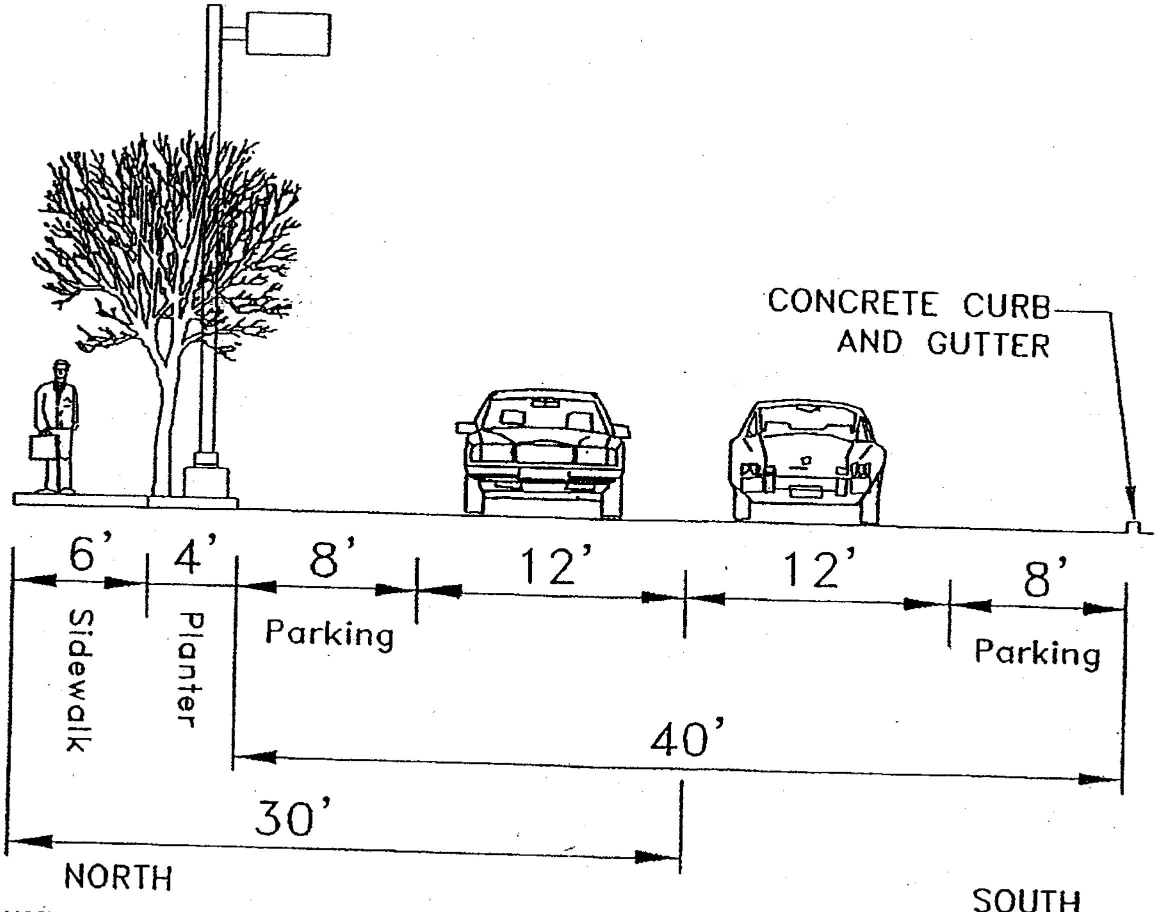
AbbeyRoad

AS OF: July 8, 2004

EXHIBIT G-2

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

SOUTH 344TH STREET IMPROVEMENTS
16TH AVENUE SOUTH TO 18TH PLACE SOUTH


CONCRETE CURB AND GUTTER
6'
4'
8'
12'
12'
8'
Sidewalk
Planter
Parking
Parking
40'
30'
NORTH
SOUTH

NOTE:
NORTH IMPROVEMENTS TIE INTO EXISTING IMPROVEMENTS EAST OF 16TH AVE. S. AND S. 344TH ST. INTERSECTION.
UTILITIES TO REMAIN ABOVE GROUND.

SECTION R
N.T.S.

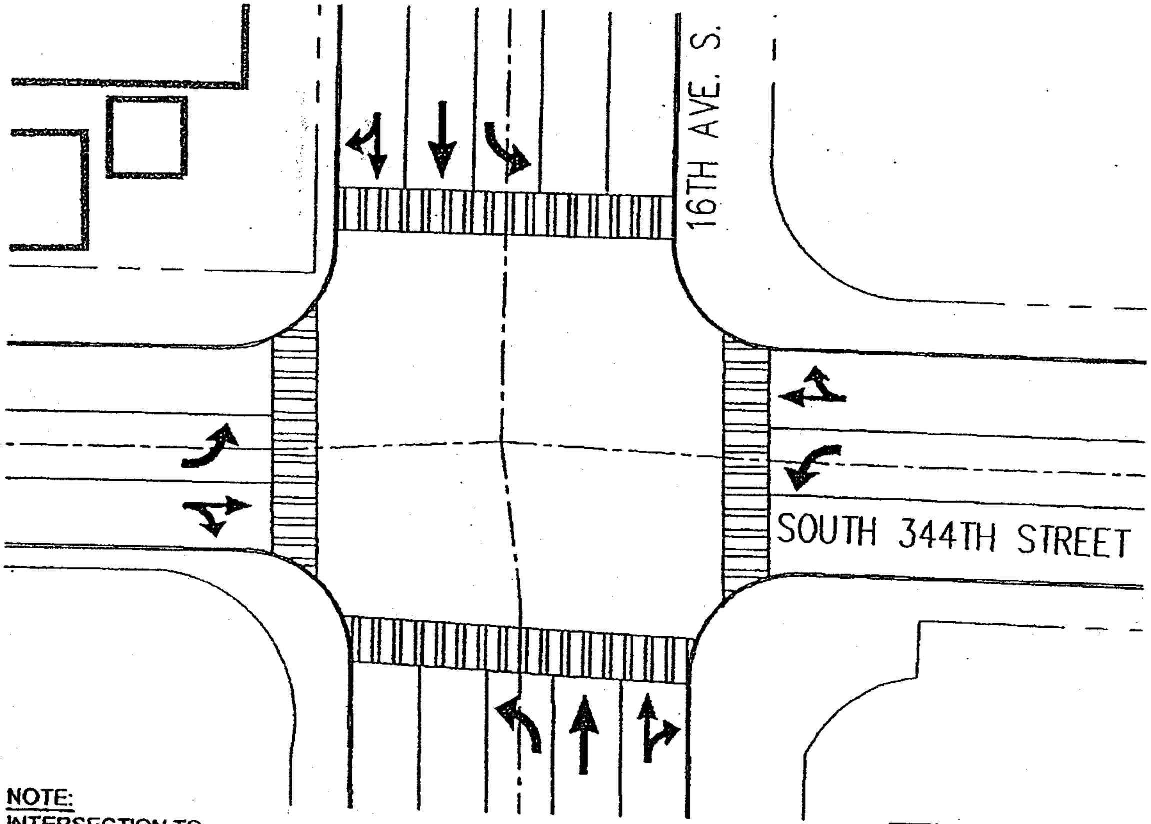
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G-3

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

16TH AVENUE SOUTH AND
SOUTH 344TH STREET INTERSECTION


16TH AVE. S.
SOUTH 344TH STREET

NOTE:
INTERSECTION TO
BE SIGNALIZED

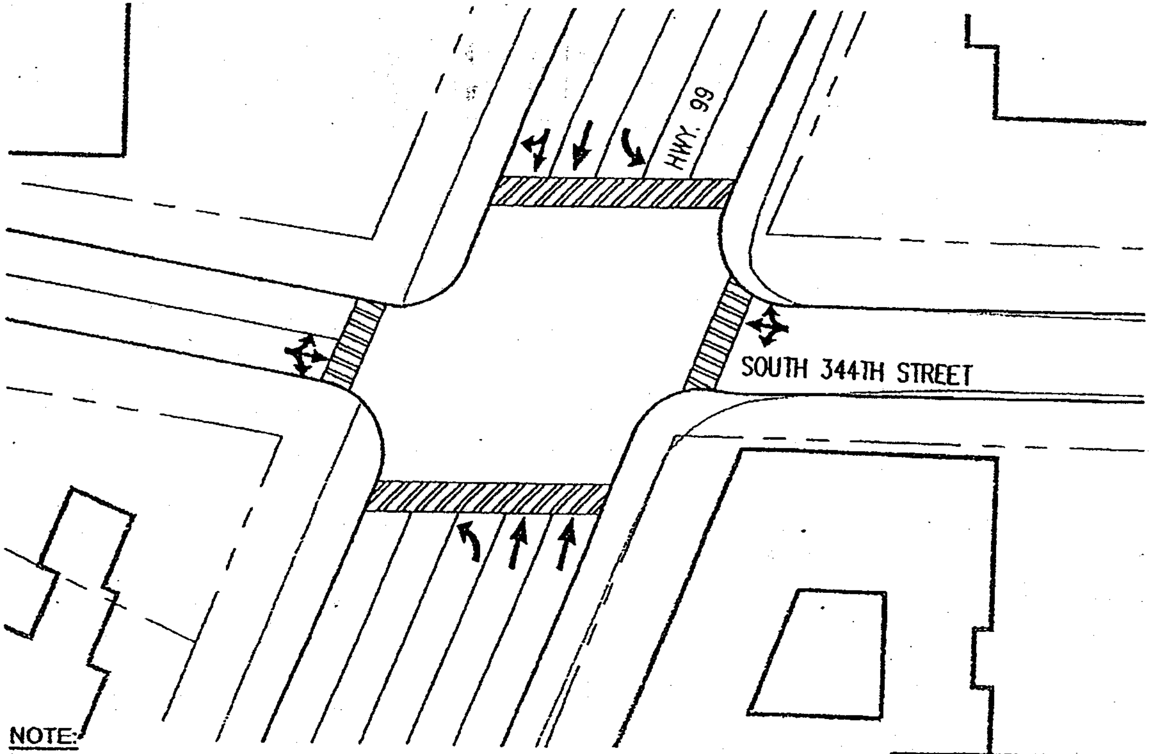
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G-4

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

SOUTH 344TH STREET AND
HWY. 99 INTERSECTION



NOTE:
INTERSECTION TO
BE SIGNALIZED

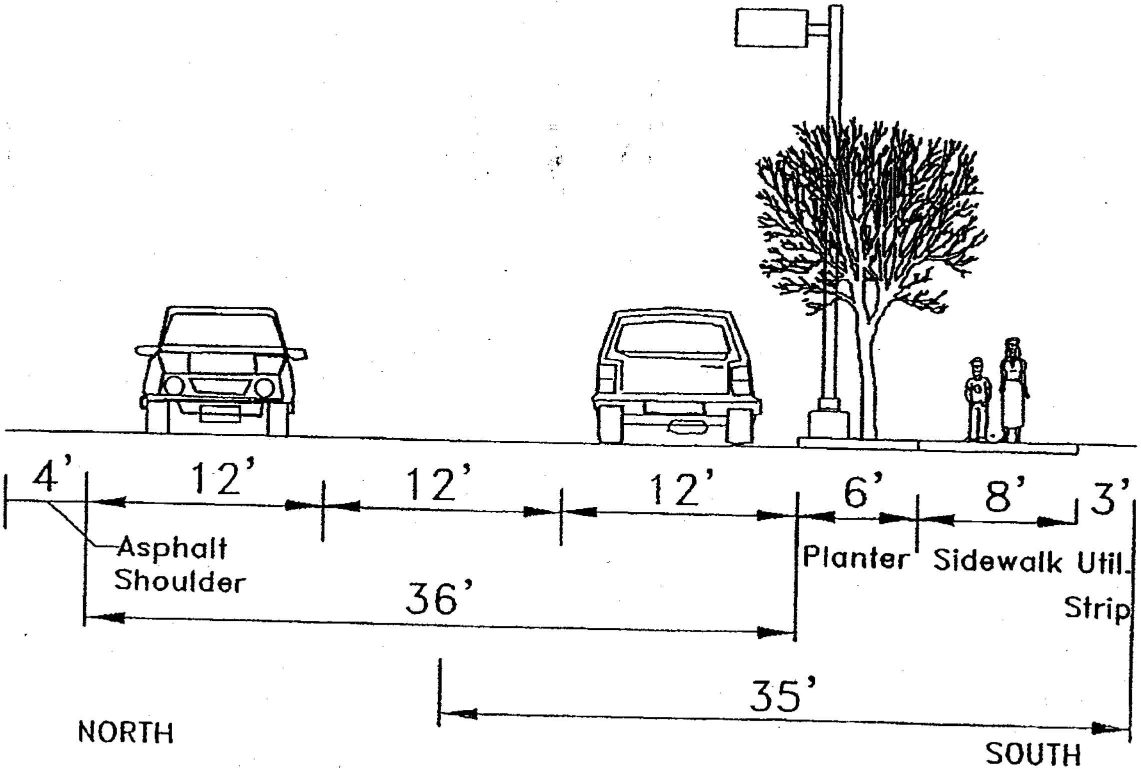
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G-5

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

SOUTH 336TH STREET IMPROVEMENTS
HWY. 99 TO 20TH AVENUE SOUTH


4'
12'
12'
12'
6'
8'
3'
Asphalt Shoulder
Planter
Sidewalk
Util. Strip
36'
35'
NORTH
SOUTH

NOTE:
PLANTER AND UTILITY STRIP MAYBE MODIFIED AT WEST HYLEBOS CULVERT CROSSING(S) TO PROTECT WETLAND AND WETLAND BUFFER.

SECTION M
N.T.S.

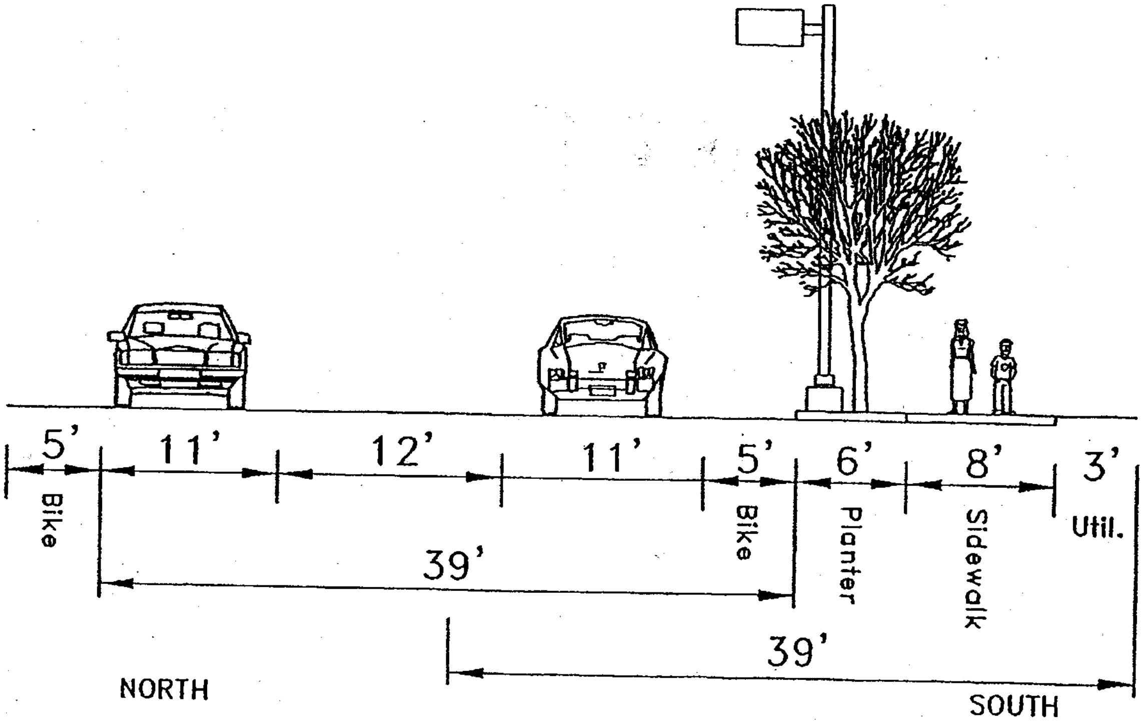
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G-6

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

SOUTH 336TH STREET IMPROVEMENTS
20TH AVENUE SOUTH INTERSTATE-5


5'
11'
12'
11'
5'
6'
8'
3'
Bike
Bike
Planter
Sidewalk
Util.
39'
39'
NORTH
SOUTH

NOTE:
PLANTER, SIDEWALK, STREET TREES AND UTILITIES STRIP STOPS 50' WEST OF EAST HYLEBOS BRANCH CULVERT(S) TO PROTECT WETLAND AND WETLAND BUFFER.

SECTION K
N.T.S.

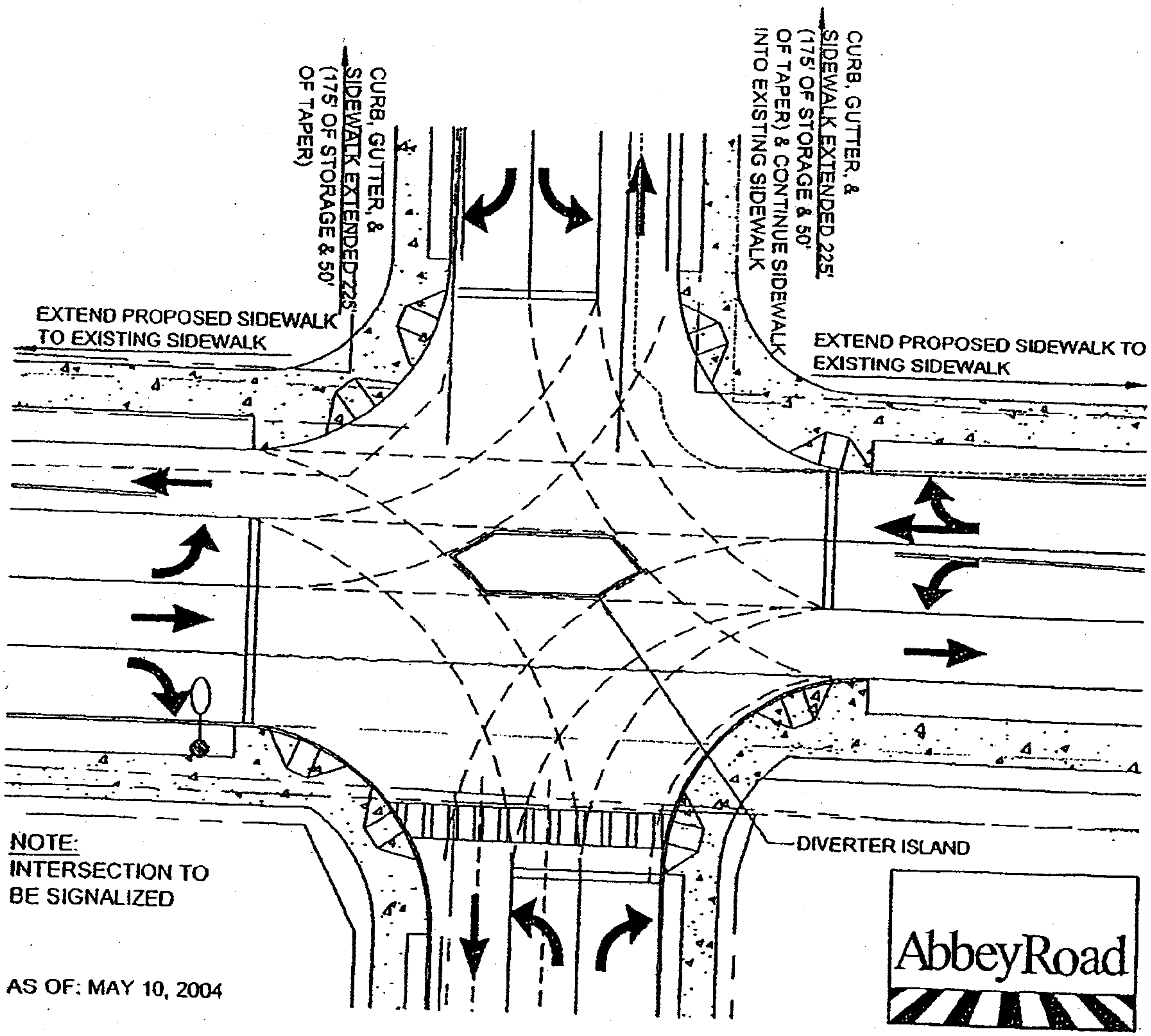
AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT G-7

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

20TH AVENUE SOUTH AND
SOUTH 336TH STREET INTERSECTION


CURB, GUTTER, & SIDEWALK EXTENDED 225' (175' OF STORAGE & 50' OF TAPER)
CURB, GUTTER, & SIDEWALK EXTENDED 225' (175' OF STORAGE & 50' OF TAPER) & CONTINUE SIDEWALK INTO EXISTING SIDEWALK
EXTEND PROPOSED SIDEWALK TO EXISTING SIDEWALK
EXTEND PROPOSED SIDEWALK TO EXISTING SIDEWALK
DIVERTER ISLAND
AbbeyRoad

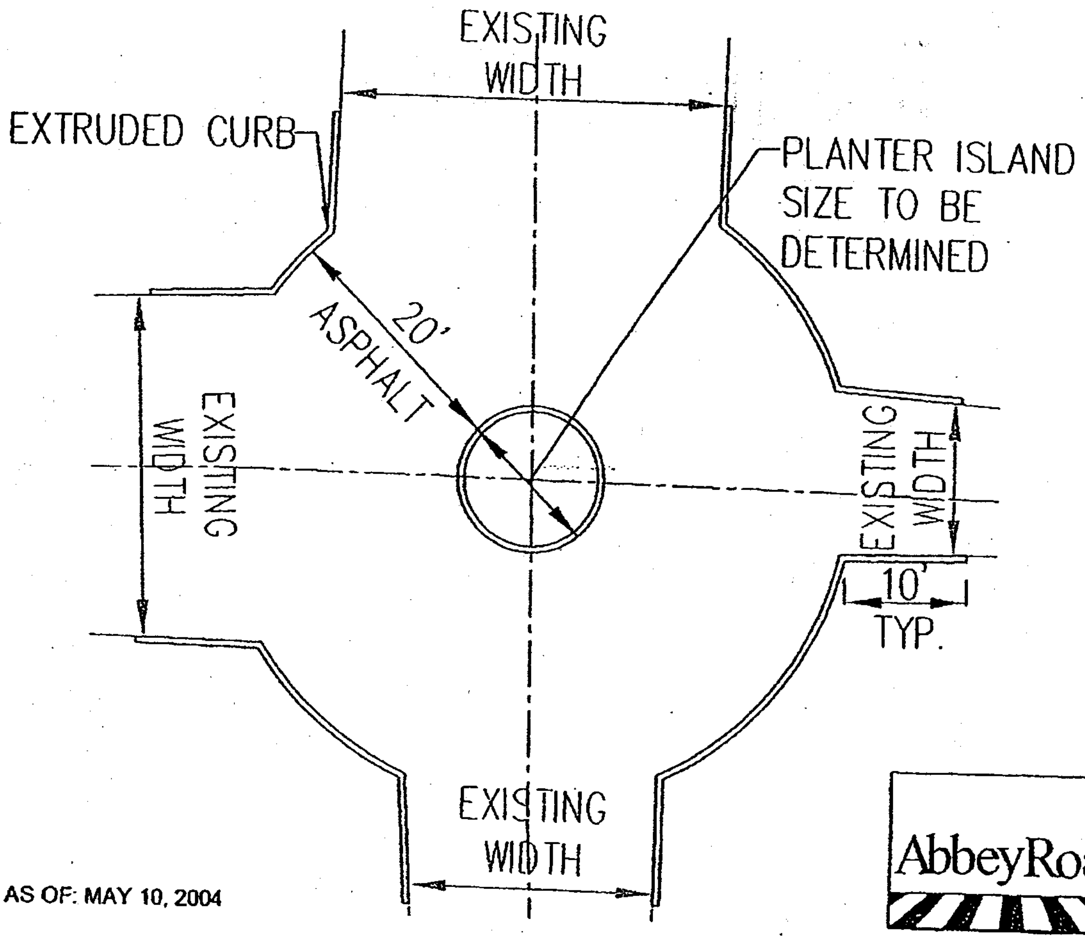
NOTE:
INTERSECTION TO
BE SIGNALIZED

AS OF: MAY 10, 2004

EXHIBIT G-8

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

TRAFFIC CALMING PLANTER ISLAND DETAIL


EXISTING WIDTH
EXTRUDED CURB
PLANTER ISLAND SIZE TO BE DETERMINED
20' ASPHALT
EXISTING WIDTH
EXISTING WIDTH
10' TYP.
EXISTING WIDTH

AS OF: MAY 10, 2004

AbbeyRoad

EXHIBIT H

TO CONCOMITANT AGREEMENT
AND
DEVELOPMENT AGREEMENT

PROCESS IV HEARING EXAMINER DECISION

CITY OF FEDERAL WAY
CITY HALL
33530 1st Way South
PO Box 9718

(253) 661-4000
Federal Way, WA 98063-9718

April 23, 2004

RECEIVED
APR 23 2004
City Clerks Office
City of Federal Way

Gil Hulsmann
Abbey Road Group, LLC
PO Box 207
Puyallup, WA 98372

RE: PROCESS IV REQUEST ENVIRONMENTALLY SENSITIVE AREA INTRUSIONS CHRISTIAN FAITH CENTER, FWHE# 04-03, FW# 02-1-2271-00-UP

Dear Appellant:

Enclosed please find the Report and Decision of the City of Federal Way Hearing Examiner relating to the above-entitled case.

Very truly yours,

STEPHEN K. CAUSSEAUX, JR.
HEARING EXAMINER

SKC/klb

cc: All parties of record
City of Federal Way

C: Lori M - CD
Karen K - Law

RECEIVED
APR 23 2004
City Clerks Office
City of Federal Way

CITY OF FEDERAL WAY

OFFICE OF THE HEARING EXAMINER

IN THE MATTER OF:)
) FWHE# 04-03
PROCESS IV REQUEST ENVIRONMENTALLY) FW# 02-1-2271-00-UP
SENSITIVE AREA INTRUSIONS)
)
CHRISTIAN FAITH CENTER)
)

I. SUMMARY OF APPLICATION

The applicant is requesting to: 1) fill a "Category III" wetland and its buffer; 2) mitigate for the filled wetland and buffer by creating wetland and additional buffer area in and adjacent to a "Category II" wetland on the site; 3) displace a portion of a wetland/stream buffer to accommodate an access road; and 4) intrude into wetland buffers for street improvements, including pavement widening, retaining wall, and extending storm pipes and stream culverts.

II. PROCEDURAL INFORMATION

Hearing Date:	April 20, 2004
Decision Date:	April 23, 2004

At the hearing the following presented testimony and evidence:

1. Lori Michaelson, Senior Planner, City of Federal Way
2. Gil Hulsman, 923 Shaw Road, Suite A, Puyallup, WA 98372
3. Garet Monger, 518 N. 59th, Seattle, WA 98103
4. Marie Adair, 28811 – 19th Ave. S., Federal Way, WA 98003

At the hearing the following exhibits were admitted as part of the official record of these proceedings:

1. Staff Report with all attachments
1-E. Addendum to Environmental Impact Statement (1E) (4/16/04)
1-F. Letters from Public (Beginning w/Derek Dexheimen) (1F) (4/16/04)

2. Power Point Presentation (Hard Copy) – Process IV Public Hearing
3. Christian Faith Centers – Wetland Areas Chart
4. Statement from Virginia Marquart
5. Marie Adair Statement

III. FINDINGS

1. The Hearing Examiner has heard testimony, admitted documentary evidence into the record, and taken this matter under advisement.

2. The Community Development Staff Report sets forth general findings, applicable policies and provisions in this matter and is hereby marked as Exhibit "1" and incorporated in its entirety by this reference.

3. All appropriate notices were delivered in accordance with the requirements of the Federal Way City Code (FWCC).

4. The applicant has a possessory ownership interest in a generally rectangular, 46.58-acre parcel of unimproved, mostly forested property located east of Pacific Highway South and west of Interstate 5 between South 336th Street and South 341st Place within the City of Federal Way. The applicant has submitted requests for approval of a comprehensive plan amendment, zone reclassification, development agreement, and development plan which, if approved, would allow development of the site into a 218,500 square-foot church, 104,480 square-foot private school, and associated parking, playfields, and landscaping. The decision to approve or deny the above requests is within the jurisdiction of the Federal Way City Council which will hold a public hearing prior to making such determination.

5. To construct the project as proposed, the applicant must also obtain Process IV approval to allow the applicant to fill a wetland and intrude into wetland/stream buffers. Specifically, the applicant requests authority to fill a Category III wetland and its buffer; create additional wetlands and buffers in and adjacent to an on-site Category II wetland; displace a portion of a wetland/stream buffer to accommodate an access road; and potentially intrude into wetland buffers to make street improvements which could include pavement widening, a retaining wall, and the extension of storm pipes and stream culverts.

6. A north/south trending ridge divides the parcel into two drainage subbasins within the Hylebos Creek Basin. A tributary to the west branch of Hylebos Creek flows

from north to south across the west side of the property, and a tributary to the east branch of Hylebos Creek flows across the east side of the parcel from north to south. The Federal Way City Code (FWCC) defines both tributaries as major streams.

7. Three wetlands exist on the site. Wetland "A" measures approximately 4.5 acres, 14,000 square feet of which are located on the site. Wetland "A" is associated with the Hylebos tributary and also serves as an operating, regional storm drainage detention facility known as "Kitts Corner Pond", designed and maintained by the City. Pursuant to a 1996 Settlement Agreement between the City and a previous property owner, the applicant will discharge stormwater runoff from the western portion of the site into the Kitts Corner Pond (Wetland "A"). However, the primary wetland hydrology is provided by the tributary which flows into Wetland "A" through an 18-inch diameter storm pipe and a pair of 42-inch diameter stream culverts beneath South 336th Street.

8. Pursuant to the Settlement Agreement, the City has provided a permanent buffer width of 100 feet around Wetland "A" with the exception of the northern portion of the boundary adjacent to South 336th Street which ranges in width from approximately 40 feet to 50 feet. The proposed site plan shows an access extending east into the site from Pacific Highway South through the southern portion of the wetland buffer as anticipated by the Settlement Agreement which requires City staff to support such an extension. However, the agreement requires Process IV review and hearing examiner approval. Thus, development of the project will not impact Wetland "A", but will impact the buffer along the south portion of the wetland and could impact a portion of the buffer along the north portion of the wetland.

9. As previously found, a Hylebos Creek tributary flows into the wetland from beneath South 336th Street, exits the site through an adjustable gate spillway in the southwest corner of the pond, and then flows into a storm pipe which passes beneath Pacific Highway South. The tributary has no defined stream channel within Wetland "A" and dries up during the late summer.

10. Wetland "C" consists of a 3,762 square-foot Category III Palustrine scrub-shrub wetland located near the center of the parcel at the proposed location of the school auditorium/sanctuary building. The applicant proposes to fill both the wetland and its required 25-foot wide buffer. Wetland "C" has no hydrological connection to any other water body as its hydrology is provided by a high ground water table. The

wetland has low habitat value due to its size, lack of plant diversity, isolation, and lack of open water during the summer months.

11. Wetland "B", located along the eastern property line, consists of a linear, riparian wetland that is associated with and straddles the eastern Hylebos Creek tributary. The wetland meets the definition of a Category II Palustrine Forested wetland which requires a 100-foot wide buffer. The Hylebos tributary provides hydrology for the wetland as it flows into said wetland through two culverts beneath South 336th Street. Sewer line construction previously disturbed the wetland and buffer. The site plan shows the wetland surrounded by a 100-foot wide buffer with the exception of the north portion adjacent to South 336th Street.

12. To build the project as proposed and make a reasonable use of the property, the applicant must fill Wetland "C" and its buffer. To mitigate therefor, the applicant proposes to intrude into Wetland "B", its buffer, and the tributary buffer to create 5,200 square feet of Category II wetland which will include grading. The applicant must also displace 16,305 square feet of Wetland "A" buffer to facilitate construction of the access road from Pacific Highway South. To mitigate for the displacement, the applicant proposes to create 20,083 square feet of wetland buffer along the eastern border of the existing buffer. The applicant may need to displace an unknown amount of buffers for both Wetlands "A" and "B" adjacent to South 336th Street. The exact area of displacement (if any) will not be known until the City Council makes its determination regarding approval of the project and road improvements. Maximum displacement will include 11,690 square feet of Wetland "A" buffer and 6,794 square feet of Wetland "B" buffer. To mitigate, the applicant will add 21,480 square feet of wetland buffer to the northeast buffer of Wetland "A" and 17,165 square feet of buffer along the western buffer of Wetland "B" (See Exhibit 3).

13. Section 22-1358 FWCC sets forth the criteria an applicant must meet prior to constructing improvements and making land surface modifications within regulated wetlands. Section 22-1359 FWCC sets forth criteria for constructing improvements and land surface modifications within regulated wetland buffers. The first five criteria set forth in each section are identical, but modifications within wetlands have four additional criteria. As previously found, the applicant must fill Wetland "C" and its buffer. Prior to obtaining approval to do so, the applicant must establish that the request satisfies all criteria set forth in Sections 22-1358(d) and 22-1359(f) FWCC. Findings on each criteria are hereby made as follows:

A. Filling the wetland will not adversely affect water quality. The wetland has no hydrologic connection with other wetlands or stream corridors. A code-required final erosion and sedimentation control plan will address adverse water quality impacts related to grading and filling activities. The created wetland and buffer along the eastern tributary will provide much greater functions relating to water quality, hydrology, and wildlife habitat than currently provided by Wetland "C".

B. Filling the wetland and buffer will not adversely affect the quality of wildlife habitat. Wetland "C" has low habitat value due to its small size, hydrologic isolation, lack of plant diversity, and lack of open water during the summer. The compensatory mitigation areas along Wetland "B" will provide habitat values equal to or greater than retention of Wetland "C". No endangered or protected animals inhabit the site.

C. Filling the wetland and buffer will not adversely affect drainage or storm water retention capabilities. The applicant will excavate the mitigation area to ensure a volume of surface water detention and retention equal to Wetland "C".

D. Filling will not lead to unstable earth conditions or create erosion hazards. Wetland "C" is not located near any geologically hazardous areas, and an erosion and sedimentation control plan which the City must approve will address erosion from filling and grading.

E. Filling the wetland will not be materially detrimental to any other property in the area nor to the City as a whole. As previously found, the applicant will create 5,200 square feet of wetland as compared to the 3,762 square feet filled.

F. As previously found, the filling of Wetland "C" will result in no net loss of wetland area, function, or value.

G. The project is in the best interest of the public health, safety, or welfare. As previously found, creating additional wetland and buffer within the valuable stream/wetland area along the east property line results in greater resource protection and will allow more efficient use of land.

H. The applicant has demonstrated sufficient scientific expertise and supervisory capability to carry out the project. The applicant's wetland biologist is a recognized expert with over 10 years experience in designing wetland mitigation plans.

I. The applicant is committed to monitoring the project and making corrections if the project fails to meet projected goals. The applicant has provided a mitigation and monitoring plan for a five-year period and has also designed the storm drainage system to allow further discharge into the wetlands to restore hydrology if such is necessary.

J. The City has approved the applicant's conceptual mitigation plan, and the replacement and enhancement wetland and buffer ratios satisfy the criteria set forth in Section 22-1358(e)(3) FWCC.

15. Prior to obtaining approval to intrude into Wetland "B" and its buffer and the Stream "B" buffer to provide compensatory wetland and buffer for filling Wetland "C" and its buffer, the applicant must also establish that the request satisfies the criteria set forth in Sections 22-1358 and 22-1359 FWCC. Findings on each criteria are hereby made as follows:

A. Intrusion to create additional wetlands will not adversely affect water quality. The created wetland area will have a greater diversity of wetland plants than Wetland "C", and such plants will provide water quality by removing nutrients and toxins by filtration and uptake in plant tissue. Mitigation and monitoring will ensure no adverse impacts to water quality.

B. The intrusion will not adversely affect the existing quality of the wetland's or buffer's wildlife habitat. Habitat potential in the mitigation area of Wetland "B" is greater than the wetland and buffer of Wetland "C". The enhanced native scrub-shrub plant community and native forest habitat will increase the vegetation and plant diversity thereby improving near stream habitat opportunities.

C. The intrusion will not adversely affect drainage or stormwater retention capabilities. The applicant has designed the created wetland to replicate the stormwater retention capacity of Wetland "C". The applicant will excavate the toe of an existing slope and create a volume of surface water detention and retention comparable to or greater than the filled wetland. Creek flood waters, as well as stormwater runoff, will provide a source of hydrology to the new wetland. Project stormwater is infiltrated into the ground will move down slope through the wetland buffer into the created wetland.

D. The intrusion will not lead to unstable earth conditions nor create erosion hazards. The creation area consists of a relatively level flood plain adjacent to the Hylebos tributary. Excavation depth will range from one to three feet, and water velocities, even during winter flooding periods, are relatively slow. The dredging will create no steep slopes or other topography subject to erosion. Extensive revegetation will bind the soil and control erosion.

E. The intrusion will not be materially detrimental to any other property in the area nor to the City as a whole. The project will not affect off-site properties or public or private open space areas.

F. As previously found, the intrusion will result in no net loss of wetland area, function, or value. The applicant is creating more wetland than it is filling in accordance with the requirements of the FWCC. The applicant is also establishing substantially more wetland buffer than destroyed.

G. The project is in the best interest of the public health, safety, or welfare. As previously found, trading a small, isolated wetland for an expanded, connected, wetland system results in greater resource protection and more efficient use of land.

H. As previously found, the applicant has demonstrated sufficient scientific expertise and supervisory capability to fulfill the project.

16. Prior to eliminating a portion of Wetland "A"'s south buffer to allow construction of the access road from Pacific Highway South, the applicant must establish that the request satisfies the criteria set forth in Section 22-1359(f) FWCC, addressing wetland buffers, and Section 22-1312(c) FWCC, addressing intrusion into setbacks for streams. Said Sections set forth the same criteria, but Section 22-1312 FWCC has one additional criteria. Findings on each criteria are hereby made as follows:

A. Locating the access road within the Wetland "A" buffer will not adversely affect water quality. As previously found, Wetland "A", located mostly west and northwest of the site, is known as the "Kitts Corner Pond" and provides a regional storm drainage facility. The applicant's conceptual storm drainage plan (Exhibit L) shows surface water collected from the proposed access road and directed into a storm water treatment system to the south of said road. The water then discharges into Wetland "A" following cleansing.

B. Construction of the road in the buffer will not adversely affect the existing quality of the wetland's or buffer's wildlife habitat. The buffers on the west and south sides of Wetland "A" are presently in poor condition and consist of earthen berms, gravel roadways, and sparse vegetation. However, the eastern buffer consists of forest and is therefore in good condition. The applicant proposes to remove 16,305 square feet of a previously disturbed buffer area and replace it with property adjacent to the high quality, forested buffer on the east side of the wetland. The access road is proposed within an existing access easement and was recognized in the Settlement Agreement.

C. Construction of the road will not adversely affect drainage or stormwater retention capabilities. Construction in accordance with a final storm drainage grading and erosion control plan will assure no adverse impacts to the drainage or stormwater retention capabilities of the buffer.

D. Construction will not lead to unstable earth conditions nor create erosion hazards. The road area contains no geologically hazardous areas, and construction in accordance with approved plans will ensure that no unstable earth conditions or erosion hazards develop.

E. Construction will not be materially detrimental to any other property in the area of the subject property nor to the City as a whole, including loss of open space. Replacement of a disturbed buffer with forested property will benefit the City and properties in the area. The additional buffer will preserve and protect sensitive areas from future land modifications and encroachments by people and animals.

F. Section 22-1312(c)(6) requires the applicant to show that the intrusion is necessary for reasonable development of the subject property. The road will provide access to the site in accordance with an existing easement recognized by the Settlement Agreement. To build the project, the applicant must have an access onto Pacific Highway South. Therefore, the applicant cannot proceed with reasonable development without the road.

17. As previously found, depending on the City Council's requirements for street

improvements on South 336th Street, the applicant may need to intrude into those portions of the buffers of both Wetlands "A" and "B" located within the right-of-way of said road. If the City Council requires full street improvements within the wetland buffer areas, the applicant will need to disturb 11,690 square feet of Wetland "A" buffer and 6,794 square feet of Wetland "B" buffer. The applicant proposes to create 21,480 square feet of buffer for Wetland "A" and 17,165 square feet of buffer for Wetland "B". Thus, the applicant will replace 18,484 square feet of low quality wetland buffer with 38,645 square feet of high quality buffer. Prior to intruding into said wetland buffers to make street improvements, the applicant must establish that the requests satisfies the criteria set forth in Sections 22-1312 and 22-1359 FWCC. The request satisfies said criteria as the applicant must construct improvements to include pavement widening, retaining walls, and extension of storm drainage pipes. The existing location and configuration of South 336th Street plus the required street improvements dictate the street and storm drainage system design for the overall project. All improvements will occur within the right-of-way, and the retaining walls will limit buffer displacement. Both buffers along South 336th Street have been previously disturbed by construction of existing street and drainage improvements but have revegetated over time. As previously noted, a sewer line was constructed within Wetland "B". The wetland buffers within the right-of-way provide no significant habitat value, but must be invaded to provide access to the site. The applicant has also demonstrated that the stream cannot cross beneath South 336th Street in an open condition, and extending the culvert by three feet will have little, discernable effect on stream function or habitat. The existing culvert meets the 100-year storm design standard as will the extensions. The culvert design does not preclude fish passage, although fish do not inhabit either tributary, and are not located immediately down stream.

18. In summary, Wetland "A" will not be disturbed, but will have its buffer area expanded from the present 192,327 square feet to a possible 205,895 square feet, and will also have 3,598 square feet of wetland enhancement. Wetland "C" will be filled and eliminated. Wetland "B" will increase in size by 5,200 square feet and will have its buffer area increased from the present 193,085 square feet to 220,089 square feet. Overall, wetland size will increase from the present 242,971 square feet to 244,410 square feet. Wetland buffers will increase from the present 393,838 square feet to 425,985 square feet (Exhibit 3). Therefore, development of the site as proposed will result in no net loss in wetlands and/or wetland buffers.

19. Prior to obtaining Process IV review approval, the applicant must establish that the request satisfies the criteria set forth in Section 22-445(c) FWCC. Findings on each

criteria are hereby made as follows:

A. All requests are consistent with the Federal Way Comprehensive Plan. Applicable goals and policies set forth in the Plan include Policy CA4 which approves a tradeoff of small, isolated wetlands in exchange for a larger, connected wetland system which can achieve greater resource protection and reduce isolation and fragmentation of habitat. The applicant proposes a development which eliminates a "small, isolated wetland" in exchange for increasing the size of a more valuable, larger, connected wetland system. Policy NEG7 of the Comprehensive Plan encourages the protection and enhancement of the functions and values of the City's wetlands, and the applicant's mitigation plans do so. As previously found, the project meets the City's objective of no overall net loss of wetland functions or values in accordance with Policy NEP43. The mitigation site complies with Policy NEP50 as it contributes to an existing wetland system and increases buffers for existing wetlands.

B. The project is consistent will ~~all~~ applicable provisions and laws of the FWCC assuming compliance with conditions of approval and City Council approval for the overall development.

C. The project is consistent with the public health, safety, and welfare.

D. The City Council will determine whether the streets and utilities in the area are adequate to serve the anticipated demand from the proposal. The wetland mitigation does not generate demand on streets and utilities. Approval of the Process IV request will authorize street frontage improvements within the South 336th Street right-of-way and construction of an access road from Pacific Highway South.

E. The City Council will determine whether the proposed accesses to the parcel are at their optimal location and configuration. Again, the Process IV approval authorizes street improvements and construction as set forth above.

20. The City included a number of comment letters which raised generalized objections regarding the filling of wetlands and intrusion into wetland buffers. However, none of the letters offered expert testimony contradicting the applicant's expert studies and the City's review thereof. The Washington Court of Appeals addressed such

comments in Maranantha Mining v. Pierce County, 59 Wash.App. 795 (1990);

> The only opposing evidence was generalized complaints from displeased citizens. Community displeasure cannot be the basis of a permit denial. 59 Wash.App. 795, at 804.

IV. CONCLUSIONS

From the foregoing findings the Hearing Examiner makes the following conclusions:

1. The Hearing Examiner has jurisdiction to consider and decide the issues presented by this request.

2. The applicant has established that the request to fill a Category III wetland and buffer, mitigate for such activities by providing additional wetlands and buffers, displacing a wetland/stream buffer to accommodate an access road, and intrude into wetland buffers to construct street improvements is consistent with applicable criteria set forth in Sections 22-1358, 22-1359, and 22-1312 FWCC. The project also complies with applicable goals and policies of the Federal Way Comprehensive Plan.

3. The project satisfies all criteria set forth in Section 22-445(c) FWCC for Process IV approval. Therefore, Process IV approval should be granted subject to the following conditions:

    1. As required by the Director of Community Development Services, prior to occupancy of any buildings on the site, the applicant shall set aside the wetlands and buffers approved by this decision as Native Growth Protection Tracts (NGPT's). The boundaries of the areas shall be surveyed and shall reflect the expanded buffers shown in a final approved Mitigation and Monitoring Plan, prepared in accordance with Condition #7 below; and shall be in addition to the buffer area for the east side of Wetland "A" as delineated the 1996 Settlement Agreement between the City of Federal Way and the Federal Way Industrial Park. The applicant shall submit the draft documents for the City's review and authorization and the documents shall be recorded as directed by the City.

    2. As required by the Directors of Community Development Services Department and Public Works Department, prior to issuance of any

construction permits, the applicant shall field-flag all identified wetland buffer boundaries in accordance with a final approved Mitigation Plan, prepared in accordance with Condition #7 below; and consistent with the recorded Native Growth Protection Tracts as required by Condition #1 above; and the buffer boundaries shall be reflected on all applicable construction drawings and permits.

3. As required by the Director of Community Development Services, prior to issuance of a building permit, the applicant shall submit for the City's review and approve a plan to provide signage on the site, identifying environmentally sensitive areas and prohibiting human and pet access into such areas. The plan shall include the number, location, and design details, including text, for the proposed signs.

4. Any use of the recreational field adjacent to Wetland "B" for competitive athletic games, such as baseball or soccer, as may be approved by the Director of Community Development Services, must provide fencing adjacent to the sports field along the west Wetland "B" buffer boundary, delineated pursuant to Condition #1 above. Prior to initiation of any such activities, the applicant shall establish the fencing pursuant to the City's review and approval of a fencing plan and design details as provided by the applicant, and such fencing shall be designed to allow for the passage of small animals.

5. As required by the Director of Community Development Services pursuant to FWCC § 22-1358(1)(g) and § 22-1358(3)(4), prior to issuance of construction permits related to any work approved with this application, the applicant shall: (a) provide a cost estimate that covers the complete costs for plant materials, installation, and maintenance, including contingencies, pursuant to the final approved Mitigation Plan; (b) provide a performance and maintenance bond to the City in the amount of 120 percent of the cost estimate; and (c) pay for the services of a qualified professional selected and retained by the City to review monitoring reports, conduct inspections, and make recommendations to the City during monitoring period. Following successful installation of the wetland mitigation work pursuant to the final approved Plan and initial inspection, the performance portion of the bond shall be released and the five-year maintenance portion of the bond shall apply during the five years of monitoring.

6. As required by the Director of Public Works, grading and clearing activities in the Wetland "B" mitigation area (excluding installation of planting and an irrigation system) shall be prohibited between October 1st and April 30th.

7. Prior to issuance of any construction permits, the applicant shall submit a final Mitigation and Monitoring Plan, for the City's review and approval, that addresses all outstanding requirements as identified in the April 8, 2004, memorandum from Sheldon and Associates, Inc.

8. The Process IV approval does not take effect unless or until the City Council approves the Comprehensive Plan Amendment, Rezone, Development Agreement, and Development Plan, as separately requested by the applicant.

DECISION:

The request for Process IV approval to allow the filling of Wetland "C", the mitigation for the filled wetland and buffer by the creation of wetland and additional buffer area in an and adjacent to Wetland "B"; the displacement of a portion of a wetland/stream buffer to accommodate an access road; and the intrusion into wetland buffers for street improvements is hereby granted subject to the conditions contained in the conclusions above.

DATED THIS 23rd DAY OF April, 2004.

STEPHEN K. CAUSSEAUX, JR.
Hearing Examiner

TRANSMITTED THIS 23rd DAY OF April, 2004, to the following:

APPLICANT/AGENT: Gil Hulsmann
Abbey Road Group, LLC
PO Box 207
Puyallup, WA 98372

OWNER(S):

Christian Faith Center
PO Box 9860
Seattle, WA 98198

Bob Loomis
2101 S. 324th St., SP 205B
Federal Way, WA 98003

R.D. Pearson
2101 S. 324th St., #303
Federal Way, WA 98003

Barry Turnbull
33355 20 S.
Federal Way, WA 98003

Phyllis L. Bowman
32820 20th Ave. S., #25
Federal Way, WA 98003-9429

Marie Adair
28811 19th Ave. S.
Federal Way, WA 98003

Dr. Patricia Mail
35214 – 28th Ave. S.
Federal Way, WA 98003

Paul Ouellette
1918 Rolling Hills SE
Renton, WA 98055

Rik Newell
2101 S. 324th St., #137
Federal Way, WA 98003

Joann Piquette

Carl Jones
Belmor Park
2101 S 324th St., SP333
Federal Way, WA 98003

Jack Tylare
2101 S. 324th St., #10
Federal Way, WA 98003

Shirley Fulbraa
33357 20 S.
Federal Way, WA 98003

Tom Rolph
1860 S. 336th St.
Federal Way, WA 98003

Juliet Sykes
402 S. 333rd St., Suite #100
Federal Way, WA 98003

Virginia Marquart
29009 22nd Ave. S.
Federal Way, WA 98003

John C. Brownson
2101 S. 324th St., #117
Federal Way, WA 98003

Robert Roper
525 SW 312th St.
Federal Way, WA 98003

Ted W. Wilson

302 S. 295th Pl.
Federal Way, WA 98003

824 S. Marine Hills Way
Federal Way, WA 98003

Margaret Nelson
32904 4th Ave. SW
Federal Way, WA 98023

John Kanto
1824 S. 344th St.
Federal Way, WA 98003

City of Federal Way
c/o Chris Green
P.O. Box 9718
Federal Way, WA 98063-9718

PROCESS IV

Rights to Appeal

Decisions of the hearing Examiner may be appealed by any person who is to receive a copy of that decision under FWCC Section 22-443.

The appeal, in the form of a letter of appeal, must be delivered to the Department of Community Development Services within fourteen (14) calendar days after the issuance of the Hearing Examiner's decision. The letter of appeal must contain:

2. A statement identifying the decision being appealed, along with a copy of the decision;

3. A statement of the alleged errors in the Hearing Examiner's decision, including specific factual finds and conclusions of the Hearing Examiner disputed by the person filing the appeal; and

4. The appellant's name, address, telephone number and fax number, and any other information to facilitate communications with the appellant.

The person filing the appeal shall include, with the letter of appeal, the fee established by the City of the costs of preparing a written transcript of the hearing (or in the alternative, the appellant may prepare the transcript at his or her sole costs from tapes of the hearing provided by the City).The appeal will not be accepted unless it is accompanied by the required fee and cost (or agreement of the appellant to prepare the transcript).

Appeals from the decision of the Hearing Examiner will be heard by The City Council. The decision of City Council is the final decision of the City.

The action of the City in granting or denying an application under this article may be reviewed pursuant to RCW 36.70C in the King County Superior Court. The Land Use Petition must be filed within twenty-one (21) calendar days after the final land use decision of the City.

EXHIBIT D

STATEMENT OF FACTS AND CONCLUSIONS

1. The applicant has a possessory ownership interest in a generally rectangular parcel of unimproved property located east of Pacific Highway South and west of Interstate 5 (I-5) between South 336th Street and South 341st Place within the City of Federal Way.

2. The subject site currently has a comprehensive plan and zoning designation of Business Park (BP) and the land is presently vacant. Existing zoning and land uses of the surrounding properties in the vicinity include single and multiple family to the north; a mix of residential, commercial, and industrial to the south; commercial to the west, and Interstate 5 and commercial to the east.

3. The applicant has submitted requests for approval of a comprehensive plan amendment and rezone, with an associated development agreement and development plan to allow development of the site into a 218,500 square-foot church, 101,526 square-foot private school, and associated parking, playfields, and accessory uses.

4. The requested Comprehensive Plan Amendment and Rezone is subject to a City Council decision pursuant to *Federal Way City Code* (FWCC) Chapter 22, Article IX, "Process VI Review;" and the requested Development Agreement and Development Plan is subject to City Council decision pursuant to FWCC Chapter 22, Article IX, "Process VI Review," and FWCC Chapter 22, Article XXI, "Development Agreements." The decision to approve or deny the requests is within the jurisdiction of the Federal Way City Council.

5. The City Council held a Public Hearing May 24, 2004 and June 15, 2004, took testimony, admitted evidence into the record, and considered the matter fully.

6. All appropriate procedures were followed in accordance with the requirements of the FWCC and applicable law.

7. All appropriate notices were delivered in accordance with the requirements of the FWCC and applicable law.

8. The Hearing Examiner reviewed and conditionally approved the environmentally sensitive areas requests associated with the application on April 23, 2004. The Hearing Examiner Decision sets forth general findings, applicable policies and provisions in the matter and is hereby incorporated in its entirety, without limitation, by this reference.

9. Pursuant to the State Environmental Policy Act (SEPA), the City issued a Notice of Adoption of Existing Environmental Documents and Issuance of a Determination of Nonsignificance, on the proposed Comprehensive Plan Amendment and Rezone of the site from Business Park (BP) to Multifamily Residential 3600 (RM-3600) on July 4, 2001. The City issued Draft and Final Environmental Impact Statements (EIS) for the development application on November 18, 2003, and March 3, 2004, and EIS Addenda on April 16, 2004 and May 21, 2004. Four public meetings were conducted during the environmental review process for the proposed project. These included an EIS Scoping Meeting on August 27, 2002; Neighborhood Traffic Meeting on May 8, 2003; Draft

Environmental Impact Statement (DEIS) hearing on December 12, 2003; and City Council EIS briefing on March 15, 2004. The Threshold Determination, EIS and addenda, and all environmental documents for the project, are hereby incorporated in their entirety, without limitation, by this reference.

10. The Staff Report sets forth general findings, applicable policies and provisions in the matter and is hereby incorporated in its entirety, without limitation, by this reference.

11. Pursuant to FWCC Section 22-1660, "Purpose," development agreements associated with a comprehensive plan designation and related zoning change may be used at the City Council's discretion, where the project is larger in scope and has potentially larger impacts than normal, or where the City Council may desire to place certain restrictions on the proposal. The intent of a development agreement is not to waive requirements normally associated with a proposed use. A "Concomitant Agreement and Development Agreement", herein called "The Agreement" or "The Development Agreement," has been prepared for the project in order to fully address and mitigate identified impacts associated with the project. The Concomitant Agreement allows for a rezone of the property subject to conditions governing the use of the property. Under the Concomitant Agreement, the allowable use of the property shall be limited to a church, a school, and accessory uses. Pursuant to FWCC Section 22-1662, "Content," the Agreement sets forth the development standards and other provisions that apply to and govern and vest the development, use, and mitigation of the development of the real property for the duration specified in the Agreement, consistent with the applicable City of Federal Way development regulations. The Agreement is accompanied by a Development Plan (*Exhibit B* to the Agreement) as required by FWCC Section 22-1669, and has been prepared in accordance with FWCC Section 22-1664, "Preparation of Development Agreement."

12. Mitigation measures established in the Agreement are based on the FWCC and adopted regulations, policies and procedures; *Federal Way Comprehensive Plan* (FWCP); the EIS prepared for the project, including the key development and operational assumptions underlying the EIS analysis; and the City's police power authority.

13. Mitigation measures established in the Agreement are proportional to direct, identified impacts of the development and are supported by substantial evidence.

14. The proposed principal uses of the site as a church and school, are allowed uses in the proposed Multifamily Residential (RM) zoning districts, pursuant to FWCC Sections 22-671 and 22-674, subject to all applicable development regulations and standards. Use and development of the site consistent with the FWCC and the Development Agreement will help ensure compatibility of the use with surrounding areas.

15. The project will provide a "front yard" setback from South 336th Street of a minimum 50 feet; with "side" and "rear" yards of 30 feet for the church building; and 50 feet for the school building, ball fields and any playground equipment. This provides an additional 20 feet more of front yard setback from South 336th Street for the church building than would be required by FWCC Sections 22-671 and 22-674, which allows additional landscape screening against South 336th Street and residential zoning districts to the north of the site. In addition, pursuant to code-required parking setbacks and design guidelines, a 15-foot parking lot setback along church portion with landscape buffer will be provided along the south property line adjacent to the residential uses to the south.

16. Consistent with FWCC Sections 22-671 and 22-674, the maximum allowed height of single-story elements of the church building is 35 feet above average building elevation (ABE), with up to three additional feet allowed for articulated cornices, and the maximum second-story height for offices, classrooms, library, and similar uses is 40 feet above ABE. The maximum height of the school building is 40 feet above ABE, with up to three additional feet allowed for articulated cornices. The maximum height of the sanctuary portion of the church, and the gymnasium portion of the school auditorium, is 55 feet ABE.

17. Pursuant to FWCC Section 22-1669, "Development Plan," and FWCC Section 22-395, "Director's Decision", the site and architectural design elements of the project were approved in a March 20, 2004, Director's Design Decision, based on the analysis and findings contained in *Exhibit A* to the decision. Development of the site in accordance with the design decision and other conditions of project approval and required mitigation will ensure incorporation of good design principles and compatibility with surrounding areas. The design decision sets forth general findings, applicable policies, and provisions, and is hereby incorporated in its entirety, without limitation, by this reference.

18. The applicant's preliminary clearing, grading, erosion control, significant tree survey, landscape, and surface water drainage plans have been reviewed and accepted under applicable City of Federal Way adopted codes, policies, and regulations, including FWCC Chapter 21, "Surface Water Management"; FWCC Chapter 22, Article XVII, "Landscaping"; and the *King County Surface Water Design Manual* (KCSWDM) and the City's amendments to the KCSWDM, subject to review of final construction plans prepared in accordance with all applicable codes and development standards; the EIS; Process IV conditions of approval; and mitigation required under the Development Agreement.

19. Surface water detention and water quality treatment facilities will be provided for both the west and east drainage sub-basins on the site, in accordance with all applicable design and development regulations.

20. The Development Agreement establishes a number of mitigation measures that meet or exceed code requirements. This includes the oversight of a Construction Site Erosion and Sediment Control (ESC) Supervisor; a Stormwater Pollution Prevention Plan; a phased construction plan; and seasonal construction limits. Surface water mitigation in the Agreement includes design and construction of the east side stormwater detention pond to meet Level 2 flow control standards; collection and dispersement of roof runoff from the sanctuary roof to adjacent wetland buffer areas; design and construction of surface water treatment facilities for the East and West 1 sub-catchments to include the use of Stormwater Management filter vault systems, with compost medium, that meets or exceeds Resource Stream Protection Standards; and provision of an Integrated Pest Management Plan as described in the *Department of Ecology Stormwater Manual* (2001), in order to control the use of fertilizers and pesticides. The Agreement also provides for denser vegetated bank cover and larger trees around surface water detention water quality treatment ponds than would otherwise be required by code. Additional vegetated cover will contribute to water quality by decreasing the temperature of surface water runoff from impervious surfaces and standing water in drainage facilities. This will help mitigate stormwater drainage impacts from the development.

21. Perimeter landscape buffers, as specified in the Development Agreement, meet or exceed the applicable standards in FWCC Section 22-1566, "Multifamily Residential, RM." This includes 50 feet of landscaping along South 336th Street; 20 feet along other public rights-of-way and access easements; 15 feet along other property lines associated with the church; and 10 feet along other

property lines associated with the school. These provisions are consistent with the FWCC, and also provide 20 feet of additional landscaping along South 336th Street than required by code. A 50 foot vegetated landscape buffer along South 336th Street will preserve additional native trees and shrubs and preserve a cross-site vegetated corridor linking to on-site wetland and stream buffers and riparian areas along the East Branch Hylebos Creek. In addition to retaining native vegetation and providing habitat opportunity, this corridor will provide water quality functions such as rainwater interception and filtering.

22. The clearing, grading, surface water, and landscaping mitigation provided in the Development Agreement is consistent with goals and policies contained in the FWCP Natural Environment Chapter, including NEG1, NEG2, NEG3, NEG10, NEP1, NEP2, NEP7, NEP 10, NEP18, NEP21, NEP63, and NEP64.

23. Pursuant to FWCC Sections 22-1671, 22-1674, and 22-1378, the required amount of parking for churches and schools is determined on a case-by-case basis, pursuant to a parking demand analysis. Based on the City's review of the applicant's Traffic Management Plan (TMP), the Development Agreement specifies a minimum of 1,406 parking stalls and a maximum of 1,540 stalls on the site to serve anticipated parking demand for ordinary operation of the site. The Agreement also requires the applicant to prepare and submit an overflow parking plan for review and approval to the Public Works Director prior to special events to manage overflow parking using resources such as transit, shuttle service, and traffic control such as flaggers and police officers. The Agreement establishes the parking setbacks from property lines, consistent with FWCC Sections 22-671 and 22-674.

24. Lakehaven Utility District has provided Certificates of Water and Sewer Availability for the property, and will provide these services pursuant to developer extension agreements between the applicant and District. Fire and emergency medical services will be provided by the Federal Way Fire Department. A City-operated regional storm drainage detention pond located in the northwest portion of the site has been determined to have adequate capacity to accommodate site drainage from the westerly sub-basin on the property.

25. Staff has reviewed and analyzed transportation related matters. The Staff Report sets forth general findings, applicable policies, and provisions related to the matter, and is hereby incorporated in its entirety, without limitation, by this reference.

26. The project site has frontage on the existing rights-of-way of South 336th Street, SR 99 (Pacific Highway South), South 341st Place, and the planned extension of 20th Avenue South, as shown in FWCP Map III-5. Pursuant to FWCC Section 22-1474(a), frontage improvements are required for these roadways.

27. South 336th Street is classified as a minor arterial, as shown in FWCP Map III-5. FWCP Map III-6 classifies South 336th Street as a Type K street. FWCP Map III-19 was revised to relocate the segment of a bicycle route on South 336th Street between 13th Place South and 20th Avenue South to South 330th Street. Therefore, a Type K street is no longer applicable to South 336th Street west of 20th Avenue South; a Type M street is now the appropriate standard. Existing improvements on the frontage consist of 36 to 54 feet of pavement with intermittent curb, gutter, and sidewalk on the north side only. Existing right-of-way width varies from 60 to 100 feet. The applicant will dedicate five feet of right-of-way on the west 400 feet of frontage only and construct the required half-street improvements on the entire frontage. Modifications approved by the Director of Public Works may be made pursuant to FWCC Section 22-1477, in order to minimize impacts to wetlands and wetland buffers.

28. SR 99 (Pacific Highway South) is classified as a principal arterial, as shown in FWCP Map III-5. FWCP Map III-6 classifies SR 99 as a Type A street. SR 99 is currently under construction to provide full standard improvements, and all necessary right-of-way has been acquired.

29. Twentieth Avenue South is classified as a minor collector, as shown in FWCP Map III-5. FWCP Map III-6 classifies 20th Avenue South as a Type R street. As a new street through the site, the applicant will dedicate all 66 feet of right-of-way and construct full street improvements.

30. South 341st Place is classified as a minor collector, as shown in FWCP Map III-5. FWCP Map III-6 classifies South 341st Place as a Type R street. Existing improvements consist of a 36-foot street with curbs and gutters, and five-foot sidewalks in a 60-foot right-of-way. The applicant will dedicate an additional three feet of right-of-way. Pursuant to FWCC Section 22-1477, the requirement for street frontage improvements on South 341st Place are waived because the improvements are already in place.

31. Pursuant to FWCC Section 22-1474(b), the City may require up to 300 square feet of right-of-way dedication per average daily trip generated. According to the EIS, average daily trip generation would exceed 2688 trips, thus allowing the City to require at a minimum 806,486 square feet of right-of-way dedication. Approximately 108,290 square feet of right-of-way dedication would be required to meet full standards. Thus, the right-of-way requirements are proportionate with the level of impact.

32. Pursuant to FWCC Section 22-1542, two-lane driveways shall be 30 feet wide, and three-lane driveways shall be 40 feet wide, unless design vehicles (the largest vehicle that would reasonably be expected to use the driveway, and therefore the one to which the driveway will be designed) require larger widths. The EIS analyzed all driveways as two-lane except for the northerly of the four driveways onto 20th Avenue South, and the driveway onto South 336th Street, which were assumed to be three-lane driveways.

33. Pursuant to FWCC Section 22-1543(a), South 336th Street has an access classification of four, which allows access points with spacing of 150 feet measured centerline-to-centerline. FWCC Section 22-1543(c) limits access to one per 330 feet of frontage. South 336th Street has approximately 2150 feet of frontage, thus six access points could be allowed. The site plan for the project shows one access approximately 572 feet west of 20th Avenue South. A single-family residential driveway is located opposite this proposed driveway, the driveway to the Ridgecrest Motel is located approximately 100 feet to the west, and a driveway to a multi-family residential complex is located 230 feet to the east. The spacing standard does not apply to single-family residential uses. If the driveway were to be relocated to the east, it would worsen the intersection sight distance for traffic turning left from the driveway onto westbound South 336th Street. If the driveway were relocated to the west, it would infringe upon wetland buffer. The Ridgecrest Motel consists of eight units. Based on ITE *Trip Generation*, 6th edition, the motel is estimated to generate four trips the morning, evening, and Saturday peak hours, and three trips during the Sunday peak hour; therefore, although this access does not meet spacing standards, it has a low probability of creating a significant safety issue. City staff will monitor.

34. Pursuant to FWCC Section 22-1543(a), SR 99 has an access classification of one, which, due to its status as a state highway, must meet the Washington State Department of Transportation (WSDOT) standard of 250 feet. Left-turn in access would best be allowed at a spacing of 330 feet, and full access is permitted only at signalized intersections. However, FWCC Section 22-1543(c) limits

access to one per 330 feet of frontage. The site has approximately 534 feet of frontage; therefore, only one access point would be permitted. The project proposes to provide a right-in/right-out access 749 feet south of South 336th Street, which would be shared with Pacifica Plaza. This location has no other access within 250 feet. Therefore, this access meets driveway spacing standards.

35. Pursuant to FWCC Section 22-1543(b), the access spacing standard for 20th Avenue South would be 150 feet. Each of the proposed driveways meets this standard. However, FWCC Section 22-1543(c) limits access to one per 330 feet of frontage. Twentieth Avenue South has 1662 feet of frontage, thus five access points could be allowed, whereas four are proposed. Therefore, this standard is met.

36. Pursuant to FWCC Section 22-1543(b), the access spacing standard for South 341st Place would be 150 feet. FWCC Section 22-1543(c) limits access to one per 330 feet of frontage. No access points are proposed onto South 341st Place. However, the creation of the intersection of 20th Avenue South and South 341st Place creates access spacing issues with an existing driveway at the intersection of 21st Avenue South and South 341st Place. As part of engineering plan review, the applicant will provide plans that provide adequate intersection sight distance, geometrics, and traffic control measures that provide for safe and efficient operation of the intersection consistent with FWCC and adopted standards.

37. Pursuant to TIA Guidelines item VI.D.4.a, the City uses *Highway Research Record 211* to determine when left-turn lanes are warranted at unsignalized intersections. A left-turn lane is warranted when certain thresholds involving travel speeds, left-turn volumes, through volumes in the same direction as the subject left-turn, and opposing traffic volumes are exceeded.

38. Based on the volumes in the traffic analysis for the EIS, this warrant is met at the driveway on westbound South 336th Street during the morning, afternoon, and evening peak hours. Therefore, the applicant will provide a westbound left-turn lane at the site access on South 336th Street.

39. Based on the volumes in the traffic analysis for the EIS, left-turn lane warrants are met at the north driveway on northbound 20th Avenue South during the morning, and Sunday between service peaks; at the north central driveway on southbound 20th Avenue South during the morning, afternoon, Sunday between service, and Sunday after service peaks; at the south central driveway on northbound 20th Avenue South during the morning, and Sunday between service peaks; at the south central driveway on southbound 20th Avenue South during the Sunday between service peak; at the south driveway on southbound 20th Avenue South during the Sunday between service and after service peaks; and at the south driveway on northbound 20th Avenue South during the Sunday between service peak. Since left-turn lanes are warranted at each driveway, the applicant will stripe 20th Avenue South to provide a two-way left-turn lane throughout the site.

40. The proposed schedule of activities contained in the Traffic Management Plan (TMP), required pursuant to FWCC Section 22-671, was analyzed in the environmental review. Pursuant to FWCP Policies TP5, TP45, and TP62, the following restrictions on the scheduling of activities will be placed on the development in order to reduce traffic impacts: school classes will be completed by 3:30 pm; Sunday services will be separated by at least 90 minutes; evening services will be scheduled to start no earlier than 6:30 pm; Dominion College will have no classes scheduled between noon and 6:30 pm; and special events will be reviewed on a case-by-case basis pursuant to the TMP and should be scheduled to not add trips during peak hours of other uses, or conversely, other uses should be canceled to accommodate the special events. Should a modification of this

schedule of activities, which was submitted for review in the EIS, be required, the Agreement specifies the applicable code process to use.

41. The intersection of SR 99 at South 312th Street would fail the adopted Level of Service (LOS) standards in 2007 with or without Christian Faith Center (CFC). This intersection was originally included in the study area based on a 10 evening peak hour trip threshold in the City's *Guidelines for the Preparation of Transportation Impact Analyses*. As a result of the initial analysis, CFC modified their proposed hours of operation to reduce evening peak hour trip generation. As a result, the project now impacts this intersection by eight evening peak hour trips, less than the 10-trip threshold. Therefore, no mitigation is required at this intersection.

42. Pursuant to the methodology analyzed in the EIS, the intersection of South 320th Street and 23rd Avenue South fails the adopted LOS standard during the evening peak hour in 2007, with or without the project, and fails as a result of the project during the Sunday peak. Staff considered other methodologies for determining failure of the adopted LOS standard without violating the adopted policy. In practice, City staff has administered the policy as outlined in the TIA guidelines as the worst of two tests. Table 2 defines a volume/capacity ratio test as X_c (as defined in the *Highway Capacity Manual*) must be less than 1.000. However, item V.B. in the TIA Guidelines specifies that no movement shall have a volume/capacity ratio greater than 1.000. It is this latter standard upon which the EIS identified the LOS failure. Using X_c, the volume /capacity ratio is 0.91 during the 2007 evening peak hour and 0.94 during the Sunday peak hour. Given that using X_c is consistent with FWCP Policy TP16, and the high cost to mitigate relative to the impact, no mitigation will be required at this intersection.

43. The intersection of South 336th Street at 1st Way South would fail the LOS standards during the evening peak hour in 2007 with or without the project. The proposed mitigation would provide a protected right turn overlap phase for westbound traffic during the southbound left-turn phase. This is a minor revision to the signal design and will be incorporated into the capital project at this location, which is scheduled to be in design in 2004. No mitigation will be required at this intersection beyond pro-rata share contributions described in the Agreement.

44. The intersection of 16th Avenue South at South 341st Place would fail the LOS standard during all peak hours analyzed as a result of the project. The project would add 426 trips during the morning peak hour, 344 trips during the afternoon peak hour, 99 trips during the evening peak hour, and 820 trips during the Sunday peak hour. Because of its proximity to the signalized intersection of 16th Avenue South and SR 99, it is impractical to signalize this intersection to resolve the LOS failure.

45. The EIS considered three alternatives to resolve the LOS failure at 16th Avenue South and South 341st Place. One assumes that the capacity restriction will resolve itself by drivers rerouting to avoid making the left-turn from westbound South 341st Place to southbound 16th Avenue South, by rerouting to South 336th Street and SR 99 when leaving the site, called the "Capacity Constrained Distribution" in the EIS. The second is to provide a connection between South 341st Place and South 344th Street, and use planned signalized intersections on South 344th Street at 16th Avenue South and SR 99 to access these roadways. The third alternative considered is to prohibit westbound left-turns from South 341st Place to southbound 16th Avenue South and accommodate U-turns by constructing a roundabout at the intersection of SR 99 and 16th Avenue South. Based on staff analysis, alternatives one and three are not recommended.

46. The "Capacity Constrained Distribution" assumes that due to significant delays encountered when attempting to make a westbound left-turn from S 341st Place to 16th Avenue S, drivers would

become frustrated and learn to use alternate routes. The EIS analysis assumed that most of these trips would leave the site to the north onto S 336th Street, and most would head west on S 336th Street to SR 99 and turn left to 16th Avenue S or continue straight on SR 99. Although no capacity improvements appear warranted as a result of this assignment, staff has significant concerns about the safety of the 16th Avenue S / S 341st Place intersection under this scenario. It has been the City's experience that unsignalized intersections operating near capacity have a higher than average collision rate. This is due primarily to increased driver frustration, leading to drivers choosing gaps in opposing traffic that are inadequate to complete the maneuver safely. Therefore, this alternative is not recommended.

47. The roundabout alternative would provide adequate levels of service. In order to accommodate planned traffic volumes, it would have a 3-lane roundabout with an inscribed diameter of 200 feet. As SR 99 is a state highway, any intersection modifications would have to be approved by WSDOT. To date, WSDOT has not approved any three-lane roundabouts on the state highway system, and its historical reluctance to approve 2-lane roundabouts casts doubt as to whether this would be a viable alternative at this time. In addition, a roundabout would need right-of-way on both sides of SR 99, impacting developed properties on the east side of SR 99. Therefore, this alternative is not recommended.

48. Providing a connection between South 341st Place and South 344th Street reroutes traffic around the intersection of 16th Avenue South and South 341st Place, and takes advantage of a project planned by the City to construct traffic signals on South 344th Street at 16th Avenue South and at SR 99.

49. Potential locations to provide this connection between South 341st Place and South 344th Street are 21st Avenue South and 18th Avenue South. Due to the presence of wetlands, three different alignments for 21st Avenue South were considered in the EIS. An alignment along the existing right-of-way would impact wetlands and result in two stream crossings; an alignment to the east would cross the wetland at its narrowest width, but would still impact wetlands and result in two stream crossings; and an alignment to the west would avoid impacting the stream and wetlands, but would require right-of-way acquisition from the truck parking lot.

50. Eighteenth Avenue South has continuous right-of-way, but is not a through street due to an existing temporary berm. Eighteenth Avenue South provides a preferred alternative to 21st Avenue South due to the wetlands in the vicinity of the proposed 21st Avenue South alignments and the transitional nature of the residential neighborhood on 18th Avenue South. Pursuant to FWCC Section 22-1477, the required right-of-way width may be modified by the Director of Public Works to avoid right-of-way acquisition and lessen the impact to the neighborhood, and utility undergrounding will not be required. Therefore, the applicant will construct 18th Avenue South as a modified street section between the southern extent of the street improvements in Kits Corner Business Park and South 344th Street.

51. The rerouting of trips using this connection on 18th Avenue South would add 417 trips to the east leg of South 344th Street east of 16th Avenue South, and 128 trips between 16th Avenue South and SR 99 during the Sunday after service peak hour. Both of these intersections are currently unsignalized. The addition of these trips would create LOS failure and safety issues associated with unsignalized intersections operating over capacity. Staff has determined that these intersections would not operate safely if the project's trips impacted these intersections prior to the completion of the Transportation Improvement Plan (TIP) project scheduled for 2008 that would add left-turn lanes on South 344th Street and signalize both intersections. Therefore, the applicant will construct traffic signals at these intersections.

52. Staff analysis has determined that the project's trips meet warrants for left-turn lanes in the westbound direction at both the intersections of SR99 and 16th Avenue S and S 344th Street and 16th Avenue S. Eastbound left-turn lanes may also be needed to line up lanes across the intersections within allowable tapers, depending on the intersection geometrics; this will be determined through engineering plan review of these intersections. Although the EIS identifies impacts related to right-of-way acquisition in order to provide full-standard improvements, it is not necessary to provide full street improvements to mitigate the safety and LOS deficiencies at these intersections. The applicant will be required to develop a design that mitigates the safety and LOS impacts while minimizing right-of-way acquisition. The applicant will provide signalization and westbound left-turn lanes necessary to assure the safe operation of these intersections in the interim. Signal interconnect will also be provided between the two signalized intersections. The need for eastbound and westbound left-turn lanes will be determined during engineering plan review. The requirement for any of the left-turn lanes on South 344th Street may be waived by the Public Works Director if it is determined that to do so would require right-of-way acquisition.

53. The intersection of 16th Avenue South/Enchanted Parkway South (SR 161) at South 348th Street (SR 18) fails the adopted LOS standard during the school afternoon peak and the Sunday peak with or without the project. The project would add 150 trips during the school afternoon peak hour and 328 trips during the Sunday peak hour. The EIS identifies the construction of a second northbound right-turn lane as a mitigation measure that would correct the LOS deficiency during the school afternoon peak by improving the LOS from F to D, and reducing the LOS deficiency significantly during the Sunday peak hour by reducing the volume/capacity ratio from 1.24 to 1.04. This mitigation measure is in addition to the project in the adopted 2004-2009 TIP, which would add a third westbound left-turn lane and eastbound and westbound right-turn lanes. Based on the traffic analysis for the EIS, in order to function without being blocked by queues in the through lanes, the right-turn lanes would need to provide 550 feet of storage. Therefore, the applicant will pay $350,000 to expand the scope of the City's existing project to add the construction of a second right-turn lane with 550 feet of storage.

54. WSDOT is proposing to construct a major revision to the I-5/SR 18 interchange, which would include access between SR 161 and I-5 to and from the north. This would provide an alternative route that would reduce traffic volumes through the intersection of SR 18 and SR 161. Therefore, it is unknown at this time what intersection configuration will be needed over the longer term at SR 18 and SR 161. Consequently, the addition of through lanes northbound that would be needed to meet the LOS standard in 2007 may not be needed after 2012.

55. The intersection at 20th Avenue South at the south central site access fails the adopted LOS standard during the Sunday after service peak as a result of the project. It is impacted by 1047 Sunday peak hour trips. The EIS addressed four options for addressing the LOS failure: provision of a two-way left-turn lane on 20th Avenue South, construction of a roundabout, signalization, and flagging the driveway during peak hours. Provision of a two-way left-turn lane is recommended to accommodate turning movement volumes, but does not fully mitigate the LOS deficiency. Left-turn volumes from 20th Avenue South into the driveways are high enough that the two-way left-turn lane would not be available for use as a refuge area for vehicles turning left from driveways onto 20th Avenue South. Flagger control during the project's peaks would safely manage traffic only when it is needed. CFC has proposed this option in the TMP. Given the low volumes of through traffic on 20th Avenue South during the project's peak hours of trip generation on Sundays, and the relative lack of impacts by the use of flagger control compared to the other alternatives, flagger control is the recommended mitigation for this location. The applicant will provide flagger control of this

driveway during Sunday peak hours, subject to conditions of the Right-of-Way Activity Permit to be issued by the Department of Public Works.

56. The EIS suggests as a mitigation measure to minimize the intrusion of project-generated traffic into residential neighborhoods to the north of the site an education program to influence route choices by notices, announcements, and new member orientation used to educate drivers. Pursuant to FWCP Policy TP5, the applicant will provide an ongoing education program to minimize traffic intrusion into adjacent residential neighborhoods.

57. The EIS discusses a broad range of traffic calming tools that might be used to discourage through traffic from using 20th Avenue South north of the site, and to maintain reasonable speeds for a residential neighborhood for those that do choose to use 20th Avenue South. Based on the analysis of the alternatives by staff, a through movement diverter is recommended and will be placed at the intersection of 20th Avenue South and South 336th Street, and is intended to prohibit through movements on 20th Avenue South across South 336th Street. All other movements at the intersection would be permitted. The design will accommodate transit turning movements and full access for emergency vehicles, making it possible that smaller vehicles could still drive around the diverter.

58. Despite the diverter, some project-generated traffic may still be expected to use 20th Avenue South to the north of the site. Therefore, there is still some need to discourage the use of 20th Avenue South through traffic calming north of the site, even with the through movement diverter. Traffic circles have been found by many agencies to significantly reduce intersection collisions and slightly reduce midblock vehicle speeds. In order to be effective at reducing speeds and encourage yielding behavior, deflection of the driver's path upon entry to the traffic circle is required. At a three-legged intersection such as at South 332nd Street, additional pavement widening may be required to provide for adequate deflection and provide positive guidance to the driver. In no case should additional right-of-way be required. Pursuant to FWCP Policy TP5, the applicant will place the through movement diverter at the intersection at South 336th Street, and yield-controlled traffic circles at South 330th Street and South 332nd Street to reduce intersection collisions and midblock vehicle speeds.

59. Neighborhood Traffic Meetings were held June 3, 2004 and June 25, 2004 with the residents on 18th Avenue South to determine the best solution for improving 18th Avenue South. Based on the discussions at the meetings, the residential segment of 18th Avenue South will be improved to a modified street section, consisting of 24 foot wide street with vertical curb and gutter, 5-foot sidewalks and 2 additional street lights mounted on existing power poles. Traffic calming elements will be installed, including two speed humps, 1 crosswalk, bulb outs at the intersection of 18th Avenue S and S 341st Street and 18th Avenue S and S 344th Street to narrow the throat width of 18th Avenue S to 20 feet, and street signage to address no through truck traffic, children playing, speed humps, crosswalk and speed limit will be installed.

60. The EIS discusses the potential advantage of extending the code-required frontage improvements on the south side of South 336th Street to provide pedestrian access to transit and the sidewalk network on SR 99. The intersection of SR 99 and South 336th Street is served by Metro Route 182 and Pierce Transit Routes 402 and 500. The City's project on SR 99 will provide transit amenities at the bus stops at this intersection. These improvements could be provided at little additional expense and would connect to one of the best-served transit corridors in the City. Therefore, pursuant to FWCP Policies TP62, TP65, and TP77, the applicant shall provide sidewalk on the south side of South 336th Street to be extended from the west property line of the site to SR 99.

61. The EIS discusses the provision of transit amenities such as shelters, benches, bus landing pads, etc. as a potential mitigation measure. The site is served by Pierce Transit Route 501 at a bus stop located on the south side of South 336th Street east of 20th Avenue South, and a bus stop located on the east side of 20th Avenue South north of South 336th Street. Sidewalks will be provided to the bus zone by code-required frontage improvements on South 336th Street. Pursuant to FWCP Policies TP62, TP65, and TP77, the applicant will provide a transit shelter (if requested by King County Metro or Pierce Transit), shelter footing, litter receptacle pad, bus landing pad, and bench, designed to King County Metro standards, located by City staff in consultation with King County Metro and Pierce Transit staff on the north side of South 336th Street east of 20th Avenue South, and on the east side of 20th Avenue South north of South 336th Street. In addition, the sidewalk will be extended on the east side of 20th Avenue South from the intersection of South 336th Street to this latter bus zone. This will help mitigate increased vehicle trips from the project.

62. The EIS addresses pro-rata share mitigation for impacts to capital projects listed on the City's TIP based on the specific project generated trips. The calculation of pro-rata contributions is described in the TIA Guidelines item VI.D. In general, the pro-rata contribution is the number of evening peak project-generated trips divided by the total evening peak hour traffic with the project multiplied by the estimated cost of the TIP project. Pursuant to FWCC Section 22-1475 and FWCP Policy TP62, the applicant shall either construct the impacted TIP projects or pay $235,900 as a pro-rata mitigation payment for impacts to projects in the 2004-2009 TIP, as identified in the Agreement.

63. The project impacts a capital project in unincorporated King County at the intersection of South 320th Street and Military Road S. Therefore, the applicant will pay King County $647 as a pro-rata share mitigation payment for impacts to the County project.

64. The development proposal includes signalization of the intersection of 20th Avenue South and South 336th Street. This intersection meets *Manual on Uniform Traffic Control Devices* (MUTCD) warrants for signalization under existing conditions; thus the proposal is consistent with FWCC Section 22-1476. The MUTCD also recommends that traffic signals within one-half mile of each other be able to be coordinated. This intersection is one-quarter mile east of the signalized intersection of SR 99 and South 336th Street. FWCP Map III-3 shows that these facilities were planned to have signal communications available between them. Pursuant to FWCP Policy TP39, the applicant will provide signal interconnect on South 336th Street between SR 99 and 20th Avenue South.

65. Based on the traffic analysis in the EIS, left-turn lanes on South 336th Street are warranted during all weekday peak hours analyzed eastbound, and during all peak hours analyzed westbound. In order to provide the left-turn lanes, the existing westbound shoulder could be restriped as a through lane. However, this would eliminate the safe walking route for school children to reach a school bus stop on 20th Avenue South from South Garden Court and Green Crest Villas condominiums. Therefore, the applicant will provide continuous sidewalk improvements on the north side of South 336th Street between South Garden Court and Green Crest Villas to provide a safe walking route to the bus stop.

66. The TIA guidelines adopt the use of an article, *Guidelines for Right-Turn Treatments at Signalized Intersections,* for determining the need for right-turn lanes at signalized intersections. Based on the traffic analysis in the EIS, right-turn lanes are warranted on all legs of the intersection of 20th Avenue South and South 336th Street. In conjunction with the through movement diverter, no through lanes on 20th Avenue South would be required. Thus, no additional widening would be

necessary on the south leg of the intersection. On the north leg of the intersection, the right-turn lane would have to have a vehicle storage length of 175 feet to function effectively. A right-turn lane on the west leg of the intersection would require additional right-of-way dedication from the project, and would have to provide 100 feet of storage to function effectively. Per WSDOT Design Manual Figure 910-14, right-turn lanes would also require 50-foot tapers. The applicant shall construct improvements to the intersection of 20th Avenue South at South 336th Street that provide signalization; signal interconnect on South 336th Street between SR 99 and 20th Avenue South; left-turn lanes on all legs of the intersection and an eastbound right turn lane with 100 feet of storage; a southbound right-turn lane that provides 175 feet of storage; the diverter island that would prohibit through movements on 20th Avenue South. These improvements mitigate the project impacts by providing adequate levels of service at the intersection, while discouraging project-generated traffic from impacting residential neighborhoods north of the site.

67. Based on the traffic analysis in the EIS, under the worst case queuing, the westbound left-turn lane at the intersection of SR 99 and South 336th Street would need a storage length of 450 feet. The existing storage available is 100 feet. The increase in storage length, combined with associated tapers per WSDOT Standard Plan H-3, would overlap the taper necessary to accommodate the left-turn lane at the site driveway onto South 336th Street. Therefore, pursuant to FWCC Section 22-1475, the applicant will provide a continuous left-turn lane between SR 99 and 20th Avenue South.

68. New traffic signals are proposed at the intersections of 20th Avenue South at South 336th Street, 16th Avenue South at South 344th Street, and SR 99 at South 344th Street. In addition, the project would significantly alter travel patterns before and after Sunday services. New signal coordination timing plans would need to be developed to accommodate safe and efficient travel in the project vicinity. Pursuant to FWCP Policy TP39, the applicant will develop timing plans for Sunday peak hours of the development at SR 99 at South 324th Street, SR 99 at South 330th Street, SR 99 at South 336th Street, 20th Avenue South at South 336th Street, 16th Avenue South at SR 99, 16th Avenue South at South 344th Street, and SR 161 at SR 18.

69. Transportation mitigation provided in the Development Agreement is consistent with goals and policies contained in the FWCP Transportation Chapter, including TP5, TP10, TP14, TP16, TP20, TP21, TP23, TP30, TP38, TP39, TP45, TP47, TP62, TP65, and TP77.

70. FWCC Section 22-1671 sets out factors to be considered for a development agreement. The City may consider, but is not limited to, the following factors when considering a development agreement: 1) compatibility with and impact on adjacent land uses and surrounding neighborhoods; 2) adequacy of and impact on community facilities including utilities, roads, public transportation, parks, recreation, and schools; 3) potential benefits of the proposal to the community; and 4) effect upon other aspects of the comprehensive plan.

71. Development of the site in accordance with all adopted City codes, policies, regulations, conditions of approval, and mitigation contained in the Development Agreement, will address project-related impacts and ensure compatibility with adjacent land uses and surrounding neighborhoods. Transportation impacts to surrounding neighborhoods will be addressed by code-required street frontage improvements and mitigation established in the development agreement, including additional street and sidewalk connections; a new street through the site; traffic calming measures such as traffic circles and island diverters; signalization; transit shelter improvements; signal timing plans; traffic management plan; and operational parameters governing use of the site. Conditions of the Hearing Examiner's Process IV decision will ensure that project-related impacts to on site wetlands, streams, and buffers are addressed. Mitigation in the Development Agreement pertaining

to clearing, grading, and landscaping, will further address construction and development-related impacts. The Director's Design Decision also ensures quality design standards and project aesthetics for compatibility with surrounding neighborhoods. Additionally, the use of the property as a church and school is more compatible with the surrounding neighborhoods than the types of uses allowed under BP zoning. Therefore, development of the site in accordance with all adopted City codes, policies, regulations, and conditions of approval, and mitigation contained in the Development Agreement is compatible with, and will not adversely impact, adjacent land uses and surrounding neighborhoods.

72. Development of the site in accordance with all City codes, policies, and regulations and conditions of approval and mitigation contained in the Development Agreement will ensure adequacy of, and address impacts to, community facilities including roads, public transportation, parks, recreation, and schools. Potential transportation-related impacts to adjacent street and the City transportation system were considered in the EIS. Mitigation for these impacts included in the Development Agreement, pursuant to City Code and the EIS, includes system improvements such as construction and dedication of 20th Avenue South through the site, connecting and improving 18th Avenue South, frontage improvements, signalizing of intersections, and traffic calming measures and transit improvements. Driveway and street access to the site was reviewed and determined to be at the optimal location and configuration, subject to the City's adopted design standards and street plans. The recreational needs of the school and day care students will be met on site by the code-required outdoor play areas, and the play field. The minimum amount of outdoor play area included in the Development Agreement meets and exceeds the requirements of the City of Federal Way and the State Superintendent of Public Instruction. In addition, users of the site may utilize City parks in the area. Any such use is expected to be small. The proposed development contains a private school.

73. The proposed church and school are expected to generate employment opportunities and potential economic and social benefits. Based on information provided by CFC, it would employ 120 employees. CFC hosts several major conferences each year, including the Vision Conference attracting 2,500 – 3,000 visitors each March, and a women's conference attracting approximately 2,000 visitors each November. CFC also participates in foreign exchange programs and estimates approximately fifteen to twenty percent of its students are from foreign countries. Employees, members of the congregation, and others who come for services, meetings, and school, may also patronize local merchants and service providers such as retail, restaurants, hotels, and entertainment. Therefore, more economic benefit would be anticipated than is currently generated by the existing vacant site. Additionally, CFC proposes several commercial activities on the site, including latte stands and bookstores, which are expected to generate revenue. As proposed and as required, the project will construct needed right-of-way improvements on and off site, including a new fully-improved City street through the site; street frontage improvements including curbs, gutter, sidewalk, street trees, street lights, and a bike lane; and other street improvements identified in the Development Agreement. Such improvements will promote safe and effective vehicle and pedestrian circulation on the site and in the immediate vicinity. In addition, the project will convert a large, vacant site that has historically been unused to a development that meets all City code requirements for landscaping, lighting, pedestrian amenities, site surveillance, and architectural design principles. CFC will provide educational opportunities through a school and college. It will provide recreation fields and a venue for special events within the City. Conditions contained in the Development Agreement will ensure mitigation of adverse impacts to on-site environmentally sensitive areas resulting from the development. Also, religious organizations typically operate or participate in various local social service-related programs such as food and clothing banks, Youth programs, and counseling, from which the community may benefit. Therefore, development of the site in accordance with all City codes, policies, regulations, and conditions of approval and

mitigation contained in the Development Agreement will provide potential benefits to the community.

74. Development of the site in accordance with all City codes, policies, and regulations and conditions of approval and mitigation contained in the Development Agreement will have no negative impact upon any other aspects of the comprehensive plan. The vision of the FWCP is to provide a supply of land for such uses as services, employment, parks, open space, and housing to meet future demand. If developed as proposed, the Project will provide land for services, employment, and recreational areas. The BP zone is that zone intended for industrial uses including manufacturing and warehousing. The July 2000 Market Analysis concluded that there would be a low demand for BP-zoned land. Therefore, the reduction in BP zoned land, resulting from changing the designation of this site from Business Park to Multiple Family will not affect the vision of the comprehensive plan.

75. FWCC Sections 22-529 (incorporating 22-448(c) by reference) and 22-530 set forth the factors that may be considered for a site-specific comprehensive plan amendment and associated rezone, and the criteria for such amendments. The City may consider, but is not limited to, the following factors when considering a proposed amendment to the comprehensive plan: the effect upon the physical environment; the effect on open space, streams, and lakes; the compatibility with and impact on adjacent land uses and surrounding neighborhoods; the adequacy of and impact on community facilities including utilities, roads, public transportation, parks, recreation, and schools; the benefit to the neighborhood, City, and region; the quantity and location of land planned for the proposed land use type and density and the demand for such land; the current and projected population density in the area; and the effect upon other aspects of the comprehensive plan. In order to encourage efficient and desired development and redevelopment of existing land designated and zoned for various types of commercial uses, when considering proposals for comprehensive plan amendments and rezones from one commercial designation to another, the City will consider development trends in commercially zones areas, market demand for various types of commercial land, and amount of vacant commercial land. For site-specific comprehensive plan amendments, the provisions of FWCC Section 22-488(c) shall also apply.

76. FWCC Section 22-488 established the following rezone criteria that must be considered. The proposed rezone is in the best interest of the residents of the City; and the proposed rezone is appropriate because either: 1) conditions in the immediate vicinity of the subject property have so significantly changed since the property was given its present zoning and that, under those changed conditions, a rezone is within the public interest; or 2) the rezone will correct a zone classification or zone boundary that was inappropriate when established; it is consistent with the comprehensive plan; it is consistent with all applicable provisions of the chapter, including those adopted by reference from the comprehensive plan; and it is consistent with the public health, safety, and welfare; and the proposed project complies with this chapter in all respects; and the site plan of the proposed project is designed to minimize all adverse impacts on the developed properties in the immediate vicinity of the subject property; and the site plan is designed to minimize impacts upon the public services and utilities; and the rezone has merit and value for the community as a whole.

77. The requested comprehensive plan amendment and rezone, from BP to RM 3600, would not in itself affect the physical environment if approved. It would result in changes to the comprehensive plan map and zoning map. Pursuant to the proposed Development Agreement, development of the site would be limited to two buildings with associated parking and recreational and athletic fields. One building would consist of a church sanctuary, school auditorium, and approved accessory uses, and the other building would be used as a private school. An evaluation of potential impacts to the

physical environment as a result of the development of the site as proposed was conducted in an EIS. If the property is developed in accordance with all applicable adopted City codes, policies, regulations, and mitigation contained in the proposed Development Agreement, impacts to the physical environment will be mitigated.

78. The site contains environmentally sensitive areas, as studied in the EIS, including regulated wetlands and streams and their buffers. The Hearing Examiner has approved certain intrusions into these areas, subject to City Council decisions on the comprehensive plan amendment, rezone, development agreement and development plan, in order to construct the project as proposed. Activities approved by the Examiner include filling a Category III wetland and its buffer, and related mitigation including a created wetland and additional buffer area in and adjacent to a Category II wetland on the site. Additional intrusions into wetland and stream buffer were approved in order to accommodate an access road and construct required right-of-way and related improvements including pavement widening, retaining walls, and extending storm pipes and stream culverts. Construction of the site in accordance with all conditions of the Hearing Examiner's decision will result in no net loss of wetlands and wetland buffers and stream buffers. In addition, pursuant to the Hearing Examiner's conditions of approval, all on site wetlands, streams, and their required buffers will be set aside and recorded as Native Growth Protection Easements or Tracts and permanently protected from any future land modifications or intrusions. In addition, the Development Agreement establishes mitigation pertaining to surface water drainage detention and water quality treatment that meets and exceeds code requirements. No lakes are present on the site. If the property is developed in accordance with all applicable adopted City codes, policies, regulations, and mitigation contained in the Hearing Examiner Decision and proposed Development Agreement, impacts on open space, streams and lakes will be mitigated.

79. The request for a change in comprehensive plan designation and zoning from BP to RM 3600 zoning (one unit per 3,600 square feet) is accompanied by a proposed Concomitant Agreement and Development Agreement, which contains a variety of mitigation measures related to site use and operation, transportation, parking, landscaping, and surface water drainage, designed to ensure compatibility with adjacent land uses and surrounding neighborhoods. In addition, rezoning the site from industrial to multifamily with a church and school development would be more compatible with residentially-zoned properties in the area than uses that may develop under the current industrial zoning, such as a warehousing facility with associated truck traffic. If the property is developed in accordance with all applicable adopted City codes, policies, regulations, and mitigation contained in the proposed Development Agreement, the development will be compatible with adjacent land uses and surrounding neighborhoods, and impacts on adjacent land uses and surrounding neighborhoods will be mitigated.

80. Development of the site as proposed, in accordance with all applicable codes, policies, regulations, conditions of approval, and mitigation measures contained in the Development Agreement, will ensure the adequacy of, and mitigate impacts on, roads, public transportation, parks, recreation, and schools.

81. The July 2000 Market Analysis concluded that there would be only an 11 to 13 percent demand for BP-zoned land in the 2000 to 2020 period. Therefore, it is possible that this land would not develop for BP uses in the near future. Conversion of the vacant site from vacant property, which is unlikely to develop in the near future, to a developed site as proposed, in accordance with all applicable codes, policies, regulations, conditions of approval, and mitigation measures contained in the Development Agreement, will be a benefit to the neighborhood, City, and region.

82. Due to the size of its existing congregation, school, and accessory uses such as administrative offices, Dominion College, day care, and future projections for growth, the CFC would like to locate on an approximate 50-acre parcel. Based on a survey of the King County Assessor's records conducted by City staff, there are only two vacant parcels in the City that are 25 acres or more in size. One of these is the parcel under discussion and the other one is the subject of Kits Corner request, located south of South 336th Street and west of Pacific Highway. The July 2000 Market Analysis concluded that there would be only an 11 to 13 percent demand for BP-zoned land in the 2000 to 2020 period. Therefore, it is possible that this land would not develop for BP uses in the near future and a comprehensive plan change and rezone to multiple family zoning and development of the site as proposed, in accordance with all applicable codes, policies, regulations, conditions of approval, and mitigation measures contained in the Development Agreement, will provide the quantity and location of land necessary for the proposed land use, density, and demand for such use.

83. If this site were developed today as warehousing under the existing BP zoning, it would generate approximately 268 employees. Based on information provided by the CFC, if the request for a multiple family designation was granted, and the facility was constructed as proposed, it would employ 120 employees. If the comprehensive plan and rezone is approved pursuant to the proposed Concomitant Agreement and Development Agreement, the use of the site is limited to the proposed church and school and permitted accessory uses, and it will not generate housing units. Rezoning of this site to allow development as a church and school will not impact the City's ability to meet required housing targets mandated under the Growth Management Act (GMA). Therefore, the proposal will not impact current and projected population density in the area.

84. There will not be any adverse impacts upon any other aspect of the comprehensive plan as a result of the proposed change from industrial zoning to multifamily zoning, pursuant to an approved Concomitant Agreement and Development Agreement. The vision of the comprehensive plan is to provide a supply of land for such uses as services, employment, parking, open space, and housing, to meet future demand. The BP zone is that zone intended for industrial uses, including manufacturing and warehousing. One of the reasons that the July 2000 Market Analysis was prepared was to determine whether the City has a 20-year supply of adequately zoned land to meet future demand. The Market Analysis concluded that there would be a low (11-13 percent) demand for BP-zoned land within the 20-year horizon. Therefore, changing the designation of this site from BP to multiple family will not affect the vision of the comprehensive plan of providing an adequate supply of land to meet future demand.

85. As described Findings 77 through 84 above, the requested comprehensive plan amendment and rezone as mitigated does not adversely impact the physical or natural environment; surrounding properties; the adequacy of community facilities; population; or the comprehensive plan; including the supply of and demand for BP-zoned property in the City. Therefore, the rezone is in the best interests of the residents of the City.

86. The City of Federal Way incorporated in February 1990. At that time, the parcels proposed for development by CFC had a mix of multi-family zoning on the west and light manufacturing zoning on the east. Upon incorporation, the City of Federal Way zoned the parcels Manufacturing Park (MP). This was changed to Business Park (BP) in 1995. Properties to the north across South 336th Street have developed as multi-family in recent years. However, very little BP zoned land has developed in this area. Additionally, the July 2000 Market Study found that there would be only an 11 to 13 percent demand for BP-zoned land in the 2000 to 2020 period. As a result, rezoning this property is appropriate and in the public interest, to allow its development rather than remaining

vacant, while at the same time maintaining an adequate supply of industrial zoned property to meet the anticipated demand.

87. The criterion that the rezone will correct a zone classification or zone boundary that was inappropriate when established is not applicable.

88. The requested rezone from BP to RM-3600 does not conflict with the vision of the comprehensive plan to accommodate industrial uses, such as warehousing and manufacturing, in BP zones located on both sides of SR-99 in the vicinity south of South 336th Street, with other BP nodes located around South 272nd Street and South 348th Street. As noted in Finding 84 above, the requested comprehensive plan change and rezone will not decrease the City's supply of BP-zoned property commensurate with the anticipated demand. Rezoning and development of the site pursuant to all applicable adopted City codes, policies, regulations, conditions of approval, and mitigation contained in the proposed Development Agreement, will ensure consistency with the comprehensive plan.

89. If the request is granted, use and development of the site must comply with all applicable provisions of this "chapter" (FWCC) and all applicable adopted regulations; Process IV conditions of approval; mitigation; and the FWCP. Furthermore, a comprehensive plan amendment from BP to multiple family and associated rezone is required for the property to be developed as a church and school. Therefore, the requested rezone, if approved and developed pursuant to all applicable adopted City codes, policies, regulations, conditions of approval, and mitigation contained in the proposed Development Agreement, will be consistent with the comprehensive plan and the "chapter".

90. The requested comprehensive plan amendment and rezone has been analyzed and determined to be consistent with the FWCC and adopted regulations; and the FWCP, and is therefore consistent with the public health, safety, and welfare.

91. Based on Findings 86 through 90, the criteria in FWCC Section 22-488(c)(1)a-e) are met.

92. The proposed development has been reviewed pursuant to all applicable provisions of this chapter (FWCC), and as proposed and as conditioned, it complies with this chapter in all respects.

93. The use of a Concomitant Agreement and Development Agreement enables the City to limit the use of the site to a church, school, and approved accessory uses. As described in Findings 77 through 84, the Development Agreement has been crafted to minimize adverse impacts on the developed properties in the immediate vicinity. Examples include, but are not limited to, requiring a larger buffer along South 336th Street, limiting the enrollment of the school and Dominion College, and restricting the scheduling of activities, such as requiring school classes to be completed by 3:30 p.m. and not scheduling special events that add trips during peak hours of other uses. The site plan of the proposed project is designed to minimize all adverse impacts on the developed properties in the immediate vicinity of the subject property.

94. All public services and utilities are available and adequate to serve the proposed development. Lakehaven Utility District has provided Certificates of Water and Sewer Availability for the site, and will provide these services pursuant to developer extension agreements between the applicant and District. Fire and emergency medical services will be provided by the Federal Way Fire Department. A City-operated regional storm drainage detention pond located in the northwest portion of the site has been determined to have sufficient capacity to accommodate surface water

drainage from the westerly sub-basin of the proposed development. The applicant will provide storm drainage detention facilities for the easterly sub-basin on the site in accordance with the FWCC and Development Agreement. Surface water drainage mitigation contained in the Development Agreement provides a higher standard of water quality treatment for both the East and West Sub-basins on the site, and a higher standard of detention on the East Sub-basin, than would otherwise be required by code. The site plan is designed to minimize impacts upon public services and utilities.

95. Rezoning of this site from BP to multiple family has merit and value for the community as a whole because it will allow development of a site that has not yet been developed and may not develop under the current zoning based on the City's Market Analysis, it supports Growth Management Act goals and policies for urban development, and for the reasons stated in Finding 73.

96. The proposed comprehensive plan amendment has been analyzed and determined to be consistent with the FWCC and FWCP, and therefore bears a substantial relationship to public health, safety, or welfare.

97. The requested comprehensive plan amendment, rezone, and development of the site as a church and school pursuant to the proposed Development Agreement, is expected to generate some benefits to the community, including employment opportunities, development of a previously undeveloped site, potential economic benefit to local shopping areas, restaurants, and hotels; and provision of social services such as food and clothing banks, and youth programs, and counseling programs, as discussed in Finding 73. Therefore, the proposed amendment is in the best interest of the residents of the City.

98. RCW Chapter 36.70A, the *Growth Management Act*, requires the City of Federal Way to adopt and implement a comprehensive plan and to amend it in a timely manner, but no more than once a year, except under certain circumstances. The City is responding to this mandate by updating the comprehensive plan. FWCP Page IV-7 (Economic Development), recognizes that there has been no substantive BP development since the City's incorporation, which suggests the influence of market forces outside of the City limits, where cheaper land and established industrial parks act as a draw for prospective park development. Therefore, the change in comprehensive plan designation and zoning of this site from BP to multiple family will not reduce the supply of BP-zoned property below what is necessary, and will enable development consistent with the economic development vision in the plan. The proposal is consistent with FWCP Economic Development Policies EDP11, EDP22, and EDP23, related to bringing in new jobs to the community, developing cultural and recreational opportunities, and encouraging the development of new multi-purpose facilities in order to increase the number of visitors to Federal Way and resultant visitor spending. The proposed amendment is, therefore, consistent with the requirements of RCW 36.70A and with the portion of the City's adopted plan not affected by the amendment.

99. As addressed in the staff report, the proposed comprehensive plan amendment and rezone have been reviewed and determined to be consistent with all applicable decisional criteria contained in the FWCC, and with the applicable goals and policies contained in the FWCP.

100. As addressed in the staff report, the Development Agreement and Development Plan have been reviewed and determined to be consistent with all applicable decisional criteria contained in the FWCC, and with the applicable goals and policies contained in the FWCP.

9.2.4 School Hours. School classes shall be completed no later than 3:30 p.m. daily.

9.2.5 Holiday Services/Special Events. Holiday services and special events shall be scheduled consistent with the approved Traffic Management Plan (TMP) required by 9.4.12 and consistent with 9.1.4.4.

9.3 Construction Mitigation.

9.3.1 Erosion Sediment Control. CFC shall designate and provide an onsite Erosion Sediment Control (ESC) Supervisor approved by the Director of Public Works, who possesses a Construction Site Erosion and Sediment Control Certification by the Washington State Department of Transportation (WSDOT). This ESC Supervisor shall be available for the duration of the project. The qualifications and responsibilities of the ESC Supervisor are outlined in the 1998 King County Surface Water Design Manual (KCSWDM) and City of Federal Way Addendum. The Director of Public Works may further limit clearing and grading activities on the site based on recommendations from the ESC Supervisor and requirements of the KCSWDM.

9.3.2 Stormwater Pollution Prevention Plan. A construction Stormwater Pollution Prevention Plan (SWPPP) shall be provided by CFC and reviewed and approved by the Director of Public Works prior to issuance of any construction permits or authorizations. Construction phasing shall be included in this plan. CFC has proposed several BMP's which shall be captured in the SWPP plan including, but not limited to, confining refueling and equipment maintenance to a hard-surface staging area with spill containment features and a spill clean-up kit, and pipe slope drains used to convey storm water over steep slopes.

9.3.3 Clearing and Grading. Clearing and grading shall be allowed only pursuant to a phased construction plan approved by the Director of Public Works. Clearing and grading shall occur only between May 1 and September 30 unless otherwise approved by the Director of Public Works.

9.4 Traffic Mitigation. CFC shall perform, as part of Project construction and prior to issuance of certificate of occupancy unless otherwise noted, the following traffic mitigation as required and approved by the Director of Public Works.

9.4.1 CFC shall reconstruct 18th Avenue South from the existing berm to S 344th Street to a ~~Type R street~~modified street section, consisting of ~~40~~ 24 foot wide street with vertical curb~~s,~~ and gutters, ~~4 foot planter strips with street trees, 6~~5-foot sidewalks, and two additional street lights mounted on existing power poles, ~~and traffic calming elements, in a 60 foot right of way,~~ consistent with the attached Exhibit G-1. Traffic calming elements shall be installed, including 2 speed humps, 1 crosswalk, bulb outs at the intersection of 18th Avenue South and S 341st Street and 18th Avenue South and S 344th Street to narrow the throat width of 18th Avenue South to 20 feet, and street signage shall be installed to address no through truck traffic, children playing, speed humps, crosswalk and speed limit.

9.4.2 CFC shall improve S 344th Street from 16th Avenue S to 18th Avenue S consistent with the attached Exhibit G-2. Construction shall consist of Type R Street. The north become frustrated and learn to use alternate routes. The EIS analysis assumed that most of these trips would leave the site to the north onto S 336th Street, and most would head west on S 336th Street to SR 99 and turn left to 16th Avenue S or continue straight on SR 99. Although no capacity improvements appear warranted as a result of this assignment, staff has significant concerns about the safety of the 16th Avenue S / S 341st Place intersection under this scenario. It has been the City's experience that unsignalized intersections operating near capacity have a higher than average collision rate. This is due primarily to increased driver frustration, leading to drivers choosing gaps in opposing traffic that are inadequate to complete the maneuver safely. Therefore, this alternative is not recommended.

47. The roundabout alternative would provide adequate levels of service. In order to accommodate planned traffic volumes, it would have a 3-lane roundabout with an inscribed diameter of 200 feet. As SR 99 is a state highway, any intersection modifications would have to be approved by WSDOT. To date, WSDOT has not approved any three-lane roundabouts on the state highway system, and its historical reluctance to approve 2-lane roundabouts casts doubt as to whether this would be a viable alternative at this time. In addition, a roundabout would need right-of-way on both sides of SR 99, impacting developed properties on the east side of SR 99. Therefore, this alternative is not recommended.

48. Providing a connection between South 341st Place and South 344th Street reroutes traffic around the intersection of 16th Avenue South and South 341st Place, and takes advantage of a project planned by the City to construct traffic signals on South 344th Street at 16th Avenue South and at SR 99.

49. Potential locations to provide this connection between South 341st Place and South 344th Street are 21st Avenue South and 18th Avenue South. Due to the presence of wetlands, three different alignments for 21st Avenue South were considered in the EIS. An alignment along the existing right-of-way would impact wetlands and result in two stream crossings; an alignment to the east would cross the wetland at its narrowest width, but would still impact wetlands and result in two stream crossings; and an alignment to the west would avoid impacting the stream and wetlands, but would require right-of-way acquisition from the truck parking lot.

50. Eighteenth Avenue South has continuous right-of-way, but is not a through street due to an existing temporary berm. Eighteenth Avenue South provides a preferred alternative to 21st Avenue South due to the wetlands in the vicinity of the proposed 21st Avenue South alignments and the transitional nature of the residential neighborhood on 18th Avenue South. ~~Pursuant to the FWCC, the applicant will construct 18th Avenue South as a Type R street between the southern extent of the street improvements in Kits Corner Business Park and South 344th Street.~~ Pursuant to FWCC Section 22-1477, the required right-of-way width may be modified by the Director of Public Works to avoid right-of-way acquisition and lessen the impact to the neighborhood, and utility undergrounding will not be required. Therefore, the applicant will construct 18th Avenue South as a modified street section between the southern extent of the street improvements in Kits Corner Business Park and South 344th Street.

51. The rerouting of trips using this connection on 18th Avenue South would add 417 trips to the east leg of South 344th Street east of 16th Avenue South, and 128 trips between 16th Avenue South and SR 99 during the Sunday after service peak hour. Both of these intersections are currently unsignalized. The addition of these trips would create LOS failure and safety issues associated with unsignalized intersections operating over capacity. Staff has determined that these intersections would not operate safely if the project's trips impacted these intersections prior to the completion of the Transportation Improvement Plan (TIP) project scheduled for 2008 that would add left-turn

lack of impacts by the use of flagger control compared to the other alternatives, flagger control is the recommended mitigation for this location. The applicant will provide flagger control of this driveway during Sunday peak hours, subject to conditions of the Right-of-Way Activity Permit to be issued by the Department of Public Works.

56. The EIS suggests as a mitigation measure to minimize the intrusion of project-generated traffic into residential neighborhoods to the north of the site an education program to influence route choices by notices, announcements, and new member orientation used to educate drivers. Pursuant to FWCP Policy TP5, the applicant will provide an ongoing education program to minimize traffic intrusion into adjacent residential neighborhoods.

57. The EIS discusses a broad range of traffic calming tools that might be used to discourage through traffic from using 20th Avenue South north of the site, and to maintain reasonable speeds for a residential neighborhood for those that do choose to use 20th Avenue South. Based on the analysis of the alternatives by staff, a through movement diverter is recommended and will be placed at the intersection of 20th Avenue South and South 336th Street, and is intended to prohibit through movements on 20th Avenue South across South 336th Street. All other movements at the intersection would be permitted. The design will accommodate transit turning movements and full access for emergency vehicles, making it possible that smaller vehicles could still drive around the diverter.

58. Despite the diverter, some project-generated traffic may still be expected to use 20th Avenue South to the north of the site. Therefore, there is still some need to discourage the use of 20th Avenue South through traffic calming north of the site, even with the through movement diverter. Traffic circles have been found by many agencies to significantly reduce intersection collisions and slightly reduce midblock vehicle speeds. In order to be effective at reducing speeds and encourage yielding behavior, deflection of the driver's path upon entry to the traffic circle is required. At a three-legged intersection such as at South 332nd Street, additional pavement widening may be required to provide for adequate deflection and provide positive guidance to the driver. In no case should additional right-of-way be required. Pursuant to FWCP Policy TP5, the applicant will place the through movement diverter at the intersection at South 336th Street, and yield-controlled traffic circles at South 330th Street and South 332nd Street to reduce intersection collisions and midblock vehicle speeds.

59. Neighborhood Traffic Meetings were held June 3, 2004 and June 25, 2004 with the residents on 18th Avenue South to determine the best solution for improving 18th Avenue South. Based on the discussions at the meetings, t~~T~~he residential segment of 18th Avenue South will be improved to a ~~Type R~~modified street section, consisting of 24 foot wide street with vertical curb and gutter, 5-foot sidewalks and 2 additional street lights mounted on existing power poles. Traffic calming elements will be installed, including two speed humps, 1 crosswalk, bulb outs at the intersection of 18th Avenue S and S 341st Street and 18th Avenue S and S 344th Street to narrow the throat width of 18th Avenue S to 20 feet, and street signage to address no through truck traffic, children playing, speed humps, crosswalk and speed limit will be installed.~~The applicant has proposed that the existing bulb in the right-of-way where the existing cul-de-sac bulb is located be used as a location for a median island to create a chicane effect, and staff proposes that curb returns on 18th Avenue South be bulbed out into the intersections at South 341st Place and South 344th Street to reduce the potential for trucks to use 18th Avenue South through the residential neighborhood. Staff also recommends signage be placed to prohibit trucks on 18th Avenue South between South 341st Place and South 344th Street and two speed humps be installed. A Neighborhood Traffic Meeting was held June 3, 2004, and Staff will work with the residents on 18th Avenue South to determine the best solution for improving 18th Avenue South.~~

Christian Faith Center (Communication ID 473746)		
Comment ID	**Comment Text**	**Response**
1	CFC would prefer not to be any alternative for the OMF South Project. Any comments below are for the sole purpose of informing Sound Transit of the consequences and impacts to CFC from the two alternatives noted above and are not an express or implied consent to any selection of CFC as the preferred site for the OMF South Project.	Sound Transit appreciates the ongoing communication and coordination that has occurred with Christian Faith Center staff during project development. After considering the Draft EIS and the comments received, the South 336th Street Alternative was identified by the Sound Transit Board as the Preferred Alternative in December 2021 (Motion M2021-81). The Midway Landfill and South 344th Street alternatives continue to be evaluated in the Final EIS. The Board will select the project to be built following publication of the Final EIS.
2	The DEIS has not adequately understood and analyzed the CFC Campus, which has led to a flawed analysis of, in particular, the South 344th Street Alternative. More on this comment follows below. Ever since CFC's Campus has been identified as a potential site for the OMF South Project, CFC has essentially been "stuck" in place and time. CFC has halted the planning and implementation of additional projects. CFC cannot grow and expand its ministry. This is true for both the South 336th Street Alternative and the South 344th Street Alternative. CFC's selection as a site for the South OMF facility has created uncertainty and anxiety for tis members. Is their spiritual "home" going to be taken from them? Where will they go?	Sound Transit recognizes the difficulties that a project of this size and potential impact present for a religious center. Subsequent to the 2021 Draft EIS, FTA approved and the Sound Transit Board authorized (resolution number R2023-26) a hardship acquisition of the four parcels associated with the Christian Faith Center. The purpose of this type of acquisition is to alleviate a particular hardship to the owner when the property owner can document on the basis of health, safety, or financial reasons that remaining in the property poses an undue hardship compared to others. Hardship and protective acquisitions do not limit the evaluation of alternatives required under the NEPA process. No development on the parcels would occur until after FTA issues a ROD and if the Sound Transit Board selects to build the Preferred or South 344th Street alternatives. The hardship acquisition would allow Christian Faith Center to begin early coordination on potential future sites. Sound Transit's relocation staff are working closely with Christian Faith Center staff to inventory needs and provide relocation assistance so that the church and school receive the moving and reestablishment entitlements available. Sound Transit could also help with site selection and would continue to provide relocation advisory services.
3	If the South 336th Street Alternative becomes the final site, then CFC will be forced to lose its Campus as a whole under eminent domain or the treat of eminent domain and find a new campus location and start a new multi-year development process anew. This is no easy task.	Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS includes a summary of Sound Transit's Acquisition and Relocation Policy.

Christian Faith Center (Communication ID 473746)		
Comment ID	**Comment Text**	**Response**
4	If the South 344th Street Alternative becomes the final site, CFC's situation becomes even worse. The DEIS simply and incorrectly assumes that the current site could be severed or bifurcated and somehow CFC could continue to operation on the remainder parcel. Because the Campus Approval is an integrated plan for the entire CFC Property, taking a significant portion for the South 344th Street Alternative disrupts the entire plan and creates a situation where CFC would be in violation of its approvals. Again, by way of example only and not to be exhaustive, taking the eastern portion of the CFC Campus for the South 344th Street Alternative Project means: • The remainder parcel no longer has a required storm water facility for its surface water management. • CFC's required access points no longer exist, because the DEIS assumes, incorrectly, that CFC uses only one access point. It is required to have multiple. • CFC's required recreational areas disappear.	Sound Transit acknowledges the challenges that would be faced by the Christian Faith Center if the South 344th Street Alternative is selected by the Sound Transit Board as the project to be built. If the South 344th Street Alternative were selected, Sound Transit would evaluate the site characteristics and Christian Faith Center's approval requirements as part of final design and appraisal process. Since identifying the South 336th Street Alternative as the Preferred Alternative, Sound Transit has moved forward with a hardship acquisition of the four parcels associated with the Christian Faith Center.
5	Beyond, the physical, land use, and environmental impacts are fiscal impacts. CFC has long term financing for its current Campus. Taking a significant portion of the property would impair the lender's collateral. Its loan would be called. With the remainder of the property now a non-conforming and non-compliant property, no lender would extend credit. The City of Federal Way could commence code enforcement action requiring CFC to come into compliance with storm water, access, and recreational facilities requirements, which CFC could not meet.	Please see the response to the previous comment (Comment ID 4).
6	CFC respectfully requests that Sound Transit carefully review the 107 page Campus Approval document to refine its analysis of impacts associated with the South 344th Street Alternative.	Sound Transit has reviewed and considered the requirements of the agreement between the Christian Faith Center and the city of Federal Way listed in the Concomitant Agreement and Development Agreement (July 10, 2004).

EQUIPPING THE NEXT GENERATION

33645 20TH AVE S. FEDERAL WAY, WA 98003
253.943.2500 MAIN OFFICE
PACIFICCHRISTIANACADEMY.COM

April 15, 2021

Dear Sound Transit Board:

We recognize that the Sound Transit Board is engaged in an important analysis of sites for a new maintenance facility. Pacific Christian Academy has been a tenant of Christian Faith church for the last 12 years as a separate entity, but prior to 2009 the school was part of the ministry for 23 years. We would like to express our hope that, when final decisions are made, there will be a home for the students who see PCA as their second family. We desire to keep the vision alive not only for our current students, but all the alumni, students, and families who have invested in the school over the last 35 years.

Pacific Christian Academy has been a contributing member of the Seattle/Federal Way community for decades. In that time, the school has demonstrated excellence in preparing young men and women to take their place as productive, contributing members of society. Strong moral values are the hallmark of a Pacific Christian education. Our value for service is lived out as our students volunteer at several critical organizations in our area. We believe we are a good community partner; our students enjoy volunteering in various outreach programs such as helping the elderly, cleaning parks, helping provide food for the hungry, serving in food banks, and partnering with other organizations who are making a positive change in the community.

The Federal Way Mirror noted, after looking at the EIS report, "Being the largest EE-12 Christian school in the Federal Way area, Pacific Christian has a very diverse K-12 student population." Our school provides an education to a widely diverse student population, thus serving the demographics of the families in Federal Way.

We understand the need for a maintenance facility for Sound Transit. We also believe there must be a place for PCA to continue its mission of equipping students to be socially relevant leaders. Time has been invested in looking for a new facility, should Christian Faith be the chosen site. That search has not produced an available site that would allow us to provide an educational experience equivalent to what our students are currently receiving. Our hope and request is that in 2023, Sound Transit will assist Pacific Christian Academy in finding a new home, should the Christian Faith site be chosen. Indeed, we are grateful for the willingness of Sound Transit staff to meet on more than one occasion with our Board of Trustees to discuss progress on the project. We feel confident that Sound Transit understands our desire to remain a viable educational option for the families of Federal Way.

Thank you for your time, effort, and your concern for Pacific Christian Academy. We look forward to hearing from you in the near future.

Sincerely,

Debbie Schindler
Head of School

Affiliations ACSI AdvancED WFIS THE WASHINGTON STATE BOARD OF EDUCATION

Pacific Christian Academy (Communication ID 473613)		
Comment ID	**Comment Text**	**Response**
1	The Federal Way Mirror noted, after looking at the EIS report, "Being the largest EE-12 Christian school in the Federal Way area, Pacific Christian has a very diverse K-12 student population." Our school provides an education to a widely diverse student population, thus serving the demographics of the families in Federal Way.	Sound Transit acknowledges the diversity of Pacific Christian Academy’s student body. Further discussion of the demographics of the population in Federal Way are discussed in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, and Appendix E, Environmental Justice Assessment, in the 2023 Draft EIS and this Final EIS.
2	We understand the need for a maintenance facility for Sound Transit. We also believe there must be a place for PCA to continue its mission of equipping students to be socially relevant leaders. Time has been invested in looking for a new facility, should Christian Faith be the chosen site. That search has not produced an available site that would allow us to provide an educational experience equivalent to what our students are currently receiving. Our hope and request is that in 2023, Sound Transit will assist Pacific Christian Academy in finding a new home, should the Christian Faith site be chosen. Indeed, we are grateful for the willingness of Sound Transit staff to meet on more than one occasion with our Board of Trustees to discuss progress on the project. We feel confident that Sound Transit understands our desire to remain a viable educational option for the families of Federal Way.	Sound Transit is committed to providing relocation assistance to displaced uses as required by Sound Transit policies and the Uniform Relocation Act. This is described in Section 3.3, Acquisitions, Displacements, and Relocations in the 2023 Draft EIS and this Final EIS.

McCARTHY
&CAUSSEAUX
ATTORNEYS AT LAW | ESTABLISHED 1977

April , 2021

902 South 10th Street
Tacoma, WA 98405

p: 253 272 2206
f: 253 272 6439

Sound Transit Board
401 South Jackson Street
Seattle, WA 98104

RE: Comments on the Draft Environmental Impact Statement for the OMF South Facility

Dear Board Members:

THE SOUTH 344TH STREET ALTERNATIVE WOULD IMPACT THE MOST SOCIAL RESOURCES AND WOULD HAVE THE GREATEST NUMBER OF BUSINESS AND RESIDENTIAL DISPLACEMENTS AS COMPARED WITH THE OTHER BUILD ALTERNATIVES.
(Section 3.6.2.2, page 3.6-9 of the Draft Environmental Impact Statement) (DEIS)

Nowhere in the Executive Summary does the above conclusion appear. Yet it is totally accurate as shown in a comparison of the 344th Street site with either the Midway Land Fill Alternative or the South 336th Street Alternative for the following reasons:

A. Table 3.5-5 of the DEIS shows a total of 26 businesses affected at the 336th Street site as compared with 60 businesses at the 344th site. The 336th site will displace three businesses while the 344th Street site will displace 15. Estimated employee displacements are 94 for 336th and 248 for 344th.

B. Table 3.5-6 DEIS shows the total taxable value of properties that must be acquired at 336th equals 50.8 million, while the taxable value of properties that must be acquired at 344th is almost twice as much at 99.5 million. 336th requires acquisition of 36 parcels and 344th requires acquisition of 64 parcels. Furthermore, said Table does not reflect that the 25 acre, Christian Faith Center, located on the 336th site, is not on the tax roles.

C. Section 3.4.3.2 DEIS shows that the OMF facility at the 336th site would convert 25 acres of public institution property not currently on the tax roles and 27 acres of vacant land. Therefore, 52 of the 97 acres proposed for acquisition are either not on the tax roles or remain vacant. The DEIS does not fully consider this fact and how it compares with the 344th site.

D. The Executive Summary reflects that the environmental impacts to critical areas are approximately the same at the 336th and 344th sites. However, the Executive Summary does not reflect that selection of the 344th site will require conversion of the State Department of Transportation's Reserve Conservation Area that the State acquired under the Highway Beautification Act in 1965. While the DEIS recognizes that fact, it contains no discussion of the impacts of the conversion or the difficulty/cost in obtaining approval therefor.

E. The DEIS assumes that Sound Transit can find a suitable location for the Ellenos Yogurt business if it selects the 344th Alternative. The DEIS also assumes that, similar to an office/warehouse business, Ellenos can simply build-up its inventory prior to the move, and then use its inventory during the time necessary to move and acquire new equipment. Such is impossible. Yogurt has a very limited shelf life and Ellenos must constantly remain in operation to protect its product, its shelf space in retail outlets, and its position in an extremely competitive market. Thus, Ellenos cannot disassemble its equipment at its present location, move it to a new site, and secure proper permits. As forth in the Ellenos letter of March 26, 2021.

> "Equally important, it will take a minimum of a year to ensure that a new facility will efficiently and effectively produce product that meet product safety and quality parameters essential to remaining competitive and financially stable. **The myriad of steps require represent 2+ year process when an organization has the excess staffing to operate two facilities and assumes the project does not encounter unexpected setbacks, which pragmatically speaking, is not likely to be the case."**

Ellenos would need to abandon its equipment at its present location and purchase new equipment for its new location. Such is cost prohibitive.

F. Ellenos estimates relocation costs alone at above 25 million. Such cost does not account for ten of millions in business opportunity losses it will incur. Ellenos anticipates expanding to a 24/7 operation and hiring many new employees by the end of 2022. Selecting the 344th Street site will put an end to Ellenos yogurt.

Thank you for your consideration of the above matters.

Very truly yours,

Stephen K. Causseaux, Jr.
Managing Partner for Schindler Family Limited
Partnership, Owners of the Ellenos Building

Schindler Family Limited Partnership, Owner of the Ellenos Yogurt Building (Communication ID 473816)		
Comment ID	**Comment Text**	**Response**
1	THE SOUTH 344TH STREET ALTERNATIVE WOULD IMPACT THE MOST SOCIAL RESOURCES AND WOULD HAVE THE GREATEST NUMBER OF BUSINESS AND RESIDENTIAL DISPLACEMENTS AS COMPARED WITH THE OTHER BUILD ALTERNATIVES. (Section 3.6.2.2, page 3.6-9 of the Draft Environmental Impact Statement) (DEIS) Nowhere in the Executive Summary does the above conclusion appear.	Table ES-1 in the Final EIS Executive Summary includes a comparison of key characteristics and impacts of all three build alternatives. Within the table, the Acquisitions subsection contains the total number of displaced businesses and residences, and the Environmental Justice, Social Resources, Community Facilities, and Neighborhoods subsection contains the number of displaced social and community resources. Additionally, Figure ES-9 and the associated Acquisitions, Land Use, and Economics text in Section ES.3, Comparison of Alternatives of the Executive Summary expands on these impacts.
2	A. Table 3.5-5 of the DEIS shows a total of 26 businesses affected at the 336th Street site as compared with 60 businesses at the 344th site. The 336th site will displace three businesses while the 344th Street site will displace 15. Estimated employee displacements are 94 for 336th and 248 for 344th.	The comment restates the information from the 2021 Draft EIS. Note that this table was updated in the 2023 Draft EIS and again in this Final EIS.
3	B. Table 3.5-6 DEIS shows the total taxable value of properties that must be acquired at 336th equals 50.8.million, while the taxable value of properties that must be acquired at 344th is almost twice as much at 99.5 million.336th requires acquisition of 36 parcels and 344th requires acquisition of 64 parcels. Furthermore, said Table does not reflect that the 25 acre, Christian Faith Center, located on the 336th site, is not on the tax roles. C. Section 3.4.3.2 DEIS shows that the OMF facility at the 336th site would convert 25 acres of public institution property not currently on the tax roles and 27 acres of vacant land. Therefore, 52 of the 97 acres proposed for acquisition are either not on the tax roles or remain vacant. The DEIS does not fully consider this fact and how it compares with the 344th site.	Section 3.5, Economics, in the 2023 Draft EIS and this Final EIS notes that the Christian Faith Center and the Pacific Christian Academy are not taxed. Section 3.5 includes a discussion of the difficulties involved with calculating specific property tax impacts. Overall, the impact is expected to be small given the reduction in taxable assessed valuation of acquired properties in relation to the area's overall tax base. As an example, the total taxable assessed valuation of real property for full and partial acquisitions for the South 344th Street Alternative accounts for 0.91 percent of Federal Way's overall assessed valuation in 2019; none of the alternatives exceed 1 percent.

Schindler Family Limited Partnership, Owner of the Ellenos Yogurt Building (Communication ID 473816)		
Comment ID	**Comment Text**	**Response**
4	D. The Executive Summary reflects that the environmental impacts to critical areas are approximately the same at the 336th and 344th sites. However, the Executive Summary does not reflect that selection of the 344th site will require conversion of the State Department of Transportation's Reserve Conservation Area that the State acquired under the Highway Beautification Act in 1965. While the DEIS recognizes that fact, it contains no discussion of the impacts of the conversion or the difficulty/cost in obtaining approval therefor.	WSDOT Resource Conservation Areas are shown and discussed in Section 3.7, Visual and Aesthetic Resources, of the of the 2023 Draft EIS and this Final EIS. The mainline tail tracks associated with the South 344th Street Alternative would impact the two Resource Conservation Areas. During final project design, Sound Transit would incorporate specific measures to mitigate impacts to the Resource Conservation Areas, consistent with the WSDOT Roadside Policy Manual.
5	E. The DEIS assumes that Sound Transit can find a suitable location for the Ellenos Yogurt business if it selects the 344th Alternative. The DEIS also assumes that similar to an office/warehouse business, Ellenos can simply build-up its inventory prior to the move, and then use its inventory during the time necessary to move and acquire new equipment. Such is impossible. Yogurt has a very limited shelf life and Ellenos must constantly remain in operation to protect its product, its shelf space in retail outlets, and its position in an extremely competitive market. Thus, Ellenos cannot disassemble its equipment at its present location, move it to a new site, and secure proper permits.	In Section 3.3, Acquisitions, Displacements, and Relocations of the 2023 Draft EIS and this Final EIS, Sound Transit recognizes the difficulties of relocating an operation like Ellenos. Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
6	F. Ellenos estimates relocation costs alone at above 25 million. Such cost does not account for ten of millions in business opportunity losses it will incur. Ellenos anticipates expanding to a 24/7 operation and hiring many new employees by the end of 2022. Selecting the 3441 Street site will put an end to Ellenos yogurt.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

REAL GREEK YOGURT
ELLENOS
TRADITIONAL FAMILY RECIPE

March 26, 2021

Sound Transit Board
401 S. Jackson St.
Seattle, WA 98104

Dear Board Member,

We are writing to you regarding the Sound Transit Authority's (STA) draft Environmental Impact Statement for the Operations and Maintenance Facility South posted on March 5, 2021. Although we found the report to be fairly thorough, it failed to capture the $10's of millions in direct costs that would be incurred as a result of relocating the Ellenos manufacturing facility which is part of site 10A, also known as the South 344th Street site. In addition, the statement fails to account for the profound opportunity costs to be incurred by Ellenos and the impact on its future as a result if forced to relocate.

When asked by local media his reaction to the possibility of our site being selected, Ellenos Co-Founder and yogurt aficionado, Con Apostolopoulos' immediate reaction was that it would be catastrophic. As a lifelong yogurt manufacturer, Mr. Apostolopoulos knows all too well the sensitive nature of yogurt manufacturing. After an extensive assessment by the Ellenos Management Team his conclusion was reenforced. The economic and strategic ramifications, both immediate and long-term, to our company and its 130+ employees would be crippling and puts into question our ability to survive this dramatic disruption to the business. It will unravel years of strategic investment and development of which the Federal Way manufacturing facility has been central to and will continue to be well into the future.

Relocation of a yogurt manufacturing facility is an extremely complex and disruptive process. Any such effort would significantly undermine our ability to compete in this highly competitive category. This is further exacerbated by the fact such turmoil comes at an immensely critical juncture in our business as we are preparing for notable national distribution over the next 3-5 years. At the core of this challenge is the fact we produce a product with an extremely short shelf life. As such, we must be able to produce product a minimum of 5-days a week in order to meet demand and keep shelves stocked. Based on current growth trajectory we anticipate this will expand to a 24/7 operation by the end 2022. Any disruption to our supply chain will quickly erode the goodwill we have worked hard to foster through the years and result in an immediate retraction of our sales and associated momentum.

It is vitally important that the Sound Transit Authority understands that yogurt manufacturing does not permit the luxury of stockpiling inventory to accommodate the move from one location to another. Product must be consistently produced nearly every day of the week due to its limited shelf life. This becomes increasingly more critical as we achieve geographic expansion where time (due to transportation time to the east coast) becomes increasingly tight. Equally important, it will take a minimum of a year to ensure that a new facility will efficiently and effectively produce product that meet product safety and quality parameters essential to remaining competitive and financially stable. The myriad of steps required represent a 2+ year process when an organization has the excess staffing to operate two facilities and assumes the project does not encounter unexpected setbacks, which pragmatically speaking, is not likely to be the case. In addition, Ellenos is not presently staffed to address the extensive effort this presents, and we are not in a financial position to do so.

The enormity of relocation should be quite evident based on the overview provided above but does not capture the opportunity costs our organization will also incur as a result. In fact, the opportunity costs are virtually incalculable because they have to factor in not only past but future opportunities lost as a result of the tremendous setback this will create. Our entire 10-year plan is built around having a well-established and operating manufacturing facility so that our focus could be on executing sales, marketing and innovation plans vital to a successful national expansion. We are still in the throes of seeking to reach that critical milestone. Relocating our manufacturing facility will place us a minimum of 3-years behind schedule and result in untold additional costs as we seek to regain our position in the uber-premium yogurt space.

In addition to opportunity costs there is the work around planning, construction, and implementation of a new manufacturing facility. To be very clear, in order to survive we will need to have a fully functioning manufacturing facility before we commence shutting down the current location. We have invested millions of dollars in equipment in order to meet current and future demand. The equipment will need to be replaced in full in order to have a fully functioning facility before we shut down the current location. This includes meeting strict Federal, State and Local permitting requirements. The net result is tens of millions of dollars will be required to duplicate our current operation. There will be very little recovered in terms of selling of the current facility's equipment and no recovery of the significant investment in the infrastructure that was required to design our plant to produce our world class product.

In conclusion, the Environmental Impact Statement, although comprehensive, fails to capture the full impact that selection of site 10A would have on Ellenos. The costs of relocation alone are estimated to be well above $25MM and does not account for the $10's of millions in opportunity costs we will incur. These additional facts combined with the EIS for OMF South clearly indicates site 10a is a poor choice relative to the other options put forth. It is hard to fathom how the Sound Transit Authority could choose site 10A given its impact on a PacNW icon (Ellenos), especially considering the additional costs not captured in the EI Statement. This compounded by the fact that not only will Ellenos suffer the grave consequences of such a choice, but so too will the nearly 100 property owners, businesses, family dwellings and churches located within the boundaries of site 10A. We therefore request the STA choose an alternative to the 344th street location when making your final decision.

Respectfully submitted,

Con Apostolopoulos / Co-Founder

Bob Klein / Co-Founder

Yv

Alex Apostolopoulos / Co-Founder

John V. Tucker / CEO

Ellenos Yogurt: Con Apostolopoulos, Alex Apostolopoulos, Yvonne Klein, Bob Klein, John Tucker (Communication ID 471974)		
Comment ID	**Comment Text**	**Response**
1	We are writing to you regarding the Sound Transit Authority's (STA) draft Environmental Impact Statement for the Operations and Maintenance Facility South posted on March 5, 2021. Although we found the report to be fairly thorough, it failed to capture the $10's of millions in direct costs that would be incurred as a result of relocating the Ellenos manufacturing facility which is part of site 10A, also known as the South 344th Street site. In addition, the statement fails to account for the profound opportunity costs to be incurred by Ellenos and the impact on its future as a result if forced to relocate.	Relocation estimates are included in the opinion of probable cost provided in Table 2.5-1 in the Final EIS. Due to the level of information available in this early phase of project development and the variety of factors that influence it, opportunity cost is not evaluated in the EIS. SEPA and NEPA do not require an analysis of economic opportunity costs of land use decisions but rather an evaluation of environmental and economic impacts on existing and reasonably foreseeable land uses for each build alternative.
2	Relocation of a yogurt manufacturing facility is an extremely complex and disruptive process. Any such effort would significantly undermine our ability to compete in this highly competitive category. This is further exacerbated by the fact such turmoil comes at an immensely critical juncture in our business as we are preparing for notable national distribution over the next 3-5 years. At the core of this challenge is the fact we produce a product with an extremely short shelf life. As such, we must be able to produce product a minimum of 5-days a week in order to meet demand and keep shelves stocked. Based on current growth trajectory we anticipate this will expand to a 24/7 operation by the end 2022. Any disruption to our supply chain will quickly erode the goodwill we have worked hard to foster through the years and result in an immediate retraction of our sales and associated momentum. It is vitally important that the Sound Transit Authority understands that yogurt manufacturing does not permit the luxury of stockpiling inventory to accommodate the move from one location to another. Product must be consistently produced nearly every day of the week due to its limited shelf life. This becomes increasingly more critical as we achieve geographic expansion where time (due to transportation time to the east coast) becomes increasingly tight. Equally important, it will take a minimum of a year to ensure that a new facility will efficiently and effectively produce product that meet product safety and quality parameters essential to remaining competitive and financially stable. The myriad of steps required represent a 2+ year process when an organization has the excess staffing to operate two facilities and assumes the project does not encounter unexpected setbacks, which pragmatically speaking, is not likely to be the case. In addition, Ellenos is not presently staffed to address the extensive effort this presents, and we are not in a financial position to do so.	Please see Section 3.3, Acquisitions, Displacements, and Relocations, and Section 3.5, Economics in the 2023 Draft EIS and this Final EIS. These sections acknowledge the unique circumstances of Ellenos Yogurt, and the relocation challenges the business would face, if the South 344th Street Alternative were selected as the project to be built.

Ellenos Yogurt: Con Apostolopoulos, Alex Apostolopoulos, Yvonne Klein, Bob Klein, John Tucker (Communication ID 471974)		
Comment ID	**Comment Text**	**Response**
3	The enormity of relocation should be quite evident based on the overview provided above but does not capture the opportunity costs our organization will also incur as a result. In fact, the opportunity costs are virtually incalculable because they have to factor in not only past but future opportunities lost as a result of the tremendous setback this will create. Our entire 10-year plan is built around having a well-established and operating manufacturing facility so that our focus could be on executing sales, marketing and innovation plans vital to a successful national expansion. We are still in the throes of seeking to reach that critical milestone. Relocating our manufacturing facility will place us a minimum of 3-years behind schedule and result in untold additional costs as we seek to regain our position in the uber-premium yogurt space. In addition to opportunity costs there is the work around planning, construction, and implementation of a new manufacturing facility. To be very clear, in order to survive we will need to have a fully functioning manufacturing facility before we commence shutting down the current location. We have invested millions of dollars in equipment in order to meet current and future demand. The equipment will need to be replaced in full in order to have a fully functioning facility before we shut down the current location. This includes meeting strict Federal, State and Local permitting requirements. The net result is tens of millions of dollars will be required to duplicate our current operation. There will be very little recovered in terms of selling of the current facility's equipment and no recovery of the significant investment in the infrastructure that was required to design our plant to produce our world class product. In conclusion, the Environmental Impact Statement, although comprehensive, fails to capture the full impact that selection of site 10A would have on Ellenos. The costs of relocation alone are estimated to be well above $25MM and does not account for the $10's of millions in opportunity costs we will incur.	Please see the responses to comments 1 and 2 of this letter.
4	These additional facts combined with the EIS for OMF South clearly indicates site 10a is a poor choice relative to the other options put forth. It is hard to fathom how the Sound Transit Authority could choose site 10A given its impact on a PacNW icon (Ellenos), especially considering the additional costs not captured in the EI Statement. This compounded by the fact that not only will Ellenos suffer the grave consequences of such a choice, but so too will the nearly 100 property owners, businesses, family dwellings and churches located within the boundaries of site 10A. We therefore request the STA choose an alternative to the 344th street location when making your final decision.	After considering the Draft EIS and the comments received, the South 336th Street Alternative, was identified by the Sound Transit Board as the Preferred Alternative in December 2021 (Motion M2021-81). The Board will select the project to be built following the Final EIS.

From: Brad Thorson <bradthorson22@gmail.com>
Sent: Monday, April 19, 2021 10:31 AM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: Public comments OMF South

Public comments for Sound Transit, OMF South

1. The Draft EIS does not classify Garage Town Owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels, even though occupants of a 4 plex were counted, as documented in Table ES-1 in the Draft EIS. This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. How do these inaccuracies get corrected and shared with Sound Transit Board members? See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the South 344th Street Site. Garage Town has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS.
2. The South 336th Street and The South 344th Street sites require Mainline track for the TDLE to be constructed. What happens if through the Budget review process, Sound Transit decides not to construct the TDLE? The cost of the two southern options for the OMF becomes much more expensive, which might make the Landfill site a better choice. This issue was not discussed in the Draft EIS. See Figure E2.3-2 in the Draft EIS.
3. Is Sound Transit in conversation with the Federal Government or the State of Washington to see if grant money can be made available to help Sound Transit fund the development of the Landfill Site?

Other Comments:

The sizes, in acres, of the three sites is different in Draft EIS Table 3.4-2 and EIS Executive Summary. The South 344th Street site is listed as 59.3 acres in the table and 65 acres in the Executive Summary. Depending on the size one uses for comparison purposes, the South 344th Street site may be too small.

The Draft EIS did not mention that the Christian Faith Center may want to sell to Sound Transit. How do Board Members become aware of this possibility?

No mention of Federal Grants from the EPA or other government agencies to assist with redevelopment costs associated with the landfill. Does the State of Washington support the Landfill Site

Brad Thorson
GarageTown Federal Way
Condominium Association
18604 Sound View Place
Edmonds, WA 98020
(206) 947-9416 Mobile
garagetownfederalway.com

Brad Thorson Garage Town (Communication ID 473733)		
Comment ID	**Comment Text**	**Response**
1	The Draft EIS does not classify Garage Town Owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels, even though occupants of a 4 plex were counted, as documented in Table ES-1 in the Draft EIS. This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. How do these inaccuracies get corrected and shared with Sound Transit Board members? See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the South 344th Street Site. Garage Town has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The South 336th Street and The South 344th Street sites require Mainline track for the TDLE to be constructed. What happens if through the Budget review process, Sound Transit decides not to construct the TDLE? The cost of the two southern options for the OMF becomes much more expensive, which might make the Landfill site a better choice. This issue was not discussed in the Draft EIS. See Figure E2.3-2 in the Draft EIS.	The purpose of this EIS is to evaluate the potential environmental impacts of OMF South, including the mainline tracks that would connect the South 336th Street and South 344th Street alternatives, regardless of whether TDLE is constructed. The cost of the mainline tracks is included in the cost estimates for the Preferred and South 344th Street alternatives as shown in Table ES-1 in the Executive Summary and in Table 2.5-1 in Section 2.5, Funding and Opinion of Probable Costs, of the Final EIS.
3	Is Sound Transit in conversation with the Federal Government or the State of Washington to see if grant money can be made available to help Sound Transit fund the development of the Landfill Site?	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	The sizes, in acres, of the three sites is different in Draft EIS Table 3.4-2 and EIS Executive Summary. The South 344th Street site is listed as 59.3 acres in the table and 65 acres in the Executive Summary. Depending on the size one uses for comparison purposes, the South 344th Street site may be too small.	The Executive Summary description provides the permanent acreage of land needed to operate the OMF South. Table 3.4-2 of the 2023 Draft EIS and this Final EIS reports the amount of land that would be converted for a transportation use for each of the alternatives. If land within an alternative is already considered to be a transportation use (for example, an existing roadway), it is not considered a land use conversion.

Brad Thorson Garage Town (Communication ID 473733)		
Comment ID	**Comment Text**	**Response**
5	The Draft EIS did not mention that the Christian Faith Center may want to sell to Sound Transit. How do Board Members become aware of this possibility?	Prior to publication of the Draft EIS, Sound Transit notified owners of potentially affected parcels of the project and potential effects. This included coordination with representatives of the Christian Faith Center. Sound Transit will continue to coordinate with property owners throughout the course of the project. Subsequent to the 2021 Draft EIS, FTA approved, and the Sound Transit Board authorized (Resolution Number R2023-26) a hardship acquisition of the four parcels associated with the Christian Faith Center. The purpose of a hardship acquisition is to alleviate a particular hardship to the owner when the property owner can document on the basis of health, safety, or financial reasons that remaining in the property poses an undue hardship compared to others. Hardship acquisitions do not limit the evaluation of alternatives required under the NEPA process. No development on the parcels would occur until after FTA issues a ROD and if the Sound Transit Board selects to build the Preferred or South 344th Street alternatives.
6	No mention of Federal Grants from the EPA or other government agencies to assist with redevelopment costs associated with the landfill. Does the State of Washington support the Landfill Site	The State of Washington has not expressed a preference on the site alternatives for OMF South. Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Hello, My name is Rod Snyder an I am the VP of Sales and Branch Operations for Red Canoe Credit Union. I am leaving the following comments as to express our hopes and concerns about how the proposed OMF South project site selection might impact our business operations. We have a credit union branch located at 33616 Pacific HWY S in Federal Way. This branch has vehicle access from Pac HWY northbound and from both directions on 336th. The South 336th Street location brings up most of my concerns, especially during the construction phase. The Draft EIS indicated there could be as many as 75 truck trips per day. With this volume of truck traffic on 336th and Pac HWY our members might find it difficult to access their branch and conduct their banking. I am also concerned about road and sidewalk construction on 336th that would temporarily close our vehicle access from our 336th entrance. Here is my question and request for this project, if 336th is selected. Will construction truck traffic travel to the job site using the east side of 336th/Weyerhaeuser Way to access the freeway? This makes much more sense since this area is nearly void of any homes or businesses that would be impacted by the high volume of truck traffic. Having trucks travel up and down HWY 99 to access 336th is a huge congestion problem for an all ready busy intersection. If 336th is selected, my business and so many more would request that the project expect truck traffic to use the east entrance of 336th East and Weyerhaeuser Way to access the job site. Also, if there will be road closure on 336th I request that there never be both directions closed at any given time. My business only has 2 access points, northbound Pac HWY and 336th. If you close 336th you will eliminate a primary access point for my members to conduct business. After reviewing the Draft EIS and the potential negative effects for each site alternative, I support the Midway Landfill as the best location. Although cost is the highest, it will have the least impact on community and businesses as well as repurposing an otherwise dead piece of property in our community. Please consider my request as this project progresses. I would like a response. Thank you.
Rod Snyder

Rod Snyder Red Canoe Credit Union (Communication ID 474301)		
Comment ID	**Comment Text**	**Response**
1	We have a credit union branch located at 33616 Pacific HWY S in Federal Way. This branch has vehicle access from Pac HWY northbound and from both directions on 336th. The South 336th Street location brings up most of my concerns, especially during the construction phase. The Draft EIS indicated there could be as many as 75 truck trips per day. With this volume of truck traffic on 336th and Pac HWY our members might find it difficult to access their branch and conduct their banking. I am also concerned about road and sidewalk construction on 336th that would temporarily close our vehicle access from our 336th entrance. Here is my question and request for this project, if 336th is selected. Will construction truck traffic travel to the job site using the east side of 336th/Weyerhaeuser Way to access the freeway? This makes much more sense since this area is nearly void of any homes or businesses that would be impacted by the high volume of truck traffic. Having trucks travel up and down HWY 99 to access 336th is a huge congestion problem for an all ready busy intersection. If 336th is selected, my business and so many more would request that the project expect truck traffic to use the east entrance of 336th East and Weyerhaeuser Way to access the job site. Also, if there will be road closure on 336th I request that there never be both directions closed at any given time. My business only has 2 access points, northbound Pac HWY and 336th. If you close 336th you will eliminate a primary access point for my members to conduct business.	The 2023 Draft EIS and this Final EIS include a description of the assumed truck routes in Section 3.2, Transportation. As described in Section 3.2.2.4, Avoidance and Minimization of Impacts, Sound Transit would prepare a construction transportation management plan addressing hauling routes and impacts to local businesses, among other topics. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours or whether the parking and users of this access could be accommodated at an alternative location.
2	After reviewing the Draft EIS and the potential negative effects for each site alternative, I support the Midway Landfill as the best location. Although cost is the highest, it will have the least impact on community and businesses as well as repurposing an otherwise dead piece of property in our community.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Hello there- I run Federal Way Custom Jewelers- the oldest retailer in Federal Way. I have seen the changes and impacts of transit and am excited for light rail. That said, I have been very disappointed by some of the decisions, or lackthereof, by Sound Transit when it comes to OMF South. The obvious best choice for OMF South is the Midway Landfill site. This is unused space, that no one but the taxpayer could afford to make usable. Furthermore, the other options would have major impacts on local businesses and organizations and negatively impact our local economy. If the megachurch leaves, I lose clients on weekends. If Ellenos and the other businesses in the corporate park are forced to relocate, then those employees and high paying jobs go with them, and those are my clients too. Sound Transit is worried about cost- the Federal government is funding most of this project. I am sure there is more grant money available to clean up the environmental issues at midway. The south sound has repeatedly been taken advantage of- we have the most low wage workers, people of color, and commuters who could use the transit, yet we are getting light rail last, AFTER the north end and east side. So, do the right thing for the south sound this time, and make up for past transgressions. It will help get my future votes and support in favor of Sound Transit. I implore Sound Transit: spend the extra money, use the wasted space, clean up our local environment, and place the OMF south on the midway landfill.

Brandon Moak, Federal Way Custom Jewelers (Communication ID 474310)		
Comment ID	**Comment Text**	**Response**
1	The obvious best choice for OMF South is the Midway Landfill site. This is unused space, that no one but the taxpayer could afford to make usable.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Furthermore, the other options would have major impacts on local businesses and organizations and negatively impact our local economy. If the megachurch leaves, I lose clients on weekends. If Ellenos and the other businesses in the corporate park are forced to relocate, then those employees and high paying jobs go with them, and those are my clients too.	Sound Transit provides relocation assistance for displaced businesses, as described in Section 3.3, Acquisitions, Displacements, and Relocations of the 2023 Draft EIS and this Final EIS. Displaced businesses may choose to relocate in the area or outside of the area. The OMF itself will be a source of employment, providing approximately 610 jobs.
3	Sound Transit is worried about cost- the Federal government is funding most of this project. I am sure there is more grant money available to clean up the environmental issues at midway.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

My business and livelihood is on the line . Northwest Equipment Sales and Rentals is positioned on the I5 corridor and Hwy 18. We employ approx 10 people . The location we purchased in 2003 was strategically situated for logistics since we haul heavy rental equipment up and down the I5 corridor. There is currently no property available that is zoned M2 or M3. This will have a devastating affect on our Business located at 2011 So 341st place in Federal Way . Please choose an alternate site like Christian Faith Center or the Midway landfill

Russ Hibbard, Northwest Equipment Sales, and Rentals (Communication ID 474314)		
Comment ID	**Comment Text**	**Response**
1	My business and livelihood is on the line. Northwest Equipment Sales and Rentals is positioned on the I5 corridor and Hwy 18. We employ approx. 10 people. The location we purchased in 2003 was strategically situated for logistics since we haul heavy rental equipment up and down the I5 corridor. There is currently no property available that is zoned M2 or M3. This will have a devastating affect on our Business located at 2011 So 341st place in Federal Way. Please choose an alternate site like Christian Faith Center or the Midway landfill	Section 3.3, Acquisitions, Displacements, and Relocations, in the 2023 Draft EIS and this Final EIS, notes the difficulties of relocating certain properties. As described in Section 3.3, Sound Transit provides compensation and support for business relocations. Section 3.5, Economics, notes that businesses that use machinery or hazardous substances may require large parcels or have additional challenges that may make relocation difficult.

From: Scott Halverson [redacted]
Sent: Thursday, April 15, 2021 11:04 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: Scott Halverson/[redacted]

Dear Sound Transit,

Thank you for taking time to speak with myself and my consultant, David Peterson, about the potential use acquisition/condemnation of my property located at [redacted] Kent Wa 98032. I am the owner of this property (Race King LLC) and i currently run 2 businesses out of this location: My septic is my primary use of the property where i park my trucks and run my business as well as my racing business which is more of a hobby.

This property is slated to be part of the Midway Landfill alternative for the Operations and Maintenance Facility for the Light Rail System. My property has already been impacted in the past due to street widening and improvements along Pacific Highway. If my property were to be impacted any further by partial condemnation or easement, then it would essentially be unusable for my businesses, and market value of the property would be severely negatively impacted by any future owner. Having said that, I would be open to selling my property to Sound Transit as long as i could find a replacement property that would fit my business needs.

If Sound Transit does pick the Midway Alternative, then i look forward to further discussions about my property that would be a win-win for both parties.

Sincerely,
Scott Halverson
[redacted]

Scott Halverson, Race King LLC (Communication ID 473485)

Comment ID	Comment Text	Response
1	This property is slated to be part of the Midway Landfill alternative for the Operations and Maintenance Facility for the Light Rail System. My property has already been impacted in the past due to street widening and improvements along Pacific Highway. If my property were to be impacted any further by partial condemnation or easement, then it would essentially be unusable for my businesses, and market value of the property would be severely negatively impacted by any future owner. Having said that, I would be open to selling my property to Sound Transit as long as i could find a replacement property that would fit my business needs.	Sound Transit would begin the property acquisition process after the Final EIS is published, and the Sound Transit Board selects the project to be built. Sound Transit would work with affected property owners to determine relocation needs. Section 3.3, Acquisitions, Displacements, and Relocations includes a summary of Sound Transit's acquisition and relocation policy. A fair and reasonable analysis of your property's value would be addressed in an appraisal and a review appraisal before the agency makes a determination of just compensation. If a partial acquisition or permanent easement were to render a remainder portion of the property unusable or the business untenable, all efforts would be made to fairly compensate for the real estate and provide entitlements for relocation.

GREATER
FEDERAL WAY
Chamber of Commerce

DT: April 19, 2021

TO: Sound Transit Board

FR: Greater Federal Way Chamber of Commerce

Public Comment: Operations and Maintenance Facility South

The Greater Federal Way Chamber of Commerce continues to identify transportation infrastructure as a priority, recognizing the necessary investment of mass transit/light rail to meet the growing demands of a growing business community in the South Puget Sound region.

As an economic development focused organization, the Chamber recognizes Sound Transit's investment in the Federal Way area with the current construction of light rail stations at 320th Street and Highline College. As the strategic plan for light rail reaches further to the south, the proposed Operations and Maintenance Facility (OMF) South, becomes a critical component for expansion of the system.

The business leaders at that Chamber have reviewed the 24 proposed OMF South sites and ask the Sound Transit Board to note the guiding principles important to the Chamber of Commerce in their evaluation of the final three sites, as follows:

- Creation of permanent, sustainable living wage jobs;
- Minimum business displacement for existing jobs;
- Enhanced opportunities for transit-adjacent development;
- Impact of economic multipliers in the community;
- Environmental issues, including health concerns and the stewardship of resources such as wetlands and trails;
- Cost of strategic growth for transportation infrastructure.

The Chamber remains focused on the diversification of the economic base of Federal Way, including the maximum retention of commercial enterprises which provide the City with its tax base and within a range of industries from light manufacturing to minority-owned businesses.

In sum, the Greater Federal Way Chamber of Commerce encourages Sound Transit to determine the OMF South site based on what is most favorable to new and existing economic opportunities in our area.

Submitted on behalf of the business community at the Federal Way Chamber,

Rebecca Martin, CCE
President and CEO

Federal Way Chamber of Commerce (Communication ID 479627)		
Comment ID	**Comment Text**	**Response**
1	The business leaders at that Chamber have reviewed the 24 proposed OMF South sites and ask the Sound Transit Board to note the guiding principles important to the Chamber of Commerce in their evaluation of the final three sites, as follows: • Creation of permanent, sustainable living wage jobs; • Minimum business displacement for existing jobs; • Enhanced opportunities for transit-adjacent development; • Impact of economic multipliers in the community; • Environmental issues, including health concerns and the stewardship of resources such as wetlands and trails; • Cost of strategic growth for transportation infrastructure. The Chamber remains focused on the diversification of the economic base of Federal Way, including the maximum retention of commercial enterprises which provide the City with its tax base and within a range of industries from light manufacturing to minority-owned businesses. In sum, the Greater Federal Way Chamber of Commerce encourages Sound Transit to determine the OMF South site based on what is most favorable to new and existing economic opportunities in our area.	The Sound Transit Board identified the South 336th Street Alternative as the Preferred Alternative, as described in Section 2.2.6 of the 2023 Draft EIS and this Final EIS. Prior to identification of the Preferred Alternative, the Sound Transit Board considered the 2021 Draft EIS analysis and comments on the 2021 Draft EIS, among other factors. The Board will consider the Draft EIS comments, Final EIS analysis, and other factors prior to selection of the project to be built.

WE IMPLORE YOU TO

PROTECT FEDERAL WAY

April 18, 2021

pac@protectfederalway.org
Protect Federal Way

Dear Sound Transit Board & EIS Team:

Thank you for your diligent work to study the three OMF South locations in greater detail in this Draft EIS. We the citizens of Federal Way, Kent, Auburn, and nearby south Sound communities appreciate the focus being placed on the impact from OMF South site decisions on our neighborhoods and people.

As we have seen in your Draft EIS, choosing the **South 344th Street** site would negatively impact the community in the following ways:

- The largest negative economic impacts on citizens and government
- The largest negative street and zoning impacts
- The largest negative wetland and stream impacts
- The largest negative property and relocation costs for Sound Transit
- The **greatest number of residential evictions at 79**
- The **greatest number of business evictions**, at 12 (and **we believe this is incorrectly low**, as that does not include small businesses in rented spaces and in unmarked spaces such as GarageTown. We consider this **25+ business evictions**).
- Three local churches (and we believe the **impact of relocating the FCC-licensed broadcast tower** for Trinity Broadcasting KTBW-TV **has not been considered** in the Draft EIS)
- The **greatest number of jobs lost at 248**.

In addition to these serious impacts to homes, jobs, and lives in our community, we also think the **Draft EIS does not address these additional concerns** about the South 344th Street site:

- The **increased relocation costs** for business owners and tenants of industrial buildings in the South 344th Street site. Dismantling and transporting industrial equipment such as the Ellenos Yogurt plant, vehicle lifts in auto shops and at

Garage Town, the KTBW-TV broadcast tower, and numerous others represent significant additional relocation costs that, while not part of the Draft EIS scope, should be considered as incremental additional costs of selecting this site.

- **Comparable properties for relocation** of businesses have not been priced. There are not viable properties in the Federal Way community or indeed anywhere within 20+ miles of the South 344th Street site to relocate many of these businesses. As this is the last industrial zone in Federal Way, choosing this site **immediately evicts all industrial businesses from Federal Way, permanently**. Obtaining license to relocation the KTBW-TV broadcast tower will be much more complex and costly than simply finding a new plot of land. Obtaining properties comparable to the GarageTown complex will be significantly more expensive (we estimate 2x-3x) than the current tax value of those properties. The true cost of choosing the South 344th Street site will be borne later, by the Sound Transit relocation committee, but **it is misleading not to include an estimate of that cost** when evaluating and selecting a site.
- The **true business costs of relocation**. Many small businesses asked by Sound Transit to relocate will simply fold and the jobs they represent will evaporate as the toll of relocation will overburden them. For example, the Ellenos Yogurt operation would need to build a duplicate facility in another location and shift all their manufacturing capacity before the existing facility could be dismantled, meaning the several multi-million-dollar investments made in their current property would need to be repeated. Businesses like Ellenos would be **faced with huge capital expenses not covered by Sound Transit that have no long-term gain to their business**. Every business targeted by relocation would be forced to make the same difficult decisions, and many will fold under the extreme burden.

Sound Transit has provided many opportunities for citizens to speak on this issue and share concerns and views with the Sound Transit Board and the Sound Transit teams. As citizens, we have shared with Sound Transit our view that choosing the South 344th Street site represents too great a cost to Federal Way to be considered viable.

- **465 citizens have signed paper and online petitions** that have been submitted to Sound Transit
- More than 45 individual citizens have sent specific comments into the Draft EIS process.

- Citizens have attended Sound Transit presentations and Sound Transit Board meetings to share these concerns.
- Citizens have also attended Federal Way City Council meetings to share concerns with Federal Way council members and ask for help.

For yourselves on the Sound Transit Board and Sound Transit planning teams, if there was any doubt which of the three remaining OMF South sites had the highest costs for citizens, businesses, and the community, these voices should have made it quite clear: **the South 344th Street Site is the most painful and costly choice for everyone**. On behalf of all of us, please preserve homes, jobs, businesses, and the future of Federal Way by removing this site from further consideration.

Thank you for your empathetic and logical decision.

Brian Nash

Chair, Protect Federal Way

A Federally-registered nonconnected Political Action Committee, EIN 84-3663586

Protect Federal Way Brian Nash (Communication ID 473676)		
Comment ID	**Comment Text**	**Response**
1	As we have seen in your Draft EIS, choosing the South 344th Street site would negatively impact the community in the following ways: • The greatest number of residential evictions at 79. • The greatest number of business evictions, at 12 (and we believe this is incorrectly low, as that does not include small businesses in rented spaces and in unmarked spaces such as GarageTown. We consider this 25+ business evictions). • Three local churches (and we believe the impact of relocating the FCC-licensed broadcast tower for Trinity Broadcasting KTBW-TV has not been considered in the Draft EIS)	Please see the response to Common Comments 1 and 2 in Table L.1-1, Responses to Common Comments, in the Final EIS. Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS was updated to include the displacement of the Trinity Broadcasting tower as a potential impact associated with the South 344th Street Alternative. The Trinity Broadcasting Network offices are permanently closed; if tower relocation is necessary, Sound Transit would work with the owner, as outlined in Section 3.3. This update is reflected in this Final EIS.
2	In addition to these serious impacts to homes, jobs, and lives in our community, we also think the Draft EIS does not address these additional concerns about the South 344th Street site: • The increased relocation costs for business owners and tenants of industrial buildings in the South 344th Street site. Dismantling and transporting industrial equipment such as the Ellenos Yogurt plan, vehicle lifts in auto shops and at Garage Town, the KTBW-TV broadcast tower, and numerous others represent significant additional relocation costs that, while not part of the Draft EIS scope, should be considered as incremental additional costs of selecting this site.	Acquisition and relocation costs were included in the conceptual capital cost estimates listed in Table 2.6-1 of the 2021 Draft EIS. These estimates were updated in the 2023 Draft EIS and are now found in Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives, in this Final EIS.

Protect Federal Way Brian Nash (Communication ID 473676)		
Comment ID	**Comment Text**	**Response**
3	• Comparable properties for relocation of businesses have not been priced. There are not viable properties in the Federal Way community or indeed anywhere within 20+ miles of the South 344th Street site to relocate many of these businesses. As this is the last industrial zone in Federal Way, choosing this site immediately evicts all industrial businesses from Federal Way, permanently. Obtaining license to relocation the KTBW-TV broadcast tower will be much more complex and costly than simply finding a new plot of land. Obtaining properties comparable to the GarageTown complex with be significantly more expensive (we estimate 2x-3x) than the current tax value of those properties. The true cost of choosing the South 344th Street site will be borne later, by the Sound Transit relocation committee, but it is misleading not to include an estimate of that cost when evaluating and selecting a site.	Acquisition and relocation costs are included in the conceptual capital cost estimates in Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives, in this Final EIS. Section 3.3, Acquisitions, Displacements, and Relocations, describes the opportunities and potential challenges associated with relocating certain businesses.
4	• The true business costs of relocation. Many small businesses asked by Sound Transit to relocate will simply fold and the jobs they represent will evaporate as the toll of relocation will overburden them. For example, the Ellenos Yogurt operation would need to build a duplicate facility in another location and shift all their manufacturing capacity before the existing facility could be dismantled, meaning the several multi-million-dollar investments made in their current property would need to be repeated. Businesses like Ellenos would be faced with huge capital expenses not covered by Sound Transit that have no long-term gain to their business. Every business targeted by relocation would be forced to make the same difficult decisions, and many will fold under the extreme burden.	Sound Transit acknowledges the difficulties and expenses involved with business relocations. Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS describes some of the difficulties associated with relocation. As described in Section 3.3, Acquisitions, Displacements, and Relocations, Sound Transit would provide relocation assistance and would compensate affected property owners according to the provisions specified in Sound Transit's Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines; the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act; and the State of Washington's relocation and property acquisition laws and regulations.
5	For yourselves on the Sound Transit Board and Sound Transit planning teams, if there was any doubt which of the three remaining OMF South sites had the highest costs for citizens, businesses, and the community, these voices should have made it quite clear: the South 344th Street site is the most painful and costly choice for everyone. On behalf of all of us, please preserve homes, jobs, businesses and the future of Federal Way by removing this site from further consideration.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Public Commenters

In the interest of privacy, personal phone numbers and email addresses have been redacted.

Public comments to Sound Transit Draft Against the Garage Town site

Jerry Carr [redacted]

Tue 4/13/2021 7:05 AM

To:Email The Board <EmailTheBoard@soundtransit.org>;OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I would like to add my voice to the public comments against the Garage Town site for the following reasons.

- The Draft EIS did not specifically include GT owners as residential or business. All 58 Garage Town owners should be included as property owners. All GT owners will be displaced if the S 344th site is selected.
- Ask how evaluation criteria is weighted. If all criteria are weighted equally, then Midway landfill should be the preferred site.
- The South 344th Site generates the most Economic activity, real estate tax and other taxes, compared to the other two sites. The landfill Site and The Christian Faith Center are not on the tax rolls.
- Table 3.3-2 in the DEIS, should be changed to include an accurate parcel count, all GT condo parcels should be included. The S 336th Street site has 19 tax parcels; The S 344th Street site has 109 tax parcels.
- If the South 344th Street is chosen 248 people will lose their jobs, 94 jobs will be lost if the 336th Street site is chosen.
- The Draft EIS did not mention that The Christian Faith Center may want to sell the property. Sound Transit needs to be in conversation with The Christian Faith Center to confirm their desire to sell the property.
- The S 344th Street site is close to the South Federal Way Station and therefore should be considered for Transit oriented development and not considered for the OMF South.
- No mention of possible EPA or other Federal or State Grants to lower cost of the Landfill site.
- Many of the sections of the Draft EIS included numbers and language that included information about the Main Line Extension which made it difficult to look at differences between the S 336th Street site and the S 344th Street sites.
- The Draft EIS did not clearly say that there will be significantly fewer truck trips and less site work on the S 336th Street site. The site work on the S 336th Street site has the lowest impact of all three sites.
- The Full Excavation option for the Midway Landfill site, is not much more costly than the other sites and has fewer negative impacts. This site is favored by most Cities and individuals, and should be selected as the preferred OMF Site.
- GT cannot be rebuilt in King County at a reasonable cost received from Sound Transit. and there is no existing property in King County like GT. Community would be destroyed.
- It would be extremely difficult and cost prohibitive to relocate the Ellenos Yogurt facility and maintain delivery to customers. If the South 344th Street site is chosen Ellenos Yogurt would go out of business.

- The Executive Summary of the DEIS reflects that the environmental impacts of the 336th Site and the S 344th sites are about the same. It does not reflect that the selection of the 344th Site would require the conversion of the Washington DOT Reserve Conservation Area and retention pond adjacent to I-5 being relocated to an additional parcel to the south of 344th street, which is not included in many of the site maps for The 344th site.
- If The Sound Transit Board decides not construct Tacoma Dome Link Extension, selection of the S 336th and S 344th sites would require excess mainline track to be constructed.
- The Draft EIS states, on page 3.6-9: " The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared with the other build alternatives." This statement of fact was not in the DEIS Executive Summary, and it should be included.
- There are 3 churches located within the S 344th Street site. Is it better to disrupt three churches or 1 church?
- Existing street improvements to the S 344th Street site, not adequate to serve the OMF. Significant improvements to S 344th and S 342nd streets would have to be made. This issue was not addressed in the DEIS

--

Regards, Jerry A. Carr

[redacted]

Public Communication: Public Comments to Sound Transit Against the Garage Town Site, Submitted by 5 Commenters		
Comment ID	**Comment Text**	**Response**
1	The Draft EIS did not specifically include GT owners as residential or business. All 58 Garage Town owners should be included as property owners. All GT owners will be displaced if the S 344th site is selected.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Ask how evaluation criteria is weighted. If all criteria are weighted equally, then Midway landfill should be the preferred site.	The purpose of the EIS is to identify potential significant adverse environmental impacts of each proposed alternative. The EIS evaluation is not weighted. Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	Table 3.3-2 in the DEIS, should be changed to include an accurate parcel count, all GT condo parcels should be included. The S 336th Street site has 19 tax parcels; The S 344th Street site has 109 tax parcels.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	The Draft EIS did not mention that The Christian Faith Center may want to sell the property. Sound Transit needs to be in conversation with The Christian Faith Center to confirm their desire to sell the property.	Sound Transit has notified all property owners who would be potentially directly affected by the OMF South build alternatives, including the Christian Faith Center. Subsequent to the 2021 Draft EIS, FTA approved and the Sound Transit Board authorized (Resolution Number R2023-26) a hardship acquisition of the four parcels associated with the Christian Faith Center. The purpose of this type of acquisition is to alleviate a particular hardship to the owner when the property owner can document on the basis of health, safety, or financial reasons that remaining in the property poses an undue hardship compared to others. Hardship acquisitions do not limit the evaluation of alternatives required under the NEPA process. No development on the parcels would occur until after FTA issues a ROD and if the Sound Transit Board selects to build the Preferred or South 344th Street alternatives.
5	The S 344th Street site is close to the South Federal Way Station and therefore should be considered for Transit oriented development and not considered for the OMF South.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS. The OMF would provide a vital support function to the entire Link light rail system. The proposed alternative site locations are appropriate for transit-related use.
6	No mention of possible EPA or other Federal or State Grants to lower cost of the Landfill site.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.
7	Many of the sections of the Draft EIS included numbers and language that included information about the Main Line Extension which made it difficult to look at differences between the S 336th Street site and the S 344th Street sites.	Because the Midway Landfill Alternative does not include mainline track construction, the EIS was organized to differentiate between impacts associated with the OMF South facility and those associated with the required mainline connecting track. The impacts associated with construction and operation of the OMF are listed separately from the impacts associated with the mainline to allow an easier comparison among the three site alternatives. Table ES-1 summarizes the key characteristics and impacts of the alternatives and was updated in the 2023 Draft EIS and this Final EIS to show total impacts of the OMF sites and mainline track, where applicable.

Public Communication: Public Comments to Sound Transit Against the Garage Town Site, Submitted by 5 Commenters		
Comment ID	**Comment Text**	**Response**
8	The Draft EIS did not clearly say that there will be significantly fewer truck trips and less site work on the S 336th Street site. The site work on the S 336th Street site has the lowest impact of all three sites.	Table 3.2-12 of the 2023 Draft EIS and this Final EIS summarizes forecast peak daily truck trips. The South 336th Street Alternative would have more peak daily truck trips than the Midway Landfill Alternative Platform design option but fewer peak daily truck trips than the Midway Landfill Alternative Hybrid and Full Excavation design options and the South 344th Street Alternative.
9	The Full Excavation option for the Midway Landfill site, is not much more costly than the other sites and has fewer negative impacts. This site is favored by most Cities and individuals, and should be selected as the preferred OMF Site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
10	GT cannot be rebuilt in King County at a reasonable cost received from Sound Transit. There is no existing property in King County like GT. Community would be destroyed. It would be extremely difficult and cost prohibitive to relocate the Ellenos Yogurt facility and maintain delivery to customers. If the South 344thStreet site is chosen Ellenos Yogurt would go out of business.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
11	The Executive Summary of the DEIS reflects that the environmental impacts of the 336thSite and the S 344thsites are about the same. It does not reflect that the selection of the 344thSite would require the conversion of the Washington DOT Reserve Conservation Area and retention pond adjacent to I-5 being relocated to an additional parcel to the south of 344th street, which is not included in many of the site maps for The 344th site.	WSDOT Resource Conservation Areas are shown and discussed in Section 3.7, Visual and Aesthetic Resources, of the 2023 Draft EIS and this Final EIS. The mainline tail tracks associated with the South 344th Street Alternative would impact the two Resource Conservation Areas. During final project design, Sound Transit would incorporate specific measures to mitigate impacts to the Resource Conservation Areas, consistent with the WSDOT Roadside Policy Manual. The manual requires that “mitigation for lost or damaged RCAs must consist of an equal value exchange that provides appropriate performance values identified in the manual.” This includes replacing RCA land impacted by the project as well as replanting that land. The manual includes permanent irrigation requirements for impacted RCAs and specific plant establishment criteria. Relocation of the WSDOT stormwater pond is discussed in Section 3.11, Water Resources.
12	The Draft EIS states, on page 3.6-9: “The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared with the other build alternatives.” This statement of fact was not in the DEIS Executive Summary, and it should be included.	Table ES-1 in the Final EIS Executive Summary includes a comparison of key characteristics and impacts of all three build alternatives. Within the table, the Acquisitions subsection contains the total number of displaced businesses and residences, and the Environmental Justice, Social Resources, Community Facilities, and Neighborhoods subsection contains the number of displaced social and community resources. Additionally, Figure ES-9 and the associated Acquisitions, Land Use, and Economics text within Section ES.3, Comparison of Alternatives of the Executive Summary expands on these impacts.

Public Communication: Public Comments to Sound Transit Against the Garage Town Site, Submitted by 5 Commenters		
Comment ID	**Comment Text**	**Response**
13	Existing street improvements to the S 344th Street site, not adequate to serve the OMF. Significant improvements to S 344th and S 342nd streets would have to be made. This issue was not addressed in the DEIS	It is assumed the comment refers to S 341st Place rather than S 342nd Street, which is outside the study area. The South 344th Street Alternative would eliminate public access to S 344th Street east of 16th Avenue S. The roadway and intersections between SR 99 and 16th Avenue S are forecast to operate similarly to the existing and 2042 No-Build Alternative conditions in both the AM and PM peak periods. Due to this, no mitigation is required. S 341st Place would be vacated under the South 344th Street Alternative. Additional information about existing and forecast traffic operations is available in Section 3.2, Transportation, and Appendix G1, Transportation Technical Report, of the 2023 Draft EIS and this Final EIS.

Commenters:

Jerry Carr (Communication ID 472870)
Brad Thorson (Communication ID 472932)
Peter Broda (Communication ID 472869)
Paul Griggs, Teena Griggs (Communication ID 473486)
Tim and Lisa Kittilsby (Communication ID 473475)

From: Peter Broda [redacted]
Sent: Friday, March 5, 2021 9:12 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the other sites instead of this one. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

Thank you.

Peter Broda
[redacted]

Sent from my iPad

Public Communication: Concerning the OMF South & S 344th St Federal Way, Submitted by 29 Commenters		
Comment ID	**Comment Text**	**Response**
1	I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Commenters:

Michelle Biga (Communication ID 471305)
Peter Broda (Communication ID 471169, 471734)
Jerry Carr (Communication ID 471625)
Scott Carson (Communication ID 472934)
Susan Kay Chung (Communication ID 471614)
Danielle Fulcer (Communication ID 471981)
Dean Fulcer (Communication ID 471980)
Brendan Garcila (Communication ID 471309)
Monica Guthrie (Communication ID 471314)
Molly Haigh (Communication ID 473890)
Diana Haines (Communication ID 471306)
Allen Hughes (Communication ID 471167)
Michael Juguilon (Communication ID 472036)
Lisa Kittilsby (Communication ID 471171)
Peter Kobzar (Communication ID 471159)
Brad Lewis (Communication ID 471313)
Darren McDonald (Communication ID 471629)
Ian Nagy (Communication ID 471166)
Brian Nash (Communication ID 471172)
Helen Pelton (Communication ID 471311)
Cynthia Phillips (Communication ID 472537)
Maria Russell (Communication ID 471619)
Rod Smith (Communication ID 471308)
Carolyn Towle (Communication ID 471617)
Tamara Vince (Communication ID 471796)
Sue Walker (Communication ID 471307)
Camile Wilson (Communication ID 471615)
Kevin Wilson (Communication ID 471312)
Kimberly Wilson (Communication ID 472035)

From: [redacted]
Sent: Thursday, April 15, 2021 9:52 AM
To: OMFSouthDEIS@soundtransit.org
Subject: Public Comment

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

April 15,2021

OMF South, c/o Hussein Rehmat
Sound Transit
401 S. Jackson Street
Seattle, WA 98104

RE: Sound Transit Operations and Maintenance Facility South
Environmental Impact Statement Comments

Mr. Rehmat:

I have reviewed the Draft EIS documents for the Operations and Maintenance Facility - South and strongly encourage the Sound Transit Board to select the Midway Landfill site for the new facility. However, if the Midway Landfill site is not chosen, the South 336th Street site is the next best option. Section 3.6.2.2 of the DEIS on page 3.6-9 states:

"The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared to the build alternatives."

Additionally, the South 344th Street site would have the greatest impact to the local tax revenue. Property owners are already paying taxes to Sound Transit and any loss of revenue further impacts the residents in the City of Federal Way.

The DEIS makes many assumptions. The DEIS should include a table of assumptions for each of the sites and all alternatives made by Sound Transit staff and consultants. This would help the public and the Sound Transit Board understand how the alternatives were analyzed in the draft DEIS and identify potential cost savings vs. the significantly large estimates in the DEIS. For example, the DEIS assumes waste removal from the Midway Landfill could only occur from May through September creating an extremely long construction duration leading to increased costs. Identify all assumptions for each alternative

The DEIS also estimated employee displacements based on assumptions for each alternative. Employee displacement numbers shown in the DEIS are based on square footage of floor space, not actual numbers. In fact, the S. 344th site would displace Ellenos Yogurt, and not only their current employees, but additional jobs that are anticipated when Ellenos expands to a 24-hour operation by the end of 2022. This should be included in the analysis. The assumptions in the DEIS do not take this into consideration. The DEIS states a suitable location for Ellenos can be found if the S. 344th alternative is selected. However, as noted in the letter from EllenosYogurt dated March 26, 2021:

"Equally important, it would take a minimum of a year to ensure a new facility will efficiently and effectively produce product that meet safety and quality parameters essential to remaining competitive and financially stable. The myriad of steps required represent a 2+ year process when an organization has the excess staffing to operate two facilities and assumes the project does not encounter unexpected setbacks, which pragmatically speaking, is not likely to be the case."

The Sound Transit Board has an opportunity to select a site that makes the most sense for the region. The Midway Landfill site offers the following benefits:

1) The Midway Landfill site is mostly vacant property.
2) The Midway Landfill site has the fewest displacements of employees.
3) The Midway Landfill site has minimal business displacement.
4) The Midway Landfill site impacts zero residences.
5) The Midway Landfill site does not impact streams.
6) The Midway Landfill site does not impact wetlands.
7) The Midway Landfill site has the lowest impact on forest resources. The forest impacts identified on the Midway Landfill site should not be considered forest.
8) And very significantly, the Midway Landfill has the least impacts on local tax revenue to the local community.

When comparing the South 344th Street and South 336th Street Alternatives, there is no question the 344th site should NOT be selected.

1) The 344th Street site would have the most residential displacements
2) The 344th Street site would displace five times as many businesses.
3) The 344th Street site would displace well over twice as many employees, and that does not include the proposed expansion at Ellenos Yogurt in 2022.
4) The 344th Street site would have a significantly larger impact on the local tax revenue in a jurisdiction that is already paying into the Sound Transit taxing district.

I encourage the Sound Transit Board to be bold and make the right decision. Challenge your staff to eliminate the assumptions in the Draft EIS, to identify the real cost of the OMF-S on the Midway Landfill site. Local and regional plans are required to look at long term benefits and impacts in the planning process. The OMF-S is a facility that will likely be functional for over a century and will have long term impacts. Certainly, the least impactful location to any community is Midway Landfill and that is best for the region. Of the two sites located within the City of Federal Way, the South 334th St. should be eliminated from consideration.

Sincerely,
Patrick Haigh

Public Communication: Sound Transit Operations and Maintenance Facility South, Submitted by 23 Commenters		
Comment ID	**Comment Text**	**Response**
1	I have reviewed the Draft EIS documents for the Operations and Maintenance Facility – South and strongly encourage the Sound Transit Board to select the Midway Landfill site for the new facility. However, if the Midway Landfill site is not chosen, the South 336th Street site is the next best option.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Section 3.6.2.2 of the DEIS on page 3.6-9 states: "The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared to the build alternatives." Additionally, the South 344th Street site would have the greatest impact to the local tax revenue. Property owners are already paying taxes to Sound Transit and any loss of revenue further impacts the residents in the City of Federal Way.	Section 3.5, Economics, in the 2023 Draft EIS and this Final EIS addresses potential changes to total taxable assessed valuation in Table 3.5-6. The South 344th Street Alternative would have the largest acquired jurisdiction taxable share (0.91 percent as compared to 0.53 percent for the Preferred Alternative and 0.11 percent for the Midway Landfill Alternative).
3	The DEIS makes many assumptions. The DEIS should include a table of assumptions for each of the sites and all alternatives made by Sound Transit staff and consultants. This would help the public and the Sound Transit Board understand how the alternatives were analyzed in the draft DEIS and identify potential cost savings vs. the significantly large estimates in the DEIS. For example, the DEIS assumes waste removal from the Midway Landfill could only occur from May through September creating an extremely long construction duration leading to increased costs. Identify all assumptions for each alternative	The assumptions for each alternative are discussed throughout the EIS within the affected environment and environmental impacts section for each element of the environment. This allows for the assumptions specific to each discipline to be alongside the discussion of impacts.
4	The DEIS also estimated employee displacements based on assumptions for each alternative. Employee displacement numbers shown in the DEIS are based on square footage of floor space, not actual numbers. In fact, the S. 344th site would displace Ellenos Yogurt, and not only their current employees, but additional jobs that are anticipated when Ellenos expands to a 24-hour operation by the end of 2022. This should be included in the analysis. The assumptions in the DEIS do not take this into consideration.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Public Communication: Sound Transit Operations and Maintenance Facility South, Submitted by 23 Commenters		
Comment ID	Comment Text	Response
5	The DEIS states a suitable location for Ellenos can be found if the S. 344th alternative is selected. However, as noted in the letter from Ellenos Yogurt dated March 26, 2021: "Equally important, it would take a minimum of a year to ensure a new facility will efficiently and effectively produce product that meet safety and quality parameters essential to remaining competitive and financially stable. The myriad of steps required represent a 2+ year process when an organization has the excess staffing to operate two facilities and assumes the project does not encounter unexpected setbacks, which pragmatically speaking, is not likely to be the case."	Section 3.3, Acquisition, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS, acknowledges that some properties, including Ellenos Yogurt, could be challenging to relocate.
6	7) The Midway Landfill site has the lowest impact on forest resources. The forest impacts identified on the Midway Landfill site should not be considered forest.	As described in Section 3.10, Ecosystem Resources, of the 2023 Draft EIS and this Final EIS, biologists identified 10 different vegetation cover types in the study area, including the following three forest types: non-native forest, mature native forest, and other native forest. Biologists identified approximately 1 acre of non-native forest and 4 acres of other native forest impacts for the Midway Landfill Alternative. The majority of the site is grassland, and most of the impacts (57 acres) would be to that vegetation type.
7	When comparing the South 344th Street and South 336th Street Alternatives, there is no question the 344th site should NOT be selected.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Commenters:

Stephen Causseaux (Communication ID 473491)
Megan Gamache (Communication ID 473665)
Phil Gamache (Communication ID 473682)
Joe Haigh (Communication ID 473677)
John P. Haigh (Communication ID 473727)
M. Louise Haigh (Communication ID 473473)
Maggie Haigh (Communication ID 473730)
Mary Haigh (Communication ID 473669)
Mike Haigh (Communication ID 473662)
Molly Haigh (Communication ID 473670)
Nancy Haigh (Communication ID 473472)
Patrick Haigh (Communication ID 473471)
Patty Haigh (Communication ID 473470, 473493)
Lynne Pearson(Communication ID 473811)
Adrian Pearson (Communication ID 473812)
Trish Peterson (Communication ID 473661)
Amber Schindler (Communication ID 473658)
Bryan Schindler (Communication ID 473649)
David Schindler (Communication ID 473726)
David Schindler, Jr. (Communication ID 473644)
Ella Schindler (Communication ID 473651)
Jeanne Schindler (Communication ID 473715)
Stella Schindler (Communication ID 473646)

OMF South Scoping

Trina Ballard Southern [redacted]
Sun 4/18/2021 2:42 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

April 18, 2021

RE: OMF South Scoping

I am writing to you in **opposition** of an OMF being built along/at 20th Ave. S. Federal Way or 16th Ave. South.

The current zoning at the Christian Faith Center (CFC) is multi-family. Zoning for the OMF at the 20th Ave. South site would require Heavy Industrial Equipment (HEI). Heavy equipment zoning is **not** tolerated so close to the protected **Hylebos Creek** as it lies within a **Resource Protection Area**.

The proposed site at 16th Ave. South is **zoned** as Business Park, also not HIE. Residential neighborhoods which pre-exist before the Business Park zoning in the area have persisted as a single-family residential area for more than two decades.

Ellenos Yogurt is the largest employer in the city of Federal Way. The OMF would displace this business. This company has spent over five million dollars upgrading their facility in the last few years. They and the other surrounding businesses should not have to vacate, especially in today's climate, where small businesses are struggling to survive. We are proud of this local business and they have our full support.

The collective impacts to businesses/residents in Federal Way from Sound Transit are extensive. The presence of your facilities/stations/lines/link should not be wherever one happens to be in Federal Way.

Sound Transit, find another location for your OMF.

Both of the mentioned sites have portions of the **Hylebos Waterway** within them. Federal Way has inventoried and classified these creeks as **MAJOR STREAMS**. The **Hylebos** is listed as **Class A Waters** under **State Water Quality Standards**.

During the construction of the church in 2004, 35,936 sq.ft. of wetlands were displaced/filled in order to create the largest church campus in the state. This area is a part of the International Flight Pathway. **Over 150 migratory birds depend on the Hylebos and the surroundings for rest, food, and water**. The Resource Protection Area would be eliminated/buried if the link line is not elevated, as it is in direct line of the Hylebos. **This land cannot tolerate any more abuses or alterations**. The allotted percentage for this space to be developed was taken 20 years ago. This land needs to remain as is.

The headwaters for the East Branch of the Hylebos are received via North Lake, less than 1/8 of a mile from this proposed site. **These waters are paramount for downstream juvenile salmon recovery. Macrobenthic invertebrates must travel freely along trees, rocks and water.** Culverting the Hylebos at this critical junction goes against the entire purpose of the Executive Proposed Hyebos and Lower Puget Sound Watershed Plan. This document created in the 1990s is a roadmap for thoughtful development around the Hyleobs. Allowing not only the link line, but the extra line of track to reach OMF, on top of an OMF, at either site in Federal Way is utterly mind-boggling in regard to environmental impacts. The residents of Federal Way remember the planning process for the church, vividly! It took four years to finally settle on a compromise and protections for the waterway. The citizens of Federal Way will not allow your facility to be built here. The once-beautiful forest with its inhabitants was taken from us once. Any further manipulations to the property will destroy what is left of the wetland connectivity and water quality in the East Branch of the Hylebos.

Sound Transit please find another location for your OMF.

The Midway Landfill is the most obvious choice and one we support, although the cost and time may make this a nonviable option. In that instance, could you please revisit your #1 (S. 352nd St.) & #4 (Fife) site options that WERE discussed 2017?

Both of these options are landfills that received toxic dumping from Boeing and the Asarco. Site #1 is an environmental nightmare because this land was never created to serve or function as a landfill, nor was this dumping site closed properly. The petroleum pipeline that runs parallel with I-5 also runs through a portion of this land. This line was installed with NO protective barriers. **The line now serves as a conduit for leachates and aids their distribution into our aquifer/ Hylebos watershed.**

Couldn’t this be a win-win for the environment, residents, and Sound Transit?

If Sound Transit is willing to tackle the Midway landfill, surely other landfill sites could be another viable option. It is up to Sound Transit to work with the public. It is Sound Transit who needs to find other solutions. Sound Transit MUST do its due diligence and exhaust all possibilities. The citizens of Federal Way will not accept another major disruption to our city.

Sound Transit please find another site for your OMF.

The citizens of Federal Way have spent the last five years striving to protect and preserve the former Weyerhaeuser Campus that lies just East of these proposed sites. We have fought against the unprecedented traffic impacts that will result if the Campus is fully built out. With Highway 18 and 320th St. at maximum failure today, the S. 336th Street offers residents a way to reach our city establishments. **The Supreme Court recently ruled that the City of Federal Way and IRG WILL adhere to the Executive Proposed Hylebos Watershed Plan**, as well as view any developments through cumulative eyes in regard to environmental impacts. The church site demands this total lens as it is a part of the original Weyerhaeuser Campus/Forest. Our city is already being accommodating for the link line and transfer stations being built along 320th. How much more will Federal Way have to endure?

We will not allow Sound Transit to hold us hostage for the next 10 years. You must work with the citizens of Federal Way. Mayor Strong leaves our Council members and citizens very little voice in how our city functions. Sound Transit is NOT the city of Federal Way and we citizens should be heard and respected as our concerns are valid.

Sound Transit told citizens in print as well as at Zoom meetings that this was not a “done deal.” One of your representatives (along with FW council members) has stated that the decision HAS been made to put the OMF at either FW sites. This certainly shows a **serious conflict of interes**t and one that needs to be made transparent to all going forward. Sound Transit is said to be misleading and confuses the public. For instance: staging public meetings and telling the public their input is needed and valued, only to find out events are for trivial items like art installations. Sound Transit then takes public input on Art and transfers that into dialogue and discussion on the important items like an OMF. Transparency is vital and should be upheld to the highest standards.

I respectfully submit these comments and expect fully to be engaged with the community and Sound Transit going forward. I am confident a better solution for your facility can and will be found. It must not be within the city limits.

Thank you for your time and thoughtful consideration.
Sincerely,
Trina Ballard Southern

Public Communication: OMF South Scoping, Submitted by 22 Commenters		
Comment ID	**Comment Text**	**Response**
1	I am writing to you in opposition to the Operations and Maintenance Facility (OMF) being built along/at 20th Ave. S. Federal Way or 16th Ave. S.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The current zoning at the Christian Faith Center (CFC) is multi-family. Zoning for the OMF at the 20th Ave. South site would require Heavy Industrial Equipment (HEI). Heavy equipment zoning is not tolerated so close to the protected Hylebos Creek as it lies within a Resource Protection Area. The proposed site at 16th Ave. South is zoned as Business Park, also not HIE. Residential neighborhoods which pre-exist before the Business Park zoning in the area have persisted as a single-family residential area for more than two decades.	As a regional transit authority facility, OMF South is considered an Essential Public Facility under Revised Code of Washington 36.70A.200, which is allowable under any zoning. As stated in Section 3.4, Land Use, of the 2023 Draft EIS and this Final EIS, OMF South is generally consistent with the city of Federal Way Comprehensive Plan as well as the intent of the zones that it would occupy within the footprints of the South 336th Street and South 344th Street alternatives. Sound Transit acknowledges that light rail transit facility uses are explicitly recognized only in the portions of the site zoned City Center Core (CC-C) and Commercial Enterprise (CE). Where the use is not explicitly recognized, Sound Transit would continue to meet zoning code and intent to the maximum extent practicable during the land use approval process. As with any development, construction and operation of OMF South would be subject to environmental regulations and permitting requirements meant to protect environmentally sensitive areas, such as streams and wetlands, that could be affected by the project. Please see Section 3.10, Ecosystem Resources, for more information.
3	Ellenos Yogurt is the largest employer in the city of Federal Way. The OMF would displace this business. This company has spent over five million dollars upgrading their facility in the last few years. They and the other surrounding businesses should not have to vacate, especially in today’s climate, where small businesses are struggling to survive.	Sound Transit acknowledges that Ellenos Yogurt is a unique facility that would be challenging to relocate. This is described in Section 3.3, Acquisitions, Displacements, and Relocations of the 2023 Draft EIS and this Final EIS.
4	Both of the mentioned sites have portions of the Hylebos waterway within them. Federal Way has inventoried and classified these creeks as MAJOR STREAMS. The Hylebos is listed as Class A Waters under State Water Quality Standards. During the construction of the church in 2004, 35,936 sq.ft. of wetlands were displaced/filled in order to create the largest church campus in the state. This area is a part of the International Flight Pathway. Over 150 migratory birds depend on the Hylebos and the surroundings for rest, food, and water. The Resource Protection Area would be eliminated/buried if the link line is not elevated, as it is in direct line of the Hylebos. This land cannot tolerate any more abuses or alterations. The allotted percentage for this space to be developed was taken 20 years ago. This land needs to remain as is.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Public Communication: OMF South Scoping, Submitted by 22 Commenters		
Comment ID	Comment Text	Response
5	The headwaters for the East Branch of the Hylebos are received via North Lake, less than 1/8 of a mile from this proposed site. These waters are paramount for downstream juvenile salmon recovery. Macrobenthic invertebrates must travel freely along trees, rocks and water. Culverting the Hylebos at this critical junction goes against the entire purpose of the Executive Proposed Hylebos and Lower Puget Sound Watershed Plan. This document created in the 1990s is a roadmap for thoughtful development around the Hylebos. Allowing not only the link line, but the extra line of track to reach OMF, on top of an OMF, at either site in Federal Way is utterly mind-boggling in regard to environmental impacts. Any further manipulations to the property will destroy what is left of the wetland connectivity and water quantity in the East Branch of the Hylebos.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Section 3.10, Ecosystems, and Appendix G.3, Ecosystems Technical Report, of the 2023 Draft EIS and this Final EIS provide information about the East and West Fork Hylebos tributaries and potential project impacts to those streams.
6	The Midway Landfill is the most obvious choice and one I support. Although the cost and time may make this an unviable option.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
7	In that instance, could you please revisit your #1 (S. 352nd St.) & #4 (Fife) site options that WERE discussed 2017? Both of these options are landfills that received toxic dumping from Boeing and the Asarco. Site #1 is an environmental nightmare because this land was never created to serve or function as a landfill, nor was this dumping site closed properly. The petroleum pipeline that runs parallel with I-5 also runs through a portion of this land. This line was installed with NO protective barriers. The line now serves as a conduit for leachates and aids their distribution into our aquifer/ Hylebos watershed. Couldn’t this be a win-win for the environment, residents, and Sound Transit? If Sound Transit is willing to tackle the Midway landfill, surely other landfill sites could be another viable option.	In 2019, Sound Transit conducted an extensive alternative site assessment process that resulted in the Sound Transit Board identifying the Midway Landfill, South 336th Street, and South 344th Street alternatives for study in the Draft EIS. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).
8	Sound Transit told citizens in print as well as at Zoom meetings that this was not a “done deal.” One of your representatives (along with FW council members) has stated that the decision HAS been made to put the OMF at either FW sites. This certainly shows a serious conflict of interest and one that needs to be made transparent to all going forward.	On December 16, 2021, the Sound Transit Board identified the South 336th Street site as the Preferred Alternative for OMF South. The Board’s identification of a preferred alternative is not a final decision. The Sound Transit Board will select the project to be built after publication of the Final EIS.

Commenters:

Charae Ashcraft (Communication ID 473641)
Debbie Caddell (Communication ID 473679)
Daniel (Communication ID 473668)
Dana Hollaway (Communication ID 473822)
David Jorgenson (Communication ID 473663)
Karen Langridge (Communication ID 473724)
Dave Lesinski (Communication ID 473716, 473734)
Kerry Lesinski (Communication ID 473718)
Martin Loft (Communication ID 473681)
Stephanie Magat (Communication ID 473647)
Milana Michalek (Communication ID 473814)
Marianne Moore (Communication ID 473660)
Loraine Rogers (Communication ID 473722)
Rachel Routt-Utrera (Communication ID 473664)
Anne Sallaska (Communication ID 473666)
Karen Smith (Communication ID 473737)
Trina Ballard Southern (Communication ID 473643)
Mark Southern (Communication ID 473645)
Tina Sumner (Communication ID 473735)
Suzanne Vargo (Communication ID 473684)
Kristen Yost (Communication ID 473721)
Bob Zimmerman (Communication ID 473620)

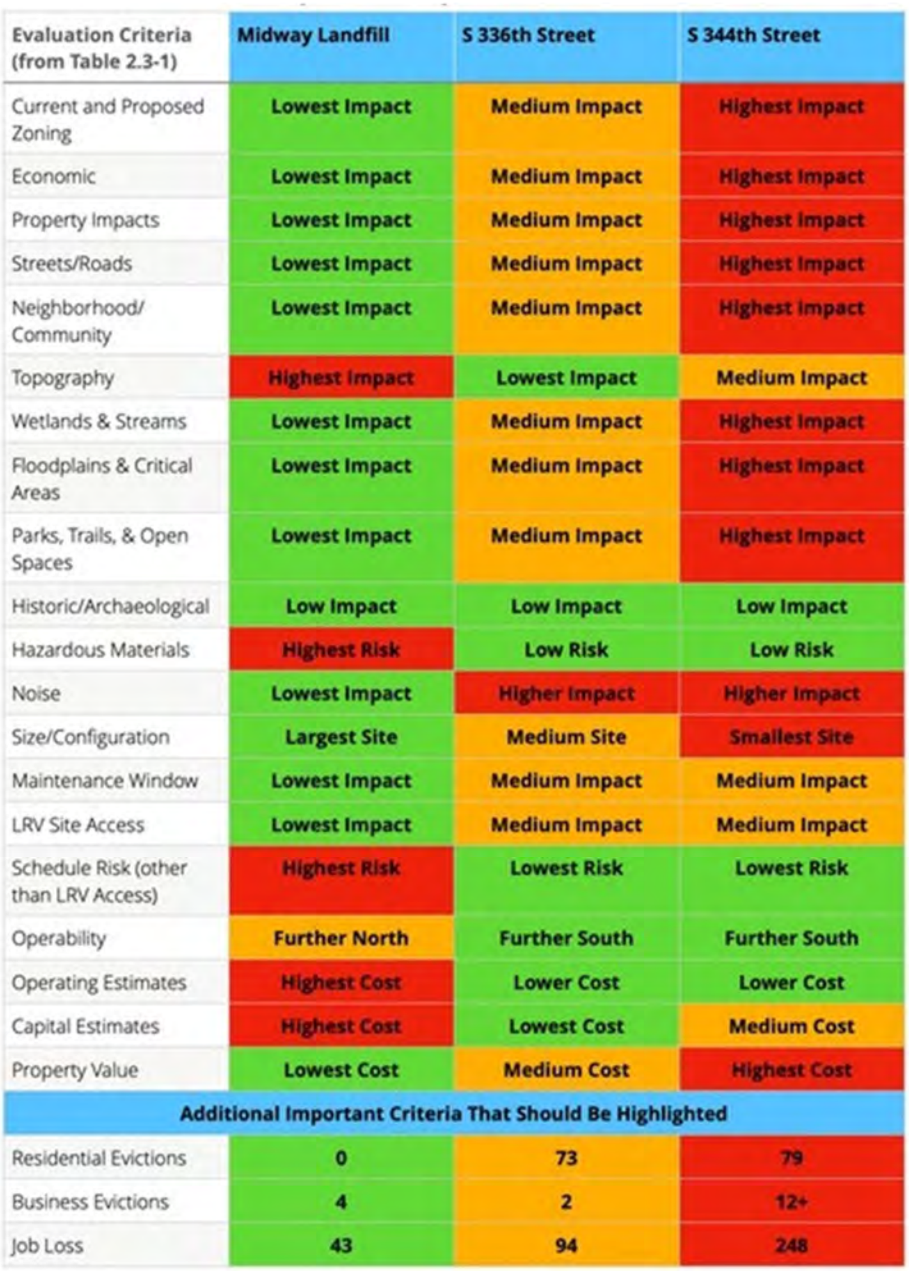
From: Teresa Wagner [redacted]
Sent: Friday, March 19, 2021 5:13 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Light Rail maintenance Yard

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

Dick's Drive Inn was previously eliminated from consideration as an alternative site due to public perception and negative impacts. Please now eliminate the S. 344th for the same exact same reasons. Of the three alternatives It is the highest negative impacts to property owners, City of Federal Way and local employees who will lose their jobs.

The negative impacts for each alternative site as documented by your own Draft EIS Statement are summarized here.



Evaluation Criteria (from Table 2.3-1)	Midway Landfill	S 336th Street	S 344th Street
Current and Proposed Zoning	Lowest Impact	Medium Impact	Highest Impact
Economic	Lowest Impact	Medium Impact	Highest Impact
Property Impacts	Lowest Impact	Medium Impact	Highest Impact
Streets/Roads	Lowest Impact	Medium Impact	Highest Impact
Neighborhood/ Community	Lowest Impact	Medium Impact	Highest Impact
Topography	Highest Impact	Lowest Impact	Medium Impact
Wetlands & Streams	Lowest Impact	Medium Impact	Highest Impact
Floodplains & Critical Areas	Lowest Impact	Medium Impact	Highest Impact
Parks, Trails, & Open Spaces	Lowest Impact	Medium Impact	Highest Impact
Historic/Archaeological	Low Impact	Low Impact	Low Impact
Hazardous Materials	Highest Risk	Low Risk	Low Risk
Noise	Lowest Impact	Higher Impact	Higher Impact
Size/Configuration	Largest Site	Medium Site	Smallest Site
Maintenance Window	Lowest Impact	Medium Impact	Medium Impact
LRV Site Access	Lowest Impact	Medium Impact	Medium Impact
Schedule Risk (other than LRV Access)	Highest Risk	Lowest Risk	Lowest Risk
Operability	Further North	Further South	Further South
Operating Estimates	Highest Cost	Lower Cost	Lower Cost
Capital Estimates	Highest Cost	Lowest Cost	Medium Cost
Property Value	Lowest Cost	Medium Cost	Highest Cost
Additional Important Criteria That Should Be Highlighted			
Residential Evictions	0	73	79
Business Evictions	4	2	12+
Job Loss	43	94	248

As you can see S 344th site has the most negative impacts by a very large margin. Please eliminate the S. 344th from further consideration. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

Thank you.

Public Communication: Light Rail Maintenance Yard, Submitted by 6 Commenters		
Comment ID	**Comment Text**	**Response**
1	Dick’s Drive Inn was previously eliminated from consideration as an alternative site due to public perception and negative impacts. Please now eliminate the S. 344th for the same exact same reasons. Of the three alternatives, the highest negative impacts to property owners, City of Federal Way and local employees who will lose their jobs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Commenters:

Ruth Erickson (Communication ID 471623)

Shawn Erickson (Communication ID 471624)

Cole Wagner (Communication ID 471618)

Doug Wagner (Communication ID 471628)

Kurt Wagner (Communication ID 471616)

Teresa Wagner (Communication ID 471622)

From: greg olson [redacted]
Sent: Saturday, March 6, 2021 6:52 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Cc: [redacted]
Subject: ST South Maintenance Facility - 344th Street option

Original communication comments, March 13, 2019 with updates to selected paragraphs for current conditions.

Site investigation committee,

Site Issues and background as they relate to 1910 South 344th Street and 1934 South 344th Street parcels, included in Option 344th Street:

- Donna and Greg Olson purchased, rezoned and developed the parcels in 1988/89. We installed water mains and sanitary sewer from locations on 344th Street near Garagetown allowing easy connection to future development on the specific surrounding properties. Our property is 2.93 useable acres.
- Donna and Greg Olson's trucking company, Evergone, Inc., operated its 100+ employee long haul postal contracting operation from the site from 1989 through 6/30/2008, our retirement.
- Donna and Greg Olson continue to own the parcels and have leased them to unrelated third parties since 7/1/2008. Each tenant since then has employed between 50-200 employees.
- The current tenant is Potelco, Inc, a wholly owned subsidiary of Quanta Services, an $8 billion in annual sales firm that concentrates in power and energy transmission and repair across the USA.
- Potelco has a lease right to utilize our property until 7/31/2028. The "capitalized value of the lease payments", which is a primary determinant of property value in real estate, likely far exceeds your estimate of property value. Also, since our previous communication date with the site committee on March 13, 2019, both Potelco and us as landlords have made some significant capital expenditures to improve the property which would need to be calculated in a valuation.
- We would likely be at risk for significant legal costs should we be forced to terminate the current lease. Additionally, should Potelco attempt to terminate the lease due to uncertainty about remaining at our site we would also incur substantial legal costs and loss of our primary source of income, a significant factor in our financial position.
- Potelco utilizes this site as their primary south sound terminal for repair and construction activities. We were told our location provided them with strategic advantages in performing their contractual services to PSE.
- Donna and Greg Olson have been approached by numerous interested buyers since ownership and currently have an "offer to buy" awaiting our decision to accept should we choose to accept the current purchase offer. This buyer has verbally increased his offer by 12% since first made in writing and communicated to the site committee on March 13, 2019.
- As recent as mid-February 2021, it was communicated to Greg by two brokers from different firms that they had clients that would be interested in leasing our property, if available. It was stated that the characteristics of our property are becoming very scarce in the south sound. This is consistent with Greg's discovery during diligent review, since 2007, of the south sound properties with similar characteristics to ours, Greg has learned that the number of available parcels is dwindling, which has made our parcel considerably more desirable to possible tenants seeking such property characteristics: substantially all paved, fully fenced and secured, zoning compliant, approved and installed storm sewer system, proper installation of an oil/water separator utility, well maintained structure with excellent access to major freeways. It would be extremely difficult for us to locate and purchase a comparable property to what we have owned since 1988 and that provided the current rental income we receive.

- Additionally, we have been contacted in the last seven years by a developer for construction of a major hotel and a developer looking for a location for a mid to high level luxury condominium project. We enjoy one of the nicer views of Mt Rainier available in the Federal Way area. In our opinion a hotel or residential condo development would be a better future use for our property and consistent with the available retail businesses nearby.
- The companies which have utilized our property since 1989 have been a significant contributor to the economy of the City of Federal Way and the south sound.

Specific property characteristics:

- Our elevation is likely 40+ feet higher than Garagetown to the east; standing on our property it's easy to see over the roof of the Garagetown units. Btw, Garagetown units are ~60 individually owned units, not a "single owner" rental.
- Approximately 8-10' under the surface on our property we have struck extremely hard "glacial till soil" when installing our 12,000 gallon underground fuel tank (which remains on the site) and the Phase III test holes we have required of each prior tenant at the end of their lease term.
- The property is substantially paved with good quality asphalt, a fully operational and approved underground storm sewer system with associated catch basins. The property is fully fenced, contains a two story 6,400 sq ft, very well maintained office and shop structure. The fuel island and shop facility is connected to a maintained oil/water separator system before discharging into the sanitary sewer. All site systems and utilities were constructed under King Co, BALD guidelines as one of the final 17 developments in process when Federal Way became a city.

Surrounding properties:

- To the west of our property are located numerous single family homes, most of which are well maintained and of the lower price range for which are affordable for the current residents. It is very likely these residents would have a very difficult time securing alternate affordable housing. We believe these residences remain on septic however could be connected to sewer on 18th.
- To our north is the prior Trinity Broadcasting station tower, currently occupied by a religious organization/church. Also, to the north is the Insurepass/Intellipass office building which I believe is leased to various users.
- To our east is a location owned and utilized by Gene's Towing and the Garagetown complex with ~60 individual residential accessory property owners. It is my opinion these owners would find it very difficult to secure alternate facilities to what they currently own and in a similar proximity to their residences.
- To the south is the Walmart superstore and numerous retail and service businesses, locating a transit repair facility so close to those business seems to me to be an inconsistent use or our property and conflict with the goals of the City of Federal Way based upon our past discussions with city officials.

In conclusion I can be reached by email, phone or in person to discuss any of these, or additional issues as needed in the selection process.

Thank you,

[redacted]
[redacted]

[redacted]
[redacted]

Greg Olson, Donna Olson, owners of 1910 and 1934 S 344th Street (Communication ID 471152)

Comment ID	Comment Text	Response
1	Potelco has a lease right to utilize our property until 7/31/2028. The "capitalized value of the lease payments", which is a primary determinant of property value in real estate, likely far exceeds your estimate of property value. Also, since our previous communication date with the site committee on March 13, 2019, both Potelco and us as landlords have made some significant capital expenditures to improve the property which would need to be calculated in a valuation. -We would likely be at risk for significant legal costs should we be forced to terminate the current lease. Additionally, should Potelco attempt to terminate the lease due to uncertainty about remaining at our site we would also incur substantial legal costs and loss of our primary source of income, a significant factor in our financial position.	As described in Section 3.3, Acquisitions, Displacements, and Relocations of the 2023 Draft EIS and this Final EIS, as a public agency, Sound Transit must pay just compensation to property owners for land and improvements acquired for public purposes. Determination of just compensation is based on an independent appraisal and appraisal review and must not be less than the fair market value of the property acquired. Sound Transit would work with qualified commercial appraisers to consider all elements contributing to the real estate value of your property as well as any leasehold interests.
2	Surrounding properties: -To the west of our property are located numerous single family homes, most of which are well maintained and of the lower price range for which are affordable for the current residents. It is very likely these residents would have a very difficult time securing alternate affordable housing. We believe these residences remain on septic however could be connected to sewer on 18th. -To our north is the prior Trinity Broadcasting station tower, currently occupied by a religious organization/church. Also, to the north is the Insurepass/Intellipass office building which I believe is leased to various users. -To our east is a location owned and utilized by Gene's Towing and the Garagetown complex with ~60 individual residential accessory property owners. It is my opinion these owners would find it very difficult to secure alternate facilities to what they currently own and in a similar proximity to their residences. -To the south is the Walmart superstore and numerous retail and service businesses, locating a transit repair facility so close to those business seems to me to be an inconsistent use or our property and conflict with the goals of the City of Federal Way based upon our past discussions with city officials.	Section 3.3, Acquisitions, Displacements, and Relocations, and Appendix E, Environmental Justice, of the 2023 Draft EIS and this Final EIS, provide information on how Sound Transit would compensate and assist all displaced residents, property owners, and businesses, including those residents who rent or who require affordable housing, according to the Sound Transit Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines and in accordance with state relocation and property acquisitions laws.

OMFS DEIS comments

Eric [redacted]

Fri 3/5/2021 1:27 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

The Midway landfill is the best possible location for OMFS. The OMF, an industrial operations and maintenance facility benefiting the public would be the best possible use for this vacant, superfund designated public land. Who better to utilize and manage and steward the risks than an tax funded agency!? The minimal impact at midway landfill to the cities, businesses, residents, and environmental concerns compared to the other 2 alternatives justifies the increased cost of construction. Provided sound transit is better stewards of taxpayer dollars than their history demonstrates... there is no reason to negatively impact more people, up end more jobs, homes, lives, tax base, multiple roads and a church. All while having greater environmental impacts in disturbing riparian zones. Tax payers are already being bled dry, despite our votes for cheaper taxes, you argued eyeman duped us. Ironic since you duped us all into voting for the absurdly expensive program you consistently fail at keeping in budget... Pot...kettle... but, since you've managed to maintain the outrageous taxes on us despite our votes... The least you could do is eminent domain as few businesses and peoples homes as possible through this process. The skilled trade and support staff jobs being created by OMFS do not replace the jobs you will otherwise take from people. Your appraisal value offers are garbage compared to an actual fair market value people could make if they sold their homes or businesses fairly without threat of being eminant domained. Not to mention demolishing pillars of the local community. (Churches)

All options considered, all costs and benefits weighed, midway land fill needs to be selected as the best possible location for the OMFS. It is lowest overall impact and is the only option not requiring additional aerial main line extensions just to be put into service.

Eric Callahan (Communication ID 471147)		
Comment ID	**Comment Text**	**Response**
1	The Midway landfill is the best possible location for OMFS.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The minimal impact at midway landfill to the cities, businesses, residents, and environmental concerns compared to the other 2 alternatives justifies the increased cost of construction. Provided sound transit is better stewards of taxpayer dollars than their history demonstrates... there is no reason to negatively impact more people, up end more jobs, homes, lives, tax base, multiple roads and a church. All while having greater environmental impacts in disturbing riparian zones.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

(No subject) [redacted]

John Thompson

Tue 3/9/2021 3:00 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Why not the huge empty and treeless
Property by I 5 and north
Of the empty Whehauser property
Sorry about the spelling

John Thompson (Communication ID 471148)		
Comment ID	**Comment Text**	**Response**
1	Why not the huge empty and treeless Property by I 5 and north Of the empty Whehauser property	The property referred to is part of the former Weyerhaeuser campus. This property was evaluated during the OMF South alternatives evaluation process in 2019, and the site was ultimately not carried forward because of high schedule risk and operating estimates due to its location on the east side of I-5. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).

Proposed Sound Transit Maintenance Facility (Kent and/or Federal Way)

Scott Candler [redacted]

Tue 3/9/2021 4:04 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

This project is looking for comments prior to April 19th.

selected for this project and if so, who are the lucky folks?

[redacted]

Scott Candler Communication ID 471149)		
Comment ID	**Comment Text**	**Response**
1	Has a design team been selected for this project and if so, who are the lucky folks?	A final design team has not yet been selected. Sound Transit plans to issue a request for proposals after publication of the Final EIS.

Our recommended alternative choice

Michele Mendia-Gonzalez [redacted]

Tue 3/9/2021 7:11 PM

To:Email The Board <EmailTheBoard@soundtransit.org>;OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Greetings,
Thank you for the mailings asking for our feedback. We recommend to build the OMF South Train yard in the old landfill site.
Thank you!
Michele and Brian Mendia
[redacted]

Brian Mendia, Michele Mendia Gonzalez (Communication ID 471150)		
Comment ID	**Comment Text**	**Response**
1	We recommend to build the OMF South Train yard in the old landfill site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Midway landfill option

Dale Menchhofer [redacted]

Sat 3/13/2021 11:45 AM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

The Midway Landfill option costs more than the other two options, and that is sufficient reason to be opposed to it. I want transit money to be spent on transit benefits, and any benefits of the Midway Landfill site do not benefit transit. With the budget so strained by the pandemic, we cannot afford to spend money unnecessarily. Although the other two options do require expending money to construct track further south, that has a transit benefit.

Dale Menchhofer (Communication ID 471151)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill option costs more than the other two options, and that is sufficient reason to be opposed to it. I want transit money to be spent on transit benefits, and any benefits of the Midway Landfill site do not benefit transit. With the budget so strained by the pandemic, we cannot afford to spend money unnecessarily. Although the other two options do require expending money to construct track further south, that has a transit benefit.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: KDub [redacted]
Sent: Friday, March 5, 2021 10:11 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility.

Job impacts and tax base shifts are critically important to property owners and the City of Federal Way. Given the relatively small number of property owners (<100) in all three alternative sites, why was a potentially inaccurate estimating approach based on square footage of buildings used to estimate number of jobs impacted? Would not a simple and direct survey of the property owners yield higher quality data for counting actual on-premise employees? I respectfully submit that for the cost of postage stamps an unnecessary and critical ambiguity in the Draft EIS can be remedied.

With construction costs essentially the same for the two Federal Way alternatives, please don’t rely on unnecessarily imprecise estimates for jobs impacted— especially when the actual job impact can be readily determined.

I also respectfully submit that treating GarageTown as a single entity in Draft EIS summary tables detracts from the fair and accurate comparison these tables are intended to provide. Please eliminate the use of footnotes in the Draft EIS that tend to bury the relative weight and interests of 60 distinct GarageTown property owners. Those 60 discrete property owners should be shown directly in the summary tables. Everyone of those owners uses their property for a residential garage or a business location. In assessing the magnitude of impacts to properties, the inclusion of GarageTown as a single property in the Draft EIS is inaccurate and misleading.

Unfortunately both of these two deficiencies in the Draft EIS work to underrepresent the true burden to S 344th site property owners and the community. Given the Draft EIS suggests the relocation options for Garage Town owners are extremely limited I encourage the Board to request a more complete comparison of all property ownership and actual job impacts across all three alternative sites.

Thank you.
Teresa Wagner

Teresa Wagner (Communication ID 471153)		
Comment ID	**Comment Text**	**Response**
1	Job impacts and tax base shifts are critically important to property owners and the City of Federal Way. Given the relatively small number of property owners (<100) in all three alternative sites, why was a potentially inaccurate estimating approach based on square footage of buildings used to estimate number of jobs impacted? Would not a simple and direct survey of the property owners yield higher quality data for counting actual on-premise employees?	The number of displaced employees is based on the business building size (taken from King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers. While not on an actual survey of businesses, it allows an equal comparison between alternatives. This methodology is consistent with environmental review being conducted for other current Sound Transit projects.
2	I also respectfully submit that treating GarageTown as a single entity in Draft EIS summary tables detracts from the fair and accurate comparison these tables are intended to provide. Please eliminate the use of footnotes in the Draft EIS that tend to bury the relative weight and interests of 60 distinct GarageTown property owners. Those 60 discrete property wners should be shown directly in the summary tables.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Kurt Wagner [redacted]
Sent: Friday, March 5, 2021 10:12 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility.

Job impacts and tax base shifts are critically important to property owners and the City of Federal Way. Given the relatively small number of property owners (<100) in all three alternative sites, why was a potentially inaccurate estimating approach based on square footage of buildings used to estimate number of jobs impacted? Would not a simple and direct survey of the property owners yield higher quality data for counting actual on-premise employees? I respectfully submit that for the cost of postage stamps an unnecessary and critical ambiguity in the Draft EIS can be remedied.

With construction costs essentially the same for the two Federal Way alternatives, please don’t rely on unnecessarily imprecise estimates for jobs impacted— especially when the actual job impact can be readily determined.

I also respectfully submit that treating GarageTown as a single entity in Draft EIS summary tables detracts from the fair and accurate comparison these tables are intended to provide. Please eliminate the use of footnotes in the Draft EIS that tend to bury the relative weight and interests of 60 distinct GarageTown property owners. Those 60 discrete property owners should be shown directly in the summary tables. Everyone of those owners uses their property for a residential garage or a business location. In assessing the magnitude of impacts to properties, the inclusion of GarageTown as a single property in the Draft EIS is inaccurate and misleading.

Unfortunately both of these two deficiencies in the Draft EIS work to underrepresent the true burden to S 344th site property owners and the community. Given the Draft EIS suggests the relocation options for Garage Town owners are extremely limited I encourage the Board to request a more complete comparison of all property ownership and actual job impacts across all three alternative sites.

Thank you.
Cole Wagner

Cole Wagner (Communication ID 471154)

Comment ID	Comment Text	Response
1	Job impacts and tax base shifts are critically important to property owners and the City of Federal Way. Given the relatively small number of property owners (<100) in all three alternative sites, why was a potentially inaccurate estimating approach based on square footage of buildings used to estimate number of jobs impacted? Would not a simple and direct survey of the property owners yield higher quality data for counting actual on-premise employees?	The number of displaced employees is based on the business building size (taken from King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers. While not on an actual survey of businesses, it allows an equal comparison between alternatives. This methodology is consistent with environmental review being conducted for other current Sound Transit projects.
2	I also respectfully submit that treating GarageTown as a single entity in Draft EIS summary tables detracts from the fair and accurate comparison these tables are intended to provide. Please eliminate the use of footnotes in the Draft EIS that tend to bury the relative weight and interests of 60 distinct GarageTown property owners. Those 60 discrete property owners should be shown directly in the summary tables.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Tony Tony Tony [redacted]
Sent: Tuesday, March 9, 2021 2:50 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South Site

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

To Whom it May Concern,

The Midway Landfill site is the ONLY one that makes sense.

Please do not use any other site!!!

The other two choices destroy jobs, homes, and make no sense.

Please, use the Midway Landfill site.

This will be the best choice for all of us.

Thank you,

Concerned Citizen/Taxpayer

Tony (Communication ID 471157)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill site is the ONLY one that makes sense. Please do not use any other site!!! The other two choices destroy jobs, homes, and make no sense.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: steven Lander [redacted]
Sent: Monday, March 8, 2021 8:58 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Placement of repair/storage south facility

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Regarding the placement of the south repair/storage facility:
Please place it at the MIdway landfill site.
There is currently work being done near there now and you should be able to start coordination with it. If you do not use it, then the site will sit empty and unused. it's the most logical place. Further the mis-placement and degradation of the other areas you propose are a detriment to the area.

thank you,
S

The poor decisions in your past, and you supposedly being deceived are not forgotten

Steven Lander (Communication ID 471164)		
Comment ID	**Comment Text**	**Response**
1	Please place it at the Midway landfill site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: LINDA SIMS [redacted]
Sent: Tuesday, March 16, 2021 11:21 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: choice of location

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

I am a big supporter of public transportation and of Sound Transit's efforts to provide this service to the Puget Sound Area. I live in Federal Way, WA, and I am excited to see the changes in progress.

I have received information about the upcoming choices of location for the South train yard, and I am writing to submit my opinion on this. Of the three choices outlined in the information from Protect Federal Way, I would strongly choose the Midway Landfill location. The other two choices (S. 344th St. and S. 336th St.) are very close to my home and other homes which would be impacted by the noise. Facilities like this should not be near to homes, schools, offices, green spaces, streams and lakes, due to noise and industrial pollution. I would hope that the clearing of homes, business and churches would render those choices off limits. I urge you to choose the Midway Landfill location for these reasons.

Thank you kindly,
Linda Sims

Linda Sims (Communication ID 471304)		
Comment ID	**Comment Text**	**Response**
1	Of the three choices outlined in the information from Protect Federal Way, I would strongly choose the Midway Landfill location.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The other two choices (S. 344th St. and S. 336th St.) are very close to my home and other homes which would be impacted by the noise. Facilities like this should not be near to homes, schools, offices, green spaces, streams and lakes, due to noise and industrial pollution.	Section 3.9, Noise and Vibration, and Appendix G2, Noise and Vibration Technical Report, of the 2023 Draft EIS and this Final EIS describe the noise assessment Sound Transit conducted for OMF South project alternatives following FTA's Transit Noise and Vibration Impact Assessment Manual (2018). Based on the current design, operation of the OMF site would not cause noise impacts. Operation of the mainline track to the South 336th Street and South 344th Street alternatives would result in noise impacts to some single-family residences, depending on the track design option. However, all noise impacts would be mitigated. During final design, all impacts would be reevaluated to verify impact levels and inform the mitigation design. The operation of OMF South would follow all regulations concerning the proper use and disposal of hazardous materials. No industrial pollution would be generated.
3	I would hope that the clearing of homes, business and churches would render those choices off limits. I urge you to choose the Midway Landfill location for these reasons.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Diana Haines [redacted]
Sent: Thursday, March 11, 2021 3:46 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the other sites instead of this one. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

Thank you.

It should be the old dumpsite. Best pick for environment and the life of Federal Way

Diana Haines (Communications ID 471306)		
Comment ID	**Comment Text**	**Response**
1	It should be the old dumpsite. Best pick for environment and the life of Federal Way	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Derick Cardenas [redacted]
Sent: Wednesday, March 17, 2021 11:20 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: RE:Midway Landfill

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Dear Sound Transit Board,
Many of us would like to see a light rail go to Federal Way. However, land is very scarce in this area. Wouldn't it make a lot more sense to use an old landfill instead of destroying churches, neighborhoods, and small businesses?
Please use some common sense. And please do not speak to me of costs and funding. Your arguments would just sound hypocritical.
Most Sincerely,
Frederick Daniel Cardenas

Frederick Cardenas (Communications ID 471611)		
Comment ID	**Comment Text**	**Response**
1	Many of us would like to see a light rail go to Federal Way. However, land is very scarce in this area. Wouldn’t it make a lot more sense to use an old landfill instead of destroying churches, neighborhoods, and small businesses?	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Jutta [redacted]
Sent: Wednesday, March 17, 2021 7:09 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South Train

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello,

Please do not build a OMF South Train in my backyard. I live in Federal Way. Please use the Midway Landfill instead. We already have a lot changing due to the light rail being brought to Federal in 2022. Please follow the option that does not destoy houses or jobs(i.e. 334th nor 336th). Instead use Midway Landfill option.

Thank you,
-J. Josionek

Jutta Josionek (Communications ID 471613)		
Comment ID	**Comment Text**	**Response**
1	Please do not build a OMF South Train in my backyard. I live in Federal Way. Please use the Midway Landfill instead. We already have a lot changing due to the light rail being brought to Federal in 2022. Please follow the option that does not destroy houses or jobs(i.e. 334th nor 336th).	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Steve Wilson [redacted]
Sent: Friday, March 19, 2021 6:54 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I wish to register my objection as a citizen to including the S 344th St site in Federal Way as a consideration for your OMF South facility. Selecting this site would eliminate over 250 jobs from the community, evict several small churches, level a neighborhood of affordable homes, and erase the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the landfill site instead of this one. I looking forward to light rail service in Federal Way and trust you to make the right decision for our community.

Thank you.

Sent from Mail for Windows 10

Steve Wilson (Communications ID 471620)		
Comment ID	**Comment Text**	**Response**
1	I wish to register my objection as a citizen to including the S 344th St site in Federal Way as a consideration for your OMF South facility. Selecting this site would eliminate over 250 jobs from the community, evict several small churches, level a neighborhood of affordable homes, and erase the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Please consider the landfill site instead of this one.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: [redacted]
Sent: Friday, March 19, 2021 10:56 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I say go with the 336th site.

Anonymous (Communications ID 471621)		
Comment ID	**Comment Text**	**Response**
1	I say go with the 336th site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: CenturyLink Customer [redacted]
Sent: Monday, March 22, 2021 12:10 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Midway landfill

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Dear Board members of the Sound Transit

When it comes to picking a site for the maintenance center i would consider the Midway landfill
I know the cost would be greater, but the transit maintenance center would be considered an industrial
site with a rail yard and maintenance buildings. This site would fit in with current business that currently surround
that area. It is a site that would displaced less current established businesses.
The longer we wait on doing something with this landfill property the more expensive it will be.

Thank You
Jack & Julie Sharlock

Jack Sharlock, Julie Sharlock (Communications ID 471626)		
Comment ID	**Comment Text**	**Response**
1	When it comes to picking a site for the maintenance center I would consider the Midway landfill I know the cost would be greater, but the transit maintenance center would be considered an industrial site with a rail yard and maintenance buildings. This site would fit in with current business that currently surround that area. It is a site that would displaced less current established businesses. The longer we wait on doing something with this landfill property the more expensive it will be.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Darren McDonald [redacted]
Sent: Tuesday, March 23, 2021 11:39 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the other sites instead of this one. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

Turning the Midway Landfill into a useful piece of land again would be a win for everyone involved.
Thank you.

Darren McDonald

Darren McDonald (Communications ID 471629)		
Comment ID	**Comment Text**	**Response**
1	Turning the Midway Landfill into a useful piece of land again would be a win for everyone involved.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Ken Broyles [redacted]
Sent: Wednesday, March 24, 2021 8:23 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I have walked around site 10A talking to businesses & home owners. Some of the businesses have been there for many years & are family owned. A lot of the homes within site 10A have been there for many years. It's also this is the only industrial site the Federal Way has. Elleno's has a huge business within site 10A that has put millions of dollars into it with improvements. They have many employees working there making the worlds best yogurt. I'm an owner within site 10A that Sound Transit is considering for the OMF facility. I'm one of the owners at GarageTown which is an extension of my home. GarageTown is not just another storage facility. I have spent a lot of time & money with improvements in my garage over the years. It is and has been a place where my Grandkids have learned to work on projects and old cars that I own. They always love to come to Grandpa's garage & learn how to work on projects. Sense schools have no classes to teach them wood working, metal shop & automobile mechanics like they had when I grew up. This is teaching them and getting them ready for life after high school or college. There are 67 garages within GarageTown with 57 owners. Within GarageTown there are some businesses that have

employees. If Tacoma can make the Asarco site on the waterfront in to a beautiful and functional place, why can't Sound Transit do the same with the Midway landfill site. Building the OMF site at the Midway landfill would have the least amount of heartbreak for all the citizens in Federal Way. Thank you for your time, Ken Broyles

Ken Broyles (Communications ID 471733)		
Comment ID	**Comment Text**	**Response**
1	A lot of the homes within site 10A have been there for many years. It’s also this is the only industrial site the Federal Way has. Ellenos has a huge business within site 10A that has put millions of dollars into it with improvements.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	There are 67 garages within GarageTown with 57 owners. Within GarageTown there are some businesses that have employees.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	If Tacoma can make the Asarco site on the waterfront in to a beautiful and functional place, why can't Sound Transit do the same with the Midway landfill site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Rod Smith [redacted]
Sent: Tuesday, March 16, 2021 2:49 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Re: Concerning the OMF South & S 344th St Federal Way

I'm not voting for S 344. I did not find where I could pick a location. I would have voted for Midway Landfill

Rod Smith

Rod Smith (Communications ID 471789)		
Comment ID	**Comment Text**	**Response**
1	I would have voted for Midway Landfill	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: CenturyLink Customer

To: Email The Board

Sent: Sunday, March 21, 2021 10:53 AM

Subject: OMF South train yard

Hello,

WHY would you choose to displace small businesses, destroy 14 homes (when there are not enough affordable home right now), and take away jobs from people who need them?

Can you think beyond profit and ease of your jobs?

Put the train yard on the landfill site where no one lives and no businesses are operating!!

Vickie Price

Federal Way

Vicky Price (Communications ID 471791)		
Comment ID	**Comment Text**	**Response**
1	WHY would you choose to displace small businesses, destroy 14 homes (when there are not enough affordable home right now), and take away jobs from people who need them?	Please see the responses to Common Comments 1 and 2 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Put the train yard on the landfill site where no one lives and no businesses are operating!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Vince, Tamara [redacted]
Sent: Tuesday, March 23, 2021 6:36 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Concerning the OMF South & S 344th St Federal Way

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the other sites instead of this one. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

Use the Midway landfill space!!

Thank you.

Sent from my iPhone

Tamara Vince (Communications ID 471796)		
Comment ID	**Comment Text**	**Response**
1	I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood. Use the Midway landfill space!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Lois Kutscha [redacted]
Sent: Wednesday, March 24, 2021 8:43 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: Site for Maintenance Facility

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

We prefer the Midway site for the Maintenance Facility. The area is already a commercial area compared to the Federal Way sites. Thank you for asking for public input.

Norm and Lois Kutscha
[redacted]

Lois Kutscha, Norm Kutscha (Communications ID 471844)		
Comment ID	**Comment Text**	**Response**
1	We prefer the Midway site for the Maintenance Facility. The area is already a commercial area compared to the Federal Way sites.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: JAMES HENNESSEY [redacted]
Sent: Sunday, March 28, 2021 12:16 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: Belmore Park

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Good afternoon, my name is James Hennessey, my wife and I are residents in Belmor Park, Federal Way. Myself and all the residents of Belmore are very concerned that you will be displacing hundreds of Senior Citizens that are on fixed income. Many of us purchased brand new homes within the past 4 years, without the Park EVER disclosing that it was a strong possibility that Sound Transit would be coming through the park. Reviewing the map of the potential routes from Federal Way to Tacoma, Sound Transit could go around the park without impacting the residents and avoid relocating us. YES, you might have to slow down a bit and lose 2-3 seconds of time, i don't think that's going to impact riders. My question is this, has your office taken into consideration that the residents of Belmor are senior citizens on a fixed income. Where are we going to move to that's affordable? And what about myself and others that just purchased a brand-new home that still has a mortgage? I'm sure there's been a lot of discussion with the owners, The Hynes Group in regards to Sound Transits intentions and plans, unfortunately, the residents of Belmor have had very limited communication from them, in fact we haven't had any updates or communication with them or Management since 2019. On behalf of the residents of Belmor Park, please reconsider coming through our park and find an alternate that wilol not displace us senior citizens.

Thank you,

James & Kathi Hennessey

James Hennessey, Kathi Hennessey (Communications ID 471982)		
Comment ID	**Comment Text**	**Response**
1	My question is this, has your office taken into consideration that the residents of Belmor are senior citizens on a fixed income. Where are we going to move to that's affordable?	Please see the response to Common Comment 2 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Reviewing the map of the potential routes from Federal Way to Tacoma, Sound Transit could go around the park without impacting the residents and avoid relocating us. YES, you might have to slow down a bit and lose 2-3 seconds of time, i don't think that's going to impact riders.	The alignments of the mainline from the Federal Way Downtown Station to the Preferred and South 344th Street alternatives were identified through early scoping, scoping, and alternatives development processes that included Tribal, agency, and public input for TDLE. Please see Section 2.3, Alternative Development and Scoping, in the Final EIS. All the alternative alignments for the mainline cross through Belmor. The mainline alignments were identified by the need to connect to the end of FWLE, north of Belmor, and had to take into account construction constraints around exiting infrastructure, roadways, and development.

Sent: Sunday, March 28, 2021 2:46 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: OMF South Draft EIS

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Of the proposed alternatives set forth in the Draft EIS, it is clear that the best alternative is:

Midway Landfill - Full Excavation

It has the least negative impact to homes, businesses, jobs, wetlands, and streams. It also has significant benefits in returning a currently unused site from a community liability into a useful asset.

Construction costs and duration can be accommodated in the overall plan, particularly in light of project realignment currently under consideration. The Midway Landfill site has no risk of increasing real estate prices, and the construction timeframe can be mitigated by both an early start and adjusting the completion date to align with a delayed requirement for service on the southern line extensions.

I strongly encourage you to choose the Midway Landfill - Full Excavation alternative as the Preferred Alternative.

Sincerely,
Edward C. Miller
Federal Way property owner

From: Edward Miller [redacted]
Sent: Sunday, March 28, 2021 3:02 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: OMF South Draft EIS

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Of the proposed alternatives set forth in the Draft EIS, it is clear that the WORST alternative is:

South 344th Street

It has the strongest negative impact to homes, businesses, and jobs. Of particular concern is the elimination of a large number of residences and businesses that would be destroyed, including the loss of the Ellenos Yogurt manufacturing facility that is located within the boundary of this alternative.

The other proposed alternatives are clearly better choices. I strongly encourage you to recommend AGAINST choosing the South 344th Street alternative as the Preferred Alternative.

Sincerely,
Edward C. Miller

Edward Miller (Communications ID 471983 and 471984)		
Comment ID	**Comment Text**	**Response**
1	Construction costs and duration can be accommodated in the overall plan, particularly in light of project realignment currently under consideration. The Midway Landfill site has no risk of increasing real estate prices, and the construction timeframe can be mitigated by both an early start and adjusting the completion date to align with a delayed requirement for service on the southern line extensions.	Please see response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. While changes have been made to the implementation schedule of Sound Transit 3, an OMF in the southern portion of the Link light rail service area is still needed to be operational by 2030. Construction of the Midway Landfill Alternative would not meet that schedule.
2	Of the proposed alternatives set forth in the Draft EIS, it is clear that the WORST alternative is: South 344th Street	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	It has the strongest negative impact to homes, businesses, and jobs. Of particular concern is the elimination of a large number of residences and businesses that would be destroyed, including the loss of the Ellenos Yogurt manufacturing facility that is located within the boundary of this alternative.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

To: Sound Transit Board:

Kent Keel	Joe McDermott
Dow Constantine	Robert Millar
Paul Roberts	Kim Roscoe
Nancy Backus	Nicola Smith
David Baker	Dave Somers
Claudia Balducci	Dave Upthegrove
Bruce Dammeir	Peter Van Reichbauer Hussian Rehmat
Jenny A Durkan	
Debora Juzrez	
Victoria Woodards	

Subject: OMF South Best Option

Hello,

Let me identify myself. I am Patricia Pugnetti. I was born and raised in Tacoma. After my marriage in 1973, my husband and I moved to the Federal Way area. Therefore, I call myself a native of the area. I can remember when there was discussion of what to do with the Midway landfill area after it closed. It was known that the landfill would not be available for any type of

normal usage for a period of time because of gas venting and such.

To consider already developed sites containing business, churches, residences, and natural habitat for the OMF site is a counterproductive use of King County land. Public input in prior rounds of comments overwhelmingly supported using the Midway landfill site as the Prime Spot for this OMF facility. At this point that should be loud and clear to Sound Transit.

EPA's Tmeline.

Milestone	**Date(s)**
Initial Assessment Completed	01/01/1983
Proposed to the National Priorities List	10/15/1984
Finalized on the National Priorities List	06/10/1986
Remedial Investigation Started	03/28/1985
Final Remedy Selected	09/06/2000
Remedial Action Started	Not Yet Achieved
Construction Completed	09/21/2000
Deleted from National Priorities List	Not Yet Achieved
Most Recent Five-Year Review	08/28/2020

Now, the time is at hand and the EPA's timeline shows that remediation on the Midway site is completed (see above) and the next step is to remove it from the national priorities list just in time to be used for the OMF project.

Regarding Midway site:

>> Public preferers using this site. Building at this location is done with consent of the governed.

>> Business (jobs), churches, residences and natural habitat are not impacted.

>> Does not remove land availability from commercial/private use in an ever more densely populated South King County. Therefore, is a better long-term stewardship of our finite land.

>> Places OMF immediately next to tracks already under construction. Supports maintenance despite possible realignment and funding issues delaying expansion beyond Federal Way. Earlier start date possible.

>> Creates more south end jobs by not displacing those currently situated on Alternative Federal Way locations.

>> Cost delta between Midway and other projects is dwarfed compared to TDLE, Ballard, Everett, and Kirkland-Issaquah links costs.

Regarding South 344thStreet site:

>> Business (jobs), churches, residences, natural habitat are impacted.

>> Ellenos Yogurt factory has approximately 150 employees, multi-millions of dollars in equipment and special licensing. Is the only industrial business in Federal Way.

>> Garage Town a community of 67 individually owned units (same as owning a condominium unit). Has modern substantial buildings including a clubhouse. They are used as extensions of households and to support businesses. Only facility of its kind in King County.

>> Supports a broadcasting tower. Radio towers have certain land-configuration needs which must be addressed and special licensing.

>> This site is a hill with businesses and residences on all sides. Is not near level like other two sites.

>> Loss of existing family homes.

>> Loss of tax revenue for City of Federal Way and King County.

>> The City of Federal Way has written to Sound Transit of their complete disapproval of any further acquisition of properties in their city. Loss of a portion of downtown retail acreage for rail station is plenty. Another municipality (Kent) would like to accommodate the OMF. Neither of the two Federal Way alternatives should be considered for use.

>> Loss of approximately 250 jobs. (EIS needs to be updated to reflect the true facts on job losses,)

Open your eyes Sound Transit, the best land choice for the OMF is the Midway Landfill area. You are going to have a lot of unhappy voters out there if you choose otherwise.

Patricia Pugnetti

[redacted]

Patricia Pugnetti (Communications ID 472033)		
Comment ID	**Comment Text**	**Response**
1	To consider already developed sites containing business, churches, residences, and natural habitat for the OMF site is a counterproductive use of King County land. Public input in prior rounds of comments overwhelmingly supported using the Midway landfill site as the Prime Spot for this OMF facility. Now, the time is at hand and the EPA's timeline shows that remediation on the Midway site is completed (see above) and the next step is to remove it from the national priorities list just in time to be used for the OMF project.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. The Midway Landfill is still classified as a high-risk hazardous materials site because it contains contaminated refuse. The remedy for the site includes a cap over the landfill to prevent stormwater from interacting with the refuse and contaminating groundwater below. Please see Final EIS Section 3.13, Hazardous Materials, for more detail.
2	Regarding Midway site: Public preferers using this site. Building at this location is done with consent of the governed. Business (jobs), churches, residences and natural habitat are not impacted. Does not remove land availability from commercial/private use in an ever more densely populated South King County. Therefore, is a better long-term stewardship of our finite land. Places OMF immediately next to tracks already under construction. Supports maintenance despite possible realignment and funding issues delaying expansion beyond Federal Way. Earlier start date possible. Creates more south end jobs by not displacing those currently situated on Alternative Federal Way locations. Cost delta between Midway and other projects is dwarfed compared to TDLE, Ballard, Everett, and Kirkland-Issaquah links costs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Patricia Pugnetti (Communications ID 472033)		
Comment ID	**Comment Text**	**Response**
3	Regarding South 344thStreet site: Business (jobs), churches, residences, natural habitat are impacted. Ellenos Yogurt factory has approximately 150 employees, multi-millions of dollars in equipment and special licensing. Is the only industrial business in Federal Way. Garage Town a community of 67 individually owned units (same as owning a condominium unit). Has modern substantial buildings including a clubhouse. They are used as extensions of households and to support businesses. Only facility of its kind in King County. Supports a broadcasting tower. Radio towers have certain land-configuration needs which must be addressed and special licensing. This site is a hill with businesses and residences on all sides. Is not near level like other two sites. Loss of existing family homes. Loss of tax revenue for City of Federal Way and King County. The City of Federal Way has written to Sound Transit of their complete disapproval of any further acquisition of properties in their city. Loss of a portion of downtown retail acreage for rail station is plenty. Another municipality (Kent) would like to accommodate the OMF. Neither of the two Federal Way alternatives should be considered for use. Loss of approximately 250 jobs. (EIS needs to be updated to reflect the true facts on job losses,)	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Greg Greenstreet [redacted]
Sent: Tuesday, March 30, 2021 1:44 PM
To: OMF South <OMFsouth@soundtransit.org>
Cc: Ramachandra, Sagar <sagar.ramachandra@soundtransit.org>
Subject: Re: Noise impacts at the OMF South

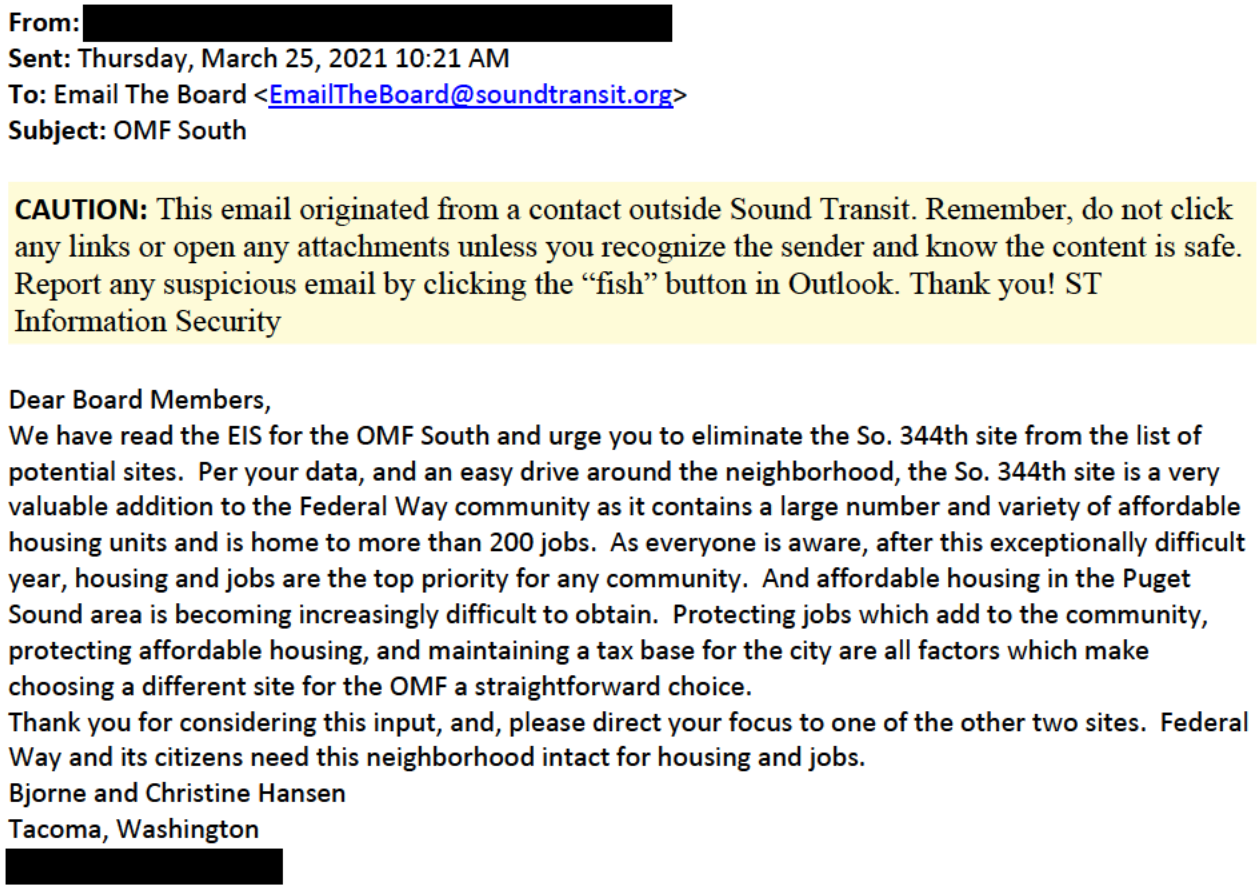
CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello Sidney,

Thank you for the thorough response. I believe the Midway Landfill would be the best location for the O&M facility based on this clarification information. The area there with the college, light rail station, new business establishments and additional multiuse 5-story buildings is a terrific foundation of a small land use planned village. The O&M facility is the smart way to deal with the landfill for now and the future. There are very few opportunities to correct a past mistake correctly.

Best regards,
Greg

Greg Greenstreet (Communications ID 472034)		
Comment ID	Comment Text	Response
1	I believe the Midway Landfill would be the best location for the O&M facility based on this clarification information. The area there with the college, light rail station, new business establishments and additional multiuse 5-story buildings is a terrific foundation of a small land use planned village. The O&M facility is the smart way to deal with the landfill for now and the future.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.



From: [redacted]
Sent: Thursday, March 25, 2021 10:21 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Dear Board Members,
We have read the EIS for the OMF South and urge you to eliminate the So. 344th site from the list of potential sites. Per your data, and an easy drive around the neighborhood, the So. 344th site is a very valuable addition to the Federal Way community as it contains a large number and variety of affordable housing units and is home to more than 200 jobs. As everyone is aware, after this exceptionally difficult year, housing and jobs are the top priority for any community. And affordable housing in the Puget Sound area is becoming increasingly difficult to obtain. Protecting jobs which add to the community, protecting affordable housing, and maintaining a tax base for the city are all factors which make choosing a different site for the OMF a straightforward choice.
Thank you for considering this input, and, please direct your focus to one of the other two sites. Federal Way and its citizens need this neighborhood intact for housing and jobs.
Bjorne and Christine Hansen
Tacoma, Washington
[redacted]

Bjorn Hansen (Communication ID 472037)		
Comment ID	**Comment Text**	**Response**
1	We have read the EIS for the OMF South and urge you to eliminate the So. 344th site from the list of potential sites. Per your data, and an easy drive around the neighborhood, the So. 344th site is a very valuable addition to the Federal Way community as it contains a large number and variety of affordable housing units and is home to more than 200 jobs. As everyone is aware, after this exceptionally difficult year, housing and jobs are the top priority for any community. And affordable housing in the Puget Sound area is becoming increasingly difficult to obtain. Protecting jobs which add to the community, protecting affordable housing, and maintaining a tax base for the city are all factors which make choosing a different site for the OMF a straightforward choice.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: [redacted]
Sent: Wednesday, March 31, 2021 1:15 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: South train yard

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

To whom it may concern,
I believe the Midway landfill is the best place to put the South train yard. It just makes sense.
Thank you for your time,
Darla Magnuson

Sent from my T-Mobile 4G LTE Device

Darla Magnuson (Communications ID 472223)		
Comment ID	**Comment Text**	**Response**
1	I believe the Midway landfill is the best place to put the South train yard.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Mary Van Horn [redacted]
Sent: Wednesday, March 31, 2021 8:49 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South Train Yard

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Please choose the Midway Landfill site for the OMF South Train Yard. Please respect and protect Federal Way residents, businesses and places of worship.

Thank you in advance for making a sensible decision to locate the OMF South Train Yard on the Midway Landfill site.

Mary Van Horn
Federal Way Resident

Mary Von Horn (Communications ID 472224)		
Comment ID	**Comment Text**	**Response**
1	Please choose the Midway Landfill site for the OMF South Train Yard. Please respect and protect Federal Way residents, businesses and places of worship.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472286

OMF South DEIS OOH Comment 1

03/05/2021

The landfill location is preferred. 2. Do not ask taxpayers for more money. 3. Meet all transit commitments. 4. Meet all deadlines. 5. Collect fares and enforce payment.

Anonymous (Communications ID 472286)		
Comment ID	**Comment Text**	**Response**
1	The landfill location is preferred.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472287

OMF South DEIS OOH Comment 2

03/05/2021

Environmental impacts, cost, and timeline are most important to me. Since Midway would be so much more expensive and take longer to build, and because building on a landfill has SO MUCH uncertainty (meaning increased cost), I'm inclined to support choosing one of the Federal Way options. Ideally, much of the construction cost savings would be used for substantial environmental mitigation, such as nearby wetland restoration projects and tree planting. However, I'll admit I don't have much information about the residential and business displacement. From an equity standpoint, I'd be curious who would be displaced and if this displacement would be perpetuating any historic harm against low-income communities or communities of color.   Thanks for this informative online open house - I appreciate the use of clear graphics to demonstrate relative quantitative impacts.

Anonymous (Communications ID 472287)

Anonymous (Communications ID 472287)		
Comment ID	**Comment Text**	**Response**
1	Since Midway would be so much more expensive and take longer to build, and because building on a landfill has SO MUCH uncertainty (meaning increased cost), I'm inclined to support choosing one of the Federal Way options.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Ideally, much of the construction cost savings would be used for substantial environmental mitigation, such as nearby wetland restoration projects and tree planting.	As described in Chapter 2 of the 2023 Draft EIS and this Final EIS, Sound Transit's Environmental Policy states that the agency will satisfy all applicable laws and regulations and mitigate environmental impacts consistent with Sound Transit's policies, as well as strive to exceed compliance, restore the environment, avoid environmental degradation, prevent pollution, and conserve resources. The construction cost estimates in Chapter 2 include environmental mitigation costs.
3	From an equity standpoint, I'd be curious who would be displaced and if this displacement would be perpetuating any historic harm against low-income communities or communities of color.	Sound Transit conducted an environmental justice analysis, which is available in Appendix E, Environmental Justice Assessment, of the Final EIS. Table E.5-1 summarizes potential impacts to environmental justice populations and associated mitigation.

Communication ID: 472288

OMF South DEIS OOH Comment 3

03/05/2021

The report has a lot of good information. However, I believe the Christian Faith Center site should be removed from the 3 selections. This is a house of worship for many as well as a school. Including the 3rd site that also affects Christian Faith Center areas and surrounding business and residences I don't believe is ideal. The noise at these areas would not benefit the community. While the Kent site offers a better surrounding area, the environmental requirements to prepare this site would be costly. However, considering the neighborhoods for the other 2 sites and the disruptions to those area, I believe the Kent site is still the best option.

Anonymous (Communications ID 472288)		
Comment ID	**Comment Text**	**Response**
1	However, I believe the Christian Faith Center site should be removed from the 3 selections. This is a house of worship for many as well as a school. Including the 3rd site that also affects Christian Faith Center areas and surrounding business and residences I don't believe is ideal.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The noise at these areas would not benefit the community.	Sound Transit conducted a noise assessment of the OMF South project alternatives following FTA and Sound Transit policies and practices. Based on the current design, operation of the OMF South site would not have noise impacts. Operation of the mainline track to the Preferred and South 344th Street alternatives could result in noise impacts to some single-family residences, depending on the track design option, which would be fully mitigated. Modification of the existing berm and noise walls adjacent to I-5 would result in traffic noise impacts at about one to three residences in Belmor. Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing berm and noise wall. A construction management plan would be developed during the design phase of the project detailing BMPs to minimize potential construction noise impacts on local businesses and residents. See Section 3.9, Noise and Vibration, and Appendix G2, Noise and Vibration Technical Report, of the Final EIS for more detail.
3	While the Kent site offers a better surrounding area, the environmental requirements to prepare this site would be costly. However, considering the neighborhoods for the other 2 sites and the disruptions to those area, I believe the Kent site is still the best option.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472289

OMF South DEIS OOH Comment 4

03/05/2021

I firmly believe this is your best available option. Your impact on the community will be substantial in other areas. The landfill makes the most sense even if it costs extra in engineering. It's land that's already vacant and next to I5. Put the tax payers money to good use and don't wipe out churches and established companies. I have spoken to several members of the community and the other sites have streams and wetlands. Local tribal council needs these areas respected. We only get on earth and our environmental impact is very important. What happens when you sell that same land at the landfill 10 years later to developers. The community will feel cheated.

Anonymous (Communications ID 472289)		
Comment ID	**Comment Text**	**Response**
1	I firmly believe this is your best available option. Your impact on the community will be substantial in other areas. The landfill makes the most sense even if it costs extra in engineering. It's land that's already vacant and next to I5. Put the tax payers money to good use and don't wipe out churches and established companies.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I have spoken to several members of the community and the other sites have streams and wetlands. Local tribal council needs these areas respected.	Regardless of the alternative the Sound Transit Board selects to build, in cooperation with Tribes and permitting agencies, Sound Transit would develop plans to mitigate the effects of the OMF South project on wetlands, streams, and regulatory buffers on a watershed basis as part of the environmental permitting process.

Communication ID: 472290

OMF South DEIS OOH Comment 5

03/05/2021

Ray Stewart

Leave the Christian Faith Center alone. Build somewhere else. p.s. stop asking b.s. questions about sexual identity/race. That stuff is inappropriate and should be illegal!

Ray Stewart (Communications ID 472290)		
Comment ID	**Comment Text**	**Response**
1	Leave the Christian Faith Center alone.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472291

OMF South DEIS OOH Comment 6

03/05/2021

AARON BOYD

Even with the higher costs for construction and operation it screams Landfill Site is the only option. Less disruption to Everything and the only negatives that you listed is related to MONEY & TIME.
Construction traffic is not a issue.

Aaron Boyd (Communications ID 472291)		
Comment ID	**Comment Text**	**Response**
1	Even with the higher costs for construction and operation it screams Landfill Site is the only option. Less disruption to Everything and the only negatives that you listed is related to MONEY & TIME. Construction traffic is not a issue.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472292

OMF South DEIS OOH Comment 7

03/05/2021

Please choose the Midway site. This is exactly the kind of thing that public funds should be used for, turning a site that has no commercial attraction/potential into a productive part of a community.

Anonymous (Communications ID 472292)		
Comment ID	**Comment Text**	**Response**
1	Please choose the Midway site. This is exactly the kind of thing that public funds should be used for, turning a site that has no commercial attraction/potential into a productive part of a community.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472293

OMF South DEIS OOH Comment 91

03/05/2021

Scott O'Dell

336th seems like the clear winner here with the least amount of business and residential impact. The landfill seems too expensive to build on with public funds given the less expensive options. It's nice that it's already empty, but that's all it has going for it.

Scott O'Dell (Communications ID 472293)		
Comment ID	**Comment Text**	**Response**
1	336th seems like the clear winner here with the least amount of business and residential impact.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The landfill seems too expensive to build on with public funds given the less expensive options.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472294

OMF South DEIS OOH Comment 8

03/05/2021

Krista Scott

I support the Midway landfill site. Despite higher costs, the impact in the long run on the environment, businesses, residents, and neighborhood in general will be worth the extra cost. The land is currently not being used - don't tear down existing structures/homes and ruin wetlands when we have the opportunity to make something good out of land previous generations wrecked. There is also the issue of equity: if we are considering doing tunnels and such for other portions of the rail system where wealthier people live, we should give lower-income folks (those of us in Kent & Federal Way) the same respect. Because you are not rich doesn't mean you don't care about aesthetics or trashing of natural landscape. We don't want our neighborhoods ruined any more than the home owners in Ballard or West Seattle. It's a matter of equity for people in the South End.

Krista Scott (Communications ID 472294)		
Comment ID	**Comment Text**	**Response**
1	I support the Midway landfill site. Despite higher costs, the impact in the long run on the environment, businesses, residents, and neighborhood in general will be worth the extra cost.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	There is also the issue of equity: if we are considering doing tunnels and such for other portions of the rail system where wealthier people live, we should give lower-income folks (those of us in Kent & Federal Way) the same respect.	The majority of the Link light rail system is above ground, and all operations and maintenance facilities would be above ground. Due to the nature of the maintenance facility, an underground location would be prohibitively expensive to construct and operate.

Communication ID: 472295

OMF South DEIS OOH Comment 9

03/05/2021

Kimberly Oconnor

I would prefer the midday option because of the minimal impact to both the environment and business

Kimberly Oconnor (Communications ID 472295)		
Comment ID	**Comment Text**	**Response**
1	I would prefer the midday option because of the minimal impact to both the environment and business	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472296

OMF South DEIS OOH Comment 10

03/06/2021

Bob Strong

The Midway landfill site is the obvious choice. What better way to use a property that cannot be used for anything else, while minimizing negative impact to people. I think alternative materials and options for the landfill site development should also be explored to lower the development cost of that site.

Bob Strong (Communications ID 472296)		
Comment ID	**Comment Text**	**Response**
1	The Midway landfill site is the obvious choice. What better way to use a property that cannot be used for anything else, while minimizing negative impact to people. I think alternative materials and options for the landfill site development should also be explored to lower the development cost of that site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472298

OMF South DEIS OOH Comment 12

03/07/2021

Mike Juguilon

I propose that the Midway Landfill location will be the home of the OMFS. I know it will be more costly, but to clean up a contaminated waste site and build a facility to benefit the whole of King county is the right thing to do. Additionally, I don't want to us to be displaced. I'm a homeowner at the South 344th Street Alternative. If I knew that this location was on the list of future sites for the OMFS, I won't had purchased it in 2018. Now though, we love our neighborhood of mixed businesses and residences. Please do the right thing. Pick the Midway Landfill site. Let's clean it up then build the OMFS facility. Thank you!

Mike Juguilon (Communications ID 472298)		
Comment ID	**Comment Text**	**Response**
1	I propose that the Midway Landfill location will be the home of the OMFS. I know it will be more costly, but to clean up a contaminated waste site and build a facility to benefit the whole of King county is the right thing to do. Additionally, I don't want to us to be displaced. I'm a homeowner at the South 344th Street Alternative.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472299

OMF South DEIS OOH Comment 13

03/07/2021

Dane Bergman

Clearly the Midway landfill is the obvious choice.

Dane Bergman (Communications ID 472299)		
Comment ID	**Comment Text**	**Response**
1	Clearly the Midway landfill is the obvious choice.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472300

OMF South DEIS OOH Comment 15

03/08/2021

I live in federal way, close to one of the preferred sites. I'd rather have this construction built in Kent.

Anonymous (Communications ID 472300)		
Comment ID	**Comment Text**	**Response**
1	I'd rather have this construction built in Kent.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472301

OMF South DEIS OOH Comment 14

03/08/2021

South 336th seems like the best option to be less expensive and impact the least amount of homes and businesses. There are many older homes in the 344th option that could cost financial impacts and displacement to those who live there.

Anonymous (Communications ID 472301)		
Comment ID	**Comment Text**	**Response**
1	South 336th seems like the best option to be less expensive and impact the least amount of homes and businesses.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	There are many older homes in the 344th option that could cost financial impacts and displacement to those who live there.	As described in Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS, Sound Transit would provide just compensation and relocation assistance to residences that would be displaced by the project following Sound Transit’s Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines (Sound Transit 2017); the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the “Uniform Act”); and the State of Washington’s relocation and property acquisition laws and regulations, including RCW 8.26 and Washington Administrative Code 468-100.

Communication ID: 472302

OMF South DEIS OOH Comment 92

03/08/2021

Tad Doviak

After reviewing the EIS for all three locations I feel that the Midway Landfill location is still the best alternative. It disrupts the community less. As a Superfund site it's use and impact on the greater environment has already been closely monitored and mitigated for. I wholeheartedly endorse the use of the Midway location.

Tad Doviak (Communications ID 472302)		
Comment ID	**Comment Text**	**Response**
1	After reviewing the EIS for all three locations I feel that the Midway Landfill location is still the best alternative. It disrupts the community less. As a Superfund site it's use and impact on the greater environment has already been closely monitored and mitigated for. I wholeheartedly endorse the use of the Midway location.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472303

OMF South DEIS OOH Comment 23

03/09/2021

Doran Luce

Go back to the location in Kent where Loews & Dickson are, both can be relocated (to the midway landfill)

Doran Luce (Communications ID 472303)		
Comment ID	**Comment Text**	**Response**
1	Go back to the location in Kent where Loews & Dickson are, both can be relocated (to the midway landfill)	This comment refers to the possible site at S 240th Street and SR 99 (publicly known as the “Dick’s Drive-In” alternative). This property was evaluated during the 2019 OMF South alternatives evaluation process and was ultimately not carried forward because the size and configuration of the site was not compatible with the needs of OMF South. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).

Communication ID: 472304

OMF South DEIS OOH Comment 22

03/09/2021

Use undeveloped site in Midway as it well overdue for usage. Clean up the mess that was left years ago.

Anonymous (Communications ID 472304)		
Comment ID	**Comment Text**	**Response**
1	Use undeveloped site in Midway as it well overdue for usage. Clean up the mess that was left years ago.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472305

OMF South DEIS OOH Comment 21

03/09/2021

Michael Sprague

The Land Fill site seems the less onerous of the two considered, but why is this limited to two prospective sites. Have you even looked at the Weyerhaeuser property? This rail project will be around for many years, why rush it? Get more information, consider a few more options and let's do this right!

Michael Sprague (Communications ID 472305)		
Comment ID	**Comment Text**	**Response**
1	The Land Fill site seems the less onerous of the two considered, but why is this limited to two prospective sites.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. OMF South went through an extensive alternative development process, which evaluated 24 possible sites. Three alternatives were carried forward for evaluation in the EIS. Please see Section 2.2, Alternative Development and Scoping, in the Final EIS for more detail.
2	Have you even looked at the Weyerhaeuser property? This rail project will be around for many years, why rush it? Get more information, consider a few more options and let's do this right!	The Weyerhaeuser property was evaluated during the OMF South alternatives evaluation process in 2019, and the site was ultimately not carried forward because of high schedule risk and operating estimates due to its location across I-5 from the proposed mainline alignment. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).

Communication ID: 472306

OMF South DEIS OOH Comment 20

03/09/2021

Tony Gringle

Sound Transit, The obvious choice here is to place the transfer station on the landfill. It seems ignorant to even study the sites in federal way due to the obvious environmental and business impacts. I understand the budget difficulties due to every project costing significantly more then expected, but please consider all factors when determining where to place this operations center. The money wasted by studying this is a waste to the tax payer. Thank you for your time

Tony Gringle (Communications ID 472306)		
Comment ID	**Comment Text**	**Response**
1	Sound Transit, The obvious choice here is to place the transfer station on the landfill. It seems ignorant to even study the sites in federal way due to the obvious environmental and business impacts.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I understand the budget difficulties due to every project costing significantly more then expected, but please consider all factors when determining where to place this operations center. The money wasted by studying this is a waste to the tax payer.	The Sound Transit Board considers the EIS analysis; Tribal, public, and agency comments on the Draft EIS; and other factors in identifying the Preferred Alternative and selecting the project to be built.

Communication ID: 472307

OMF South DEIS OOH Comment 19

03/09/2021

Robert Wheeler

Your information is good; lengthy as it should be and not everyone will spend the time to review it because of that length. Simply put by your own words below MIDWAY is the only choice. This site would create the fewest residential, business and employee displacements of the three site alternatives. It would result in no impacts to community and social resources, wetland or streams and create the fewest forest impacts. Your agency is huge drawing on taxpayers dollars. I reviewed salaries alone from the FOIA obtained in 2018 and it shows 1066 employees. 10 pages into the 43 pages total (253 names) I was still seeing 6 figure salaries. 20 earned over $200,000.00 per year. Do not use "expense for Midway" as an excuse. Do not use "time of construction" as an excuse. Your delivery to date has been late. I pay for it but will never see the "good" if any come from it. I will attend the public meetings and ensure that you hear MIDWAY!

Robert Wheeler (Communications ID 472307)		
Comment ID	**Comment Text**	**Response**
1	Simply put by your own words below MIDWAY is the only choice. This site would create the fewest residential, business and employee displacements of the three site alternatives. It would result in no impacts to community and social resources, wetland or streams and create the fewest forest impacts.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472308

OMF South DEIS OOH Comment 18

03/09/2021

Maire Dhu Lemley

While I see the Midway Landfill is the longest and most expensive location of the 3 proposed sites, the impact to forests (and animals living there), streams, and businesses at the other sites, is a huge concern. As I live just below the Midway site, next to the College, and use this particular stretch of highway for travel to and from shopping and errands, I am not thrilled about the impact on traffic that a longer preparation time could have. Also, placing columns of concrete seems like there would be noise, and vibration, which after only a small period of time, would become quite annoying. When all is said and done, what will be the noise impact if any, and will shift changes bring in extra traffic and congestion, and if so, will Sound Transit be a partner in road upkeep, and noise and traffic mitigation?

Maire Dhu Lemley (Communications ID 472308)		
Comment ID	**Comment Text**	**Response**
1	While I see the Midway Landfill is the longest and most expensive location of the 3 proposed sites, the impact to forests (and animals living there), streams, and businesses at the other sites, is a huge concern.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Also, placing columns of concrete seems like there would be noise, and vibration, which after only a small period of time, would become quite annoying. When all is said and done, what will be the noise impact if any, and will shift changes bring in extra traffic and congestion, and if so, will Sound Transit be a partner in road upkeep, and noise and traffic mitigation?	Project construction may result in temporary noise and vibration impacts for all build alternatives. Best Management Practices would be used during construction to minimize potential construction noise impacts on local businesses and residents. Based on the current design, there would be no long-term noise impacts associated with operation of the OMF sites for any of the build alternatives. The South 336th Street and South 344th Street alternatives mainline options could result in noise impacts to some single-family residences along the mainline, depending on the track design option, which would be fully mitigated. Modification of the existing berm and noise walls adjacent to I-5 would result in traffic noise impacts at about one to three residences in Belmor. Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing berm and noise wall. Additional information is available in Section 3.9, Noise and Vibration, and Appendix G2, Noise and Vibration Technical Report, of the Final EIS. There would be no long-term traffic impacts associated with operation of the OMF South alternatives. However, there could be increased traffic and congestion during construction. Sound Transit would develop and implement a construction transportation management plan that would address site access, traffic control, and haul routes per city of Kent or city of Federal Way requirements. The plan would include measures to minimize traffic disruptions. Additional information is available in Section 3.2, Transportation, and Appendix G1, Transportation Technical Report, of the Final EIS.

Communication ID: 472309

OMF South DEIS OOH Comment 17

03/09/2021

We would prefer the Midway Landfill site for the OMF South Site. It would have the least impact on traffic in the area. It would also have the least harm to small businesses and homes in the area.

Anonymous (Communications ID 472309)		
Comment ID	Comment Text	Response
1	We would prefer the Midway Landfill site for the OMF South Site. It would have the least impact on traffic in the area. It would also have the least harm to small businesses and homes in the area.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472310

OMF South DEIS OOH Comment 16

03/09/2021

I think a platformed option over the Midway Landfill is the best option for the community in the long run. I also think that citing the OMF within walking distance of the station, as Midway does, could help allow OMF employees to take Link to work.

Anonymous (Communications ID 472310)		
Comment ID	**Comment Text**	**Response**
1	I think a platformed option over the Midway Landfill is the best option for the community in the long run. I also think that citing the OMF within walking distance of the station, as Midway does, could help allow OMF employees to take Link to work.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472311

OMF South DEIS OOH Comment 30

03/10/2021

Cheryl Lyons

How much noise would be heard by the train from 320th to 330th St? Would Sound Transit buy property on 330th? How would you keep the homeless population down at the light rail stations and loitering??? This light rail system could make the Federal Way homeless issues worse? How can Sound Transit keep it under control?

Cheryl Lyons (Communications ID 472311)		
Comment ID	**Comment Text**	**Response**
1	How much noise would be heard by the train from 320th to 330th St?	For the South 336th and South 344th Street alternatives, the average equivalent sound levels (Ldn) at the closest residences to the proposed mainline track would range from 55 dBA to 65 dBA, depending on the location. This would not create a noise impact under FTA criteria. More detailed information regarding the noise levels is available in Section 6.3 of Appendix G2, Noise and Vibration Technical Report, of the Final EIS.
2	Would Sound Transit buy property on 330th?	Appendix H1, Potentially Affected Parcels, of the 2023 Draft EIS and this Final EIS lists the parcels that would be potentially partially or fully acquired for the project based on the current design. Sound Transit currently does not anticipate the need to purchase property on S 330th Street. Final determinations of affected properties will be based on the project's final design following the Sound Transit Board's selection of the project to be built.
3	How would you keep the homeless population down at the light rail stations and loitering??? This light rail system could make the Federal Way homeless issues worse? How can Sound Transit keep it under control?	There are no light rail stations associated with the OMF South project.

Communication ID: 472312

OMF South DEIS OOH Comment 29

03/10/2021

The OMF is needed for West Seattle or Tacoma extensions. It is not needed for the Federal Way extension. The logical place for a large industrial yard such as this is in an area that is industrial in nature. As this OMF is not needed until much later phases, the options on the table should be tossed and new options reevaluated. The most appropriate place for this yard is likely in the industrial area of the Tacoma / Fife tideflats. I would also look at this with the lens of Equity. The areas that are being selected currently are home to our low income and BIPOC populations. Why are we placing massive industrial infrastructure with 24x7 light and noise pollution where our poor and BIPOC neighbors live?

Anonymous (Communications ID 472312)		
Comment ID	**Comment Text**	**Response**
1	The OMF is needed for West Seattle or Tacoma extensions. It is not needed for the Federal Way extension.	FWLE could operate without the OMF South. However, once built, OMF South would serve the entire Link system. The Link System-Wide Storage Building would receive and store all parts of the Link light rail system, including LRV parts and components, MOW track and components, and facility parts and components.
2	As this OMF is not needed until much later phases, the options on the table should be tossed and new options reevaluated. The most appropriate place for this yard is likely in the industrial area of the Tacoma / Fife tideflats.	Three sites in the Tacoma tideflats area were evaluated as part of the alternative development process. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf). The sites were not carried forward because their southern location would affect the ability to open the facility in time to accept and commission the new LRVs needed to implement Sound Transit 3. Sound Transit has adopted a realignment plan that serves as a framework for delivering agency system expansion as rapidly as possible. While changes have been made to the implementation schedule of Sound Transit 3, an OMF in the southern portion of the Link light rail service area is needed by 2030. The current forecasted in-service date is 2032 for the Preferred and South 344th Street alternatives and 2035 to 2037 (depending on the subsurface construction design option) for the Midway Landfill Alternative. Sound Transit is pursuing measures to advance the opening earlier.
3	I would also look at this with the lens of Equity. The areas that are being selected currently are home to our low income and BIPOC populations. Why are we placing massive industrial infrastructure with 24x7 light and noise pollution where our poor and BIPOC neighbors live?	Appendix E, Environmental Justice Assessment, of the Final EIS evaluates potential impacts to environmental justice populations.

Communication ID: 472313

OMF South DEIS OOH Comment 28

03/10/2021

DO not destroy the homes schools etc in the s 344th st or 336th st sites!!!!!! NO need to with midway as the least destructive plan!! You have no $ for this or even running the system at all this entire entity is planned for a non existent user base so you loose $ ever year STOP MAKING BAD CHOICES this hurts everyone!!!!!!!!!!!!!

Anonymous (Communications ID 472313)		
Comment ID	**Comment Text**	**Response**
1	DO not destroy the homes schools etc in the s 344th st or 336th st sites!!!!!! NO need to with midway as the least destructive plan!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472314

OMF South DEIS OOH Comment 27

03/10/2021

While it may not be the cheapest option or easiest to build on, I urge ST to choose the Midway site for the South OMF. It has the least impact to people, the environment (both natural and built), and the economy. It also doesn't require the removal of housing, which our region is already in desperate need of. The Midway site also gives us a chance to "recycle" this vacant eyesore into something useful and beneficial for the community.

Anonymous (Communications ID 472314)		
Comment ID	**Comment Text**	**Response**
1	While it may not be the cheapest option or easiest to build on, I urge ST to choose the Midway site for the South OMF. It has the least impact to people, the environment (both natural and built), and the economy. It also doesn't require the removal of housing, which our region is already in desperate need of. The Midway site also gives us a chance to "recycle" this vacant eyesore into something useful and beneficial for the community.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472315

OMF South DEIS OOH Comment 26

03/10/2021

Please put this at the Christian Faith Center. This will be less disruptive and safer than the landfill. Please do NOT use the landfill... unsafe now AND IN FUTURE. THANK YOU

Anonymous (Communications ID 472315)		
Comment ID	**Comment Text**	**Response**
1	Please put this at the Christian Faith Center. This will be less disruptive and safer than the landfill.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472316

OMF South DEIS OOH Comment 25

03/10/2021

Dennis Higgins

The Midway site is preferable because of the lack of residences and businesses needed to be removed. The additional cost for constructing this site should be itemized separately and funding pursued from congress and/ or the state. It is a smart re-purposing of otherwise useless land in the midst of a dense urban area.

Dennis Higgins (Communications ID 472316)		
Comment ID	**Comment Text**	**Response**
1	The Midway site is preferable because of the lack of residences and businesses needed to be removed.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The additional cost for constructing this site should be itemized separately and funding pursued from congress and/ or the state.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472317

OMF South DEIS OOH Comment 24

03/10/2021

Landfill option all the way! I know it's the most expensive option but think about the positive impacts of utilizing an underutilized, blighted space. Also trying to build into established properties, especially from marginalized communities, could stir up the locals who depend on them.

Anonymous (Communications ID 472317)		
Comment ID	**Comment Text**	**Response**
1	Landfill option all the way! I know it's the most expensive option but think about the positive impacts of utilizing an underutilized, blighted space.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Also trying to build into established properties, especially from marginalized communities, could stir up the locals who depend on them.	Sound Transit is committed to conducting meaningful outreach and engagement to environmental justice populations. Details regarding engagement strategies throughout the project so far are included in Section 4, Outreach to Minority and Low-Income Populations, of Appendix E, Environmental Justice Assessment, in the Final EIS. Sound Transit would continue to work with environmental justice populations and affected communities as the project progresses.

Communication ID: 472318

OMF South DEIS OOH Comment 34

03/11/2021

Either alternative is preferable to the Midway Landfill. The costs associated with the landfill site are simply indefensible.

Anonymous (Communications ID 472318)		
Comment ID	**Comment Text**	**Response**
1	Either alternative is preferable to the Midway Landfill. The costs associated with the landfill site are simply indefensible.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472320

OMF South DEIS OOH Comment 32

03/11/2021

The Midway landfill alternative while more costly upfront and more challenging due to the superfund site status seems to be the best long term decision. It puts a piece of property to a better use than simply being a capped landfill while it offers fewer impacts to residents in the Federal Way area that would be displaced by either of those options, allows business and tax base to remain rather than be lost in Federal Way, and does not impact the streams in the Federal Way area.

Anonymous (Communications ID 472320)		
Comment ID	**Comment Text**	**Response**
1	The Midway landfill alternative while more costly upfront and more challenging due to the superfund site status seems to be the best long term decision. It puts a piece of property to a better use than simply being a capped landfill while it offers fewer impacts to residents in the Federal Way area that would be displaced by either of those options, allows business and tax base to remain rather than be lost in Federal Way, and does not impact the streams in the Federal Way area.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. Section 3.13, Hazardous Materials, in the 2023 Draft EIS and this Final EIS discusses the potential impacts and avoidance, minimization, and mitigation measures concerning construction within the landfill and management of contaminated material.

Communication ID: 472321

OMF South DEIS OOH Comment 31

03/11/2021

Danyel Lyons

The Midway Landfill is the best option. There are only two negatives for location that will require detailed planning and impact considerations: 1. Superfund site and all of the environmental mitigations that come with it. 2. Traffic and pedestrian impacts. Being next to 516 & I-5 interchange and a college already causes problems with large volumes. Adding the transit stop and OMF will cause an exponential volume increase and will require a major overhaul the traffic pattern/plan for a mile in all directions.

Danyel Lyons (Communications ID 472321)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill is the best option. There are only two negatives for location that will require detailed planning and impact considerations: 1. Superfund site and all of the environmental mitigations that come with it.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	2. Traffic and pedestrian impacts. Being next to 516 & I-5 interchange and a college already causes problems with large volumes. Adding the transit stop and OMF will cause an exponential volume increase and will require a major overhaul the traffic pattern/plan for a mile in all directions.	The traffic operations analysis for the Midway Landfill Alternative incorporated existing and forecast background traffic as well as planned transportation improvements from other projects. The transportation analysis was updated in the 2023 Draft EIS and again for this Final EIS and concludes that the Midway Landfill Alternative study intersections would continue to meet level of service standards with the project.

Communication ID: 472322

OMF South DEIS OOH Comment 35

03/14/2021

Midway landfill makes the most sense. You won't displace any businesses, churches, or homeowners. It's a blank slate, and making use of something that has sat for the last 50 years.

Anonymous (Communications ID 472322)		
Comment ID	**Comment Text**	**Response**
1	Midway landfill makes the most sense. You won't displace any businesses, churches, or homeowners.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472323

OMF South DEIS OOH Comment 36

03/15/2021

Jason Little

I prefer the Midway site with the excavation plan. It has by far the fewest residential, business and environmental impacts which minimizes potential cost and litigation due to land acquisition, community impact and natural environment mitigation strategies. It also doesn't require the build of additional track beyond Federal Way at this time saving project cost in the near term.

Jason Little (Communications ID 472323)		
Comment ID	**Comment Text**	**Response**
1	I prefer the Midway site with the excavation plan. It has by far the fewest residential, business and environmental impacts which minimizes potential cost and litigation due to land acquisition, community impact and natural environment mitigation strategies. It also doesn't require the build of additional track beyond Federal Way at this time saving project cost in the near term.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472324

OMF South DEIS OOH Comment 38

03/16/2021

Richard Tackett

Prefer Midway Landfill site as it allows site to go back to productive use and not impact jobs at others.

Richard Tackett (Communications ID 472324)		
Comment ID	Comment Text	Response
1	Prefer Midway Landfill site as it allows site to go back to productive use and not impact jobs at others.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472325

OMF South DEIS OOH Comment 37

03/16/2021

Lydia Long

Please consider the negative impact to our community if you build the maintenance facility in Federal Way. The initial investment to clean up and re-purpose the Midway Landfill location is well worth the time and money. It will take useless land and recycle it into a valuable asset. Also, the Midway Landfill location with not negatively affect any residential areas. Thank you.

Lydia Long (Communications ID 472325)		
Comment ID	**Comment Text**	**Response**
1	Please consider the negative impact to our community if you build the maintenance facility in Federal Way.	The purpose of the environmental review process is to identify significant adverse environmental impacts and propose mitigation measures to reduce the impacts.
2	The initial investment to clean up and re-purpose the Midway Landfill location is well worth the time and money.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472326

OMF South DEIS OOH Comment 41

03/18/2021

After looking at all three choices and evaluating the potential impacts to the ecosystem, businesses, the residence, the community as well as the costs, and current land utilization. The midway landfill is the best choice. Yes, it will cost more but we will be repurposing the landfill in a positive manner and turning something that has been an eye sore into an integral part of our community. While minimizing all of the impacts above else where. The investment is worth the additional cost.

Anonymous (Communications ID 472326)		
Comment ID	**Comment Text**	**Response**
1	After looking at all three choices and evaluating the potential impacts to the ecosystem, businesses, the residence, the community as well as the costs, and current land utilization. The midway landfill is the best choice. Yes, it will cost more but we will be repurposing the landfill in a positive manner and turning something that has been an eye sore into an integral part of our community.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472327

OMF South DEIS OOH Comment 40

03/18/2021

Kyle Kooy

Midway landfill is the best geographical location: already empty land that requires no buyout, already on the mainline that is getting built right now, and in a worst case scenario where the Tacoma extension has to be put on indefinite pause due to Covid-related funding impacts, it requires no extra mainline to be built beyond the Federal Way extension. However, the impact of it being a landfill, and all the problems that come with building on a superfund site, are even more enormous than I imagined. From a pure budgetary standpoint, either of the other two sites should be used, simply because Covid has caused ST3 funding to evaporate to such a degree that resource are spread too thin to do anything but the cheapest option. Unfortunately for the accountants, I am an idealist. With Sound Transit being a public organization rather than a private one, I think it should have the duty to look beyond the monetary cost/benefit analysis of a project and instead focus on how much of an improvement said project can bring to an area. Of the three sites, I think developing the Midway site provides the greatest improvement to the surrounding community. Yes, it will cost billions of dollars more, but it will reduce (or possibly even eliminate, if I understand the full excavation proposal correctly) the impact of a superfund site that is smack dab in the middle of a growing urban area, directly adjacent to three major transportation arterials (99, I-5, and eventually the Link Mainline). Kent and Des Moines were quite eager to push the landfill onto Sound Transit when the initial OMF rumor pointed to a shopping center, and perhaps those cities can put some money where their mouth is and assist with the cost, along with Seattle who would no longer be responsible for monitoring and cleanup. This literal neighborhood cleanup could be a group effort to do good. The other two sites involve eminent domain of land that can be used for other purposes, and in fact currently is. Using Midway offers the region the opportunity to transform useless, dangerous land into something useful. I think that is a long term benefit to the area that is worth the added cost, and it's only with Sound Transit's governmental backing and large funding that I foresee this site ever being transformed to something usable in my lifetime.

Kyle Kooy (Communications ID 472327)		
Comment ID	**Comment Text**	**Response**
1	Midway landfill is the best geographical location: already empty land that requires no buyout, already on the mainline that is getting built right now, and in a worst case scenario where the Tacoma extension has to be put on indefinite pause due to Covid-related funding impacts, it requires no extra mainline to be built beyond the Federal Way extension. However, the impact of it being a landfill, and all the problems that come with building on a superfund site, are even more enormous than I imagined.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Of the three sites, I think developing the Midway site provides the greatest improvement to the surrounding community. Yes, it will cost billions of dollars more, but it will reduce (or possibly even eliminate, if I understand the full excavation proposal correctly) the impact of a superfund site that is smack dab in the middle of a growing urban area, directly adjacent to three major transportation arterials (99, I-5, and eventually the Link Mainline).	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472328

OMF South DEIS OOH Comment 39

03/18/2021

I am totally against this entire project and don't want it anywhere.

Anonymous (Communications ID 472328)		
Comment ID	**Comment Text**	**Response**
1	I am totally against this entire project and don't want it anywhere.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472329

OMF South DEIS OOH Comment 43

03/19/2021

Jeannie VanVleet

I think the additional expense to put the site at the Midway landfill is worth it. The other 2 options uproot businesses in Federal Way.

Jeannie VanVleet (Communications ID 472329)		
Comment ID	**Comment Text**	**Response**
1	I think the additional expense to put the site at the Midway landfill is worth it. The other 2 options uproot businesses in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472330

OMF South DEIS OOH Comment 42

03/19/2021

I support the location at the S. 336th Street site as the first choice. Alternatively, the Midway landfill site.

Anonymous (Communications ID 472330)		
Comment ID	**Comment Text**	**Response**
1	I support the location at the S. 336th Street site as the first choice. Alternatively, the Midway landfill site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472331

OMF South DEIS OOH Comment 45

03/20/2021

Laura Arnold

Although the projected cost and length of time are higher for the Midway facility, I believe this would be the best choice. The other two displace workers and residents. There is a high number under represented residents and employees in this area and that needs to be acknowledged and considered strongly. What will happen to those displaced? Is there trully fair compensation that all of the residents and employees have a say in? Or is there any compensation? And that is a cost factor. Then there are the protected lands that could really screw up the ecosystem. Not just what is built upon but also the other side of I-5. Yes. There is noise but then you are increasing noise and air pollution. There has already been a large growth of urban development in Federal Way, so I hear from long term residents. I would hate for Federal Way to loose more of it's natural beauty as well. Then the construction and constant ongoing work at the Federal Way sites 336th & 344th would continue to disrupt the ecosystem around the facility, not to mention disrupt traffic and make it harder for travelers and commuters getting to and from Auburn. Also, why does the midway location cost more annually? I understand construction but not the ongoing cost. There is less track to the facility. Because it is further from the FW transit center? It would be closer to the Kent stations wouldn't it? Even so, I would rather have the extra cost to protect the community and the environment. Also, it seems excavation would be a safer option but I am not an engineer. But I do worry about employees working over a toxic ground. I would think with heat and other environmental changes the toxins could rise to the surface. Plus, wouldn't that be better if there is still shifting ground? Again I am not an engineer.

Laura Arnold (Communications ID 472331)		
Comment ID	**Comment Text**	**Response**
1	Although the projected cost and length of time are higher for the Midway facility, I believe this would be the best choice.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	There is a high number under represented residents and employees in this area and that needs to be acknowledged and considered strongly. What will happen to those displaced? Is there truly fair compensation that all of the residents and employees have a say in? Or is there any compensation? And that is a cost factor.	Appendix E, Environmental Justice Assessment, evaluates potential impacts to low-income and minority populations. As described in Appendix E and Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, of the 2023 Draft EIS and this Final EIS, Sound Transit would compensate all affected property owners according to the Sound Transit Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines and in accordance with state relocation and property acquisitions laws. Acquisition and relocation costs were included in the conceptual capital cost estimates described in the 2021 Draft EIS as shown in Table 2.6-1 in Section 2.6, Funding and Conceptual Cost Estimates and have been updated in Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives in the Final EIS. Employees of displaced businesses would not be directly compensated. If the displaced business relocated in the area, the employee could follow. If the business owner decides to relocate elsewhere or close their business, the employee would become unemployed.
3	Also, why does the midway location cost more annually? I understand construction but not the ongoing cost. There is less track to the facility. Because it is further from the FW transit center? It would be closer to the Kent stations wouldn't it?	The additional $1M in annual operations and maintenance cost for the Midway Landfill is discussed in the Executive Summary and Section 2.5, Funding and Opinion of Probable Cost, in the Final EIS. The higher cost is attributed to additional annual expenses to mitigate for potential risks posed by settlement and methane gas over the lifespan of the facility. It is also due to higher operating costs for the trains to deploy each morning before passenger service begins and return to the OMF each night after passenger service has shut down.

Laura Arnold (Communications ID 472331)		
Comment ID	**Comment Text**	**Response**
4	Also, it seems excavation would be a safer option but I am not an engineer. But I do worry about employees working over a toxic ground. I would think with heat and other environmental changes the toxins could rise to the surface. Plus, wouldn't that be better if there is still shifting ground?	If excavation of landfill materials is required, safety precautions including personal protective equipment, air monitoring, and other best practices would be employed to ensure the safety of workers on site. With excavation, landfill contaminants would be removed from the site and disposed of in a controlled manner limiting movement outside the landfill. The design of a platform over the landfill would use stabilization methods to prevent landfill settling. See Section 3.13, Hazardous Materials, in the Final EIS for additional information. An Environmental Protection Plan would likely be required to establish procedures to manage and monitor the waste excavation and handling process, including management of stormwater and landfill gas. In addition to continuous landfill gas management, measures would need to be established to prevent air intrusion into the landfill that could result in a landfill fire. A project-specific Health and Safety Plan would also be required and would include stipulations that construction workers who may be exposed to potentially hazardous substances would be required to obtain the appropriate level of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training.

Communication ID: 472332

OMF South DEIS OOH Comment 44

03/20/2021

Barbara Sperling

I strongly oppose either of the two sites located in Federal Way. Bringing such a site to the downtown area would destroy it. Who would want to come anymore. I certainly would not. It would uproot business, cost jobs and destroy homes. The level of traffic, during and after construction, caused by the site would have a horrible effect on traffic in the area. Property values nearby would plummet. It is past time that we stop putting money before people. The Midway Landfill may be more expensive financially, but it would destroy fewer lives and businesses and would leave Federal Way as city still worth living in. Putting this site in Federal Way would only drive people and businesses away.

Barbara Sperling (Communications ID 472332)		
Comment ID	**Comment Text**	**Response**
1	I strongly oppose either of the two sites located in Federal Way. Bringing such a site to the downtown area would destroy it. It would uproot business, cost jobs and destroy homes. The level of traffic, during and after construction, caused by the site would have a horrible effect on traffic in the area. Property values nearby would plummet.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Midway Landfill may be more expensive financially, but it would destroy fewer lives and businesses and would leave Federal Way as city still worth living in.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472333

OMF South DEIS OOH Comment 48

03/22/2021

Based on the information provided, I believe the most prudent option for the new OMF site is the Midway Landfill. It has the least impact on both the environment and people.

Anonymous (Communications ID 472333)		
Comment ID	**Comment Text**	**Response**
1	Based on the information provided, I believe the most prudent option for the new OMF site is the Midway Landfill. It has the least impact on both the environment and people.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472334

OMF South DEIS OOH Comment 47

03/22/2021

SE JONG KIM

I prefer midway landfill site because this option will have less environmental impact even though it takes more time to build and costs more. I need to prepare the future in long term. The landfill site is less congested as well at this point.

SE JONG KIM (Communications ID 472334)		
Comment ID	**Comment Text**	**Response**
1	I prefer midway landfill site because this option will have less environmental impact even though it takes more time to build and costs more. The landfill site is less congested as well at this point.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472335

OMF South DEIS OOH Comment 46

03/22/2021

David Lind

Big waste of taxpayer money, only to be built to increase the empires of the politicians, and the power they have, and the government. This does nothing for anyone else

David Lind (Communications ID 472335)		
Comment ID	**Comment Text**	**Response**
1	Big waste of taxpayer money, only to be built to increase the empires of the politicians, and the power they have, and the government. This does nothing for anyone else	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472336

OMF South DEIS OOH Comment 50

03/23/2021

Thomas Smiley

Based on cost alone I say either of the 2 federal way OMF are better with the S 344 st as best. Id be for either of the 2 Federal way ones as it would be better spaced for the whole south link system.

Thomas Smiley (Communications ID 472336)		
Comment ID	**Comment Text**	**Response**
1	Based on cost alone I say either of the 2 federal way OMF are better with the S 344 st as best. Id be for either of the 2 Federal way ones as it would be better spaced for the whole south link system.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472337

OMF South DEIS OOH Comment 49

03/23/2021

Christopher Ensor

I prefer the Midway option to both the Federal Way EIS options.   Although Midway will be more expensive and will cause more disruption during construction, it has less environmental impact and will not require the removal and replacement of any existing commercial and residential property. I believe these are the most important longer term issues. Please pick Midway! This is land that is not required for any alternative use and will otherwise not contribute to any environmental or economic solutions. Yes, more expensive, but please think longer term. The draft EIS shows this is the best choice.

Christopher Ensor (Communications ID 472337)		
Comment ID	**Comment Text**	**Response**
1	I prefer the Midway option to both the Federal Way EIS options. Although Midway will be more expensive and will cause more disruption during construction, it has less environmental impact and will not require the removal and replacement of any existing commercial and residential property.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472338

OMF South DEIS OOH Comment 54

03/24/2021

midway landfill its vacant and will not hurt local stores and homes

Anonymous (Communications ID 472338)		
Comment ID	**Comment Text**	**Response**
1	midway landfill its vacant and will not hurt local stores and homes	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472339

OMF South DEIS OOH Comment 53

03/24/2021

Daryl Wendt

S 336th St because of its ideal, and I don't want ppl to have to pay for extra charges for moving into a new storage facility because of our economy and folks that are broke

Daryl Wendt (Communications ID 472339)		
Comment ID	**Comment Text**	**Response**
1	S 336th St because of its ideal	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I don't want ppl to have to pay for extra charges for moving into a new storage facility because of our economy and folks that are broke	Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, of the 2023 Draft EIS and this Final EIS provides information on how Sound Transit would compensate all affected property owners according to the Sound Transit Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines and in accordance with state relocation and property acquisitions laws.

Communication ID: 472340

OMF South DEIS OOH Comment 52

03/24/2021

Ruth Strawser

Having read the Draft EIS for the Sound Transit OMF South project I respectfully submit my preferred alternative recommendation is the South 336th Street Alternative. My recommendation is based on total cost of the project and the construction duration both of which appear lowest in this alternative. In my view the Midway Landfill site alternative should be removed from any further consideration. The higher cost and construction make it unattractive as a taxpayer. The site leaves open too many open questions related to cost and design which will obviously equate to a higher overall project cost. I believe the remediation costs alone would seriously delay, or worse cancel, the project for too long a time period. And the liability for the site is just too high a risk. I understand the concerns expressed by the city of Federal Way related to the South 336th Street and the South 344th Street Alternatives, but in my view those can be more easily mitigated than what the Midway Landfill site might expose in terms of costs and mitigation. So finally I submit the South 336th Street Alternative should be the alternative selected for the Final EIS for the South OMF project. Thank you for allowing my recommendation to be submitted.

Ruth Strawser (Communications ID 472340)		
Comment ID	**Comment Text**	**Response**
1	Having read the Draft EIS for the Sound Transit OMF South project I respectfully submit my preferred alternative recommendation is the South 336th Street Alternative. My recommendation is based on total cost of the project and the construction duration both of which appear lowest in this alternative.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	In my view the Midway Landfill site alternative should be removed from any further consideration. The higher cost and construction make it unattractive as a taxpayer. The site leaves open too many open questions related to cost and design which will obviously equate to a higher overall project cost. I believe the remediation costs alone would seriously delay, or worse cancel, the project for too long a time period. And the liability for the site is just too high a risk.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472341

OMF South DEIS OOH Comment 51

03/24/2021

Dave Hackman

344th sounds best to me

Dave Hackman (Communications ID 472341)		
Comment ID	**Comment Text**	**Response**
1	344th sounds best to me	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

OPERATIONS & MAINTENANCE FACILITY SOUTH DRAFT EIS

ONLINE PUBLIC MEETING & HEARING

March 24, 2021

REPORTED BY: Thad Byrd, CCR
REPORTED ON: 3/24/21

WEDNESDAY, MARCH 24, 2021

6:45 p.m.

-- oo 0 oo --

GREG: Hello, my name is Greg, and my question is on noise mitigation and how much contribution we believe the light rail yard will contribute to the environment where we have multiple trains and sharp tracks as the train's coming in and out.

Do the wheels squeal? Are they unloading or disconnecting heavy equipment? I don't know. I worked in a facility down by Martin Luther King Way, the south end of Boeing Field.

There's kind of an S curve that the lightrail goes through. The train actually squeals. I know that Sound Transit works on it quite often trying to mitigate the noise, but I was wondering if that single train is similar to what we have.

It looks like about six tracks or a dozen tracks in the yard. What has the noise mitigation been or expectation?

I did print the draft and looked through it, and it looks like a very thorough job from what I can see. Both of them are good.

I guess my personal opinion would be the Midway Landfill would be the more logical site because it's been a problem, eyesore, what to do with the past landfill, what to do with it.

A plan of this scale would probably solve that, but the biggest concern I have is that there's a community college up there and a lightrail station.

In the future there's going to be a village area, and it'll probably be apartment housing. It's a good place for the city to develop around.

This might be the right thing, but if you have something that's going to create a lot of noise contributing to the school and everything else where people live there, maybe it's not a good idea.

LIZ MACK: Thank you, Greg. We'll move on to our next speaker, which is going to be Timothy.

TIMOTHY: Hello, I'm Tim, and I want to put in my vote for the Midway Landfill lot off of what was said previously here.

I think it is a place that is going to have the least effect on people because if we use the other two sites that are in Federal Way, there's going to be an effect on housing and there's going to be an effect on businesses.

Of course, housing is a huge issue, and for us to take away either one of the sites is going to remove a bunch of residential housing. We're going to be removing some businesses, especially in the 344th site. The least amount of personal effect or human effect is going to be with the Midway Landfill.

I understand the engineering issues with it. When it comes from an engineering standpoint, using either one, any one of the three different resolutions for the Midway Landfill, none of them sound really wonderful.

I get it, but we're not going to have also an environmental effect that hasn't already been done decades ago.

We're not going to have to deal with either of the streams like we're dealing with in the 344th or 336th Street site, and so this is why I'm voting for the Midway Landfill because of the least amount of personal and also environmental effects. Thank you.

MS. MACK: Thank you for your comment.

SUZANNE VARGO: This is Suzanne, and thank you so much. Having fought for the warehouser campus for the last five years, having been on it since I was six years old, having lived in this city for the last 55 years, have you guys taken into consideration your 75 truck trips plus the additional roughly 800 that the IRG businesses' warehouses will also be impacting on our area?

320th, Highway 18 are both at maximum failure and have been for many, many years. We don't seem to be getting any relief there, and I'm concerned that we in the south end are just not going to be able to function.

We are not going to be able to manipulate our city. Our traffic manager tells us the next 10 years in the City of Federal Way will be an absolute nightmare as he drops his head and shakes it.

I'm a little nervous, and he was just talking about our 320th with the Sound Transit facility going in over there, so I'm very concerned as a resident over here in the south end.

How we are going to function unless you have taken into consideration the other developments' plans in this area and the limited road availability that we have at this point?

We don't seem to have many places to go, so that's just one of my questions. I'll be talking to Paul I'm sure in the future about all sorts of great environmental stuff, so thank you so much you guys.

I really appreciate this, and I think this is a nice way to get things done, so thank you very much. May I just say go Midway Landfill?

LIZ MACK? Thank you.

MARGARET SIMMONS: Hi, there. It's Margaret. The name Mott MacDonald is the name of the company that I work for, so it just signed me in that way, so apologies for that.

I am a resident of Federal Way and actually an engineer, so I follow all this stuff and appreciate the opportunity here to make a few statements.

Contrary to the prior speakers, I do not support the use of the Midway Landfill. I have some knowledge about what the problems are that are being experienced by the Federal Way construction link extension construction right now, and the expense it's causing.

I believe that Sound Transit should not own the fact that the Midway Landfill is contaminated and the extra cost of hundreds of millions of dollars to mitigate the contamination that is at that site.

There are many projects that are vying for a limited amount of money at this point. We've talked about the realignment.

There's many other communities who need similar lightrail extensions without any sort of contributions from the City of Seattle, who owns that site or others who have responsibility for that site. I don't think we should be selecting that site. I think there are two other sites that are equally viable.

I do understand the motivation behind getting that site covered and into a more useful condition, but not to the expense of other projects and maybe even the significant delay in this project with the additional costs and the time that it would take to earn the revenue to be able to address it, so thank you.

LIZ MACK: Thank you for your comment. Our next speaker is going to be Susan Honda.

SUSAN HONDA: I just wanted to thank you for the opportunity to let people speak with you tonight. I wish this was in person, but it is what it is.

I also wanted to be on record that the city council voted to support the OMF South at the Midway Landfill. The city council has sent two letters to the Sound Transit board in support of that decision.

Members of the council have gone to board meetings to speak with Sound Transit in person when that was possible.

If this was to be built in Federal Way, we would lose housing. We would lose childcare, and we all know that with the pandemic, childcare has become a very real issue in which women, especially women have not been able to go to work because of lack of childcare.

We would lose businesses, and we have two businesses that we know may not be able to be replaced because it would be too difficult to find something that would be suitable for them to be rebuilt.

It would take away some money from our taxes here in Federal Way which support many, many things, and once again as a private citizen, I do support the Midway Landfill. I think it is the best site, and truly the only site that this should even be considered. Thank you very much.

LIZ MACK: Thank you for your comment. Our next speaker is Vic.

VIC: Thank you just for the opportunity here. I want to also share my opinion. I think that the Midway would make the most sense. I do appreciate some of the comments that it is a landfill. It would probably cost a lot to fix and to mediate.

At the same time that will have to be dealt with either way in the future, and I think that if you have a suitable site for such an operation as this, it would be great to take advantage of that to mediate at this time and to make things work.

I think it's also harder for the residents in the Federal Way site to have to deal with all these changes because now we are impacting homeowners and families who have to move out.

I personally have family there who are already retired, and it's very, very hard for them to be able to deal with this.

In addition, it is much easier I think to have the overall area pitch in in terms of taxes and any kind of costs that may be incurred versus having to impact and have all of this pressure weighed upon the shoulders of just a few families and a few businesses in that smaller area there. I thank you for the opportunity to share my opinion.

LIZ MACK: It looks like our next speaker will be Bill.

BILL: First time to use this Zoom system, so bear with me. Regarding the Midway Landfill, I'm also for that. My whole family's for that.

When I look at the projects that Sound Transit has in work, the extension to West Seattle, Issaquah and these other sites or locations, the costs on your documentation are way more than the Midway Landfill.

If the Midway Landfill does end up costing more than the Federal Way sites, you need to put it in perspective, but it's far below what you're spending on other projects.

You need to step back, look at big pictures. It's not like it's just ominous over all the other constructions.

By building at Midway Landfill, you add jobs to the south end, and you do not take the jobs away from the location in Federal Way. One of your features is, yes, we bring in jobs, but going to Federal Way, yes, you delete jobs.

You replace some of those with your facility, so overall benefit to the south end to add a large increase in jobs instead of subtracting some to add yours. Thank you.

(The public hearing was

adjourned at 7:31 p.m.)

STATE OF WASHINGTON)
) ss.
COUNTY OF KING   )

I, the undersigned Washington Certified Court Reporter, do hereby certify:

That the foregoing proceedings held on the date indicated on the caption sheet were reported stenographically by me and thereafter reduced to typewriting under my direction;

I further certify that the transcription is true and correct to the best of my ability.

Signed this 2nd day of April, 2021.

/s/ Thad E. Byrd

Washington Certified Court Reporter
CCR No. 2052

Greg Greenstreet (Communications ID 472435)

Greg Greenstreet (Communications ID 472435)		
Comment ID	**Comment Text**	**Response**
1	Hello, my name is Greg, and my question is on noise mitigation and how much contribution we believe the light rail yard will contribute to the environment where we have multiple trains and sharp tracks as the train's coming in and out. Do the wheels squeal? Are they unloading or disconnecting heavy equipment? I don't know. I worked in a facility down by Martin Luther King Way, the south end of Boeing Field. There's kind of an S curve that the lightrail goes through. The train actually squeals. I know that Sound Transit works on it quite often trying to mitigate the noise, but I was wondering if that single train is similar to what we have. It looks like about six tracks or a dozen tracks in the yard. What has the noise mitigation been or expectation?	An updated discussion of potential noise and vibration impacts from OMF South are discussed in Section 3.9, Noise and Vibration, and Appendix G2, Noise and Vibration Technical Report, in the Final EIS. The noise assessment evaluates the change in noise due to the project and is based on the existing noise levels in the environment before the project is introduced. It considers all noise sources within the OMF site, including train movements, vehicle washing, and vehicles entering/exiting from the mainline tracks. Sound Transit has committed to reducing any potential wheel squeal by installing wayside lubricators on tight radius curves for both the mainline track and within the OMF sites for all three build alternatives. Wheel squeal is discussed in more detail in Section 6.2 of Appendix G2, Noise and Vibration Technical Report. Noise mitigation is also discussed in Section 3.9.3 of the Final EIS and Section 8 of Appendix G2, Noise and Vibration Technical Report. No noise impacts were identified for operations within any of the three OMF South alternative sites. However, mitigation is recommended for LRV operation along the mainline track and for traffic noise as a result of modifications to the noise walls and berm adjacent to I-5.
2	I guess my personal opinion would be the Midway Landfill would be the more logical site because it's been a problem, eyesore, what to do with the past landfill, what to do with it.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Tim (Communications ID 472437)		
Comment ID	**Comment Text**	**Response**
1	I think it is a place that is going to have the least effect on people because if we use the other two sites that are in Federal Way, there's going to be an effect on housing and there's going to be an effect on businesses. Of course, housing is a huge issue, and for us to take away either one of the sites is going to remove a bunch of residential housing. We're going to be removing some businesses, especially in the 344th site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS provides updated information on potential displacements. Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, provides information on how Sound Transit would compensate all affected property owners according to the Sound Transit Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines and in accordance with state relocation and property acquisitions laws.
2	The least amount of personal effect or human effect is going to be with the Midway Landfill. I understand the engineering issues with it. When it comes from an engineering standpoint, using either one, any one of the three different resolutions for the Midway Landfill, none of them sound really wonderful.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Suzanne Vargo (Communications ID 472438)		
Comment ID	**Comment Text**	**Response**
1	Have you guys taken into consideration your 75 truck trips plus the additional roughly 800 that the IRG businesses' warehouses will also be impacting on our area? 320th, Highway 18 are both at maximum failure and have been for many, many years. We don't seem to be getting any relief there, and I'm concerned that we in the south end are just not going to be able to function.	The transportation analysis for OMF South does not use forecasts from specific businesses or developments. Rather, it estimates future traffic growth using a travel demand model that takes into account locally adopted land use plans throughout the region. The analysis applied the growth percentage and rerouted traffic based on roadway network changes necessary to access the proposed OMF South alternatives. Please see Final EIS Appendix G1, Transportation Technical Report, for more detail.
2	How we are going to function unless you have taken into consideration the other developments' plans in this area and the limited road availability that we have at this point?	Chapter 4 of the EIS considers the cumulative effects of OMF South with other proposed projects in the area. The list of other proposed projects was updated for the 2023 Draft EIS, which is reflected in this Final EIS. OMF South is not anticipated to result in cumulative impacts to traffic as described in Section 3.1, Transportation, of the Final EIS.
3	May I just say go Midway Landfill?	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Margaret (Communications ID 472440)		
Comment ID	**Comment Text**	**Response**
1	Contrary to the prior speakers, I do not support the use of the Midway Landfill. I have some knowledge about what the problems are that are being experienced by the Federal Way construction link extension construction right now, and the expense it's causing. I believe that Sound Transit should not own the fact that the Midway Landfill is contaminated and the extra cost of hundreds of millions of dollars to mitigate the contamination that is at that site. There are many projects that are vying for a limited amount of money at this point. We've talked about the realignment. There's many other communities who need similar lightrail extensions without any sort of contributions from the City of Seattle, who owns that site or others who have responsibility for that site. I don't think we should be selecting that site. I think there are two other sites that are equally viable.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Susan Honda (Communications ID 472441)		
Comment ID	**Comment Text**	**Response**
1	I also wanted to be on record that the city council voted to support the OMF South at the Midway Landfill. The city council has sent two letters to the Sound Transit board in support of that decision.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	If this was to be built in Federal Way, we would lose housing. We would lose childcare, and we all know that with the pandemic, childcare has become a very real issue in which women, especially women have not been able to go to work because of lack of childcare. We would lose businesses, and we have two businesses that we know may not be able to be replaced because it would be too difficult to find something that would be suitable for them to be rebuilt. It would take away some money from our taxes here in Federal Way which support many, many things, and once again as a private citizen, I do support the Midway Landfill.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Vic (Communications ID 472442)		
Comment ID	**Comment Text**	**Response**
1	I think that the Midway would make the most sense. I do appreciate some of the comments that it is a landfill. It would probably cost a lot to fix and to mediate. At the same time that will have to be dealt with either way in the future, and I think that if you have a suitable site for such an operation as this, it would be great to take advantage of that to mediate at this time and to make things work.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I think it's also harder for the residents in the Federal Way site to have to deal with all these changes because now we are impacting homeowners and families who have to move out.	Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS provides updated information on potential displacements. Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, provides information on how Sound Transit would compensate all affected property owners according to the Sound Transit Real Property Acquisitions and Relocation Policy, Procedures, and Guidelines and in accordance with state relocation and property acquisitions laws.
3	In addition, it is much easier I think to have the overall area pitch in in terms of taxes and any kind of costs that may be incurred versus having to impact and have all of this pressure weighed upon the shoulders of just a few families and a few businesses in that smaller area there.	Sound Transit is a regional agency funded partially by property taxes and car tab fees paid by property and vehicle owners in King, Pierce, and Snohomish counties.

Bill (Communications ID 472443)		
Comment ID	**Comment Text**	**Response**
1	Regarding the Midway Landfill, I'm also for that.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	When I look at the projects that Sound Transit has in work, the extension to West Seattle, Issaquah and these other sites or locations, the costs on your documentation are way more than the Midway Landfill. If the Midway Landfill does end up costing more than the Federal Way sites, you need to put it in perspective, but it's far below what you're spending on other projects.	The Link light rail extensions identified in the Sound Transit 3 Plan, including the extension to West Seattle and the extension from South Kirkland to Issaquah, include different project scope elements resulting in higher costs. For example, the extension from South Kirkland to Issaquah includes about 11.8 miles of mainline guideway and four stations. Due to this, the light rail extensions are anticipated to have higher costs than the OMF South alternatives.
3	By building at Midway Landfill, you add jobs to the south end, and you do not take the jobs away from the location in Federal Way. One of your features is, yes, we bring in jobs, but going to Federal Way, yes, you delete jobs. You replace some of those with your facility, so overall benefit to the south end to add a large increase in jobs instead of subtracting some to add yours.	Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS identifies estimated business and employee displacements for each of the alternatives. Some displaced businesses may choose to relocate in the same area, while others may not. Since the relocation decisions are determined by individual business owners, the EIS does not calculate a net job gain/loss.

OPERATIONS & MAINTENANCE FACILITY SOUTH DRAFT EIS

ONLINE PUBLIC MEETING & HEARING

March 30, 2021

REPORTED BY: Thad Byrd, CCR
REPORTED ON: 3/30/21

THURSDAY, MARCH 30, 2021

12:12 p.m.

-- oo 0 oo --

LIZ MACK: Our first speaker is Arnie.

ARNIE: One of the things I'm rather concerned about is the people that are affected by the EIS, especially the 346th area estimates do not seem to be a good way to share in how many jobs will be affected.

They grossly undercount some of the parcels that are there. They put a little asterisk by it and say 11, but that area has branched down.

There's 67 separate parcels in that property, and they're owned by different people and to lump them into one is really unconscionable.

The other thing I would say as far as the jobs, it says 470 new jobs. It really doesn't count all the jobs that are being lost, and that's why it's important to get an actual count done.

If they could include how many jobs are being lost, that benefits greatly the decrease for the number of jobs, and the tax base that is lost choosing either 336th or 348th is significant to the City of Federal Way.

I would just strongly encourage people, despite the problems, to use the Federal Way landfill for the OMF South.

LIZ MACK: Thank you for your comment, Arnie.

JEANNE BURBIDGE: I appreciate the opportunity to make a couple of comments. I noticed the concern about the additional cost for the Midway Landfill site.

However, there should be additional resources available because of the fact this is a Superfund site. There is something called Brownfield money that may be called something else now, but in the past has been used to address similar kinds of conditions of property that is virtually unusable for any purpose without improvements and dealing with the damage that has been done to that property through the landfill.

I believe that using the Midway Landfill site would actually have a double benefit in providing a very good location in terms of its accessibility and its lack of causing business displacement or social displacement or other kinds of environmental concerns and problems, whereas both of the Federal Way locations have been found to result in social concerns and displacements, residential displacements, business displacements, employee reductions and environmental concerns in terms of the wetlands in terms of the forest and in terms of the streams with the network that's very present throughout that area, so indeed my strong recommendation would be the Midway Landfill site. Thank you.

LIZ MACK: Thank you for your comments.

T. NEWBERRY: Thanks for this opportunity. I would just like to kind of say I think the Midway Landfill site probably does have a few things going for it without disrupting other folks and businesses. That's first and foremost.

I also wanted to comment or ask a question as to whether or not a waste conversion facility may have been thought about for this site, which may help clean up the site, create some economic opportunities possibly for Sound Transit, there being some definite benefits to the Kent and Federal Way areas and have the opportunity to create real sustainability, so I'm just wondering if that had been considered at all.

LIZ MACK: Great, thank you very much for your comment.

(The public hearing was
adjourned at 12:56 p.m.)

STATE OF WASHINGTON)
) ss.
COUNTY OF KING   )

I, the undersigned Washington Certified Court Reporter, do hereby certify:

That the foregoing proceedings held on the date indicated on the caption sheet were reported stenographically by me and thereafter reduced to typewriting under my direction;

I further certify that the transcription is true and correct to the best of my ability.

Signed this 2nd day of April, 2021.

/s/ Thad E. Byrd

Washington Certified Court Reporter
CCR No. 2052

Arnold Dewalt (Communication ID 472444)		
Comment ID	**Comment Text**	**Response**
1	They grossly undercount some of the parcels that are there. They put a little asterisk by it and say 11, but that area has branched down. There's 67 separate parcels in that property, and they're owned by different people and to lump them into one is really unconscionable.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The other thing I would say as far as the jobs, it says 470 new jobs. It really doesn't count all the jobs that are being lost, and that's why it's important to get an actual count done. If they could include how many jobs are being lost, that benefits greatly the decrease for the number of jobs, and the tax base that is lost choosing either 336th or 348th is significant to the City of Federal Way.	Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS describes impacts of displacement on tax base and identifies estimated business and employee displacements for each alternative. Some displaced businesses may choose to relocate in the same area, while others may not. Since the relocation decisions are determined by individual business owners, the EIS does not calculate a net job gain/loss.
3	I would just strongly encourage people, despite the problems, to use the Federal Way landfill for the OMF South.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Jeanne Burbidge (Communications ID 472445)		
Comment ID	**Comment Text**	**Response**
1	I noticed the concern about the additional cost for the Midway Landfill site. However, there should be additional resources available because of the fact this is a Superfund site. There is something called Brownfield money that may be called something else now, but in the past has been used to address similar kinds of conditions of property that is virtually unusable for any purpose without improvements and dealing with the damage that has been done to that property through the landfill.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I believe that using the Midway Landfill site would actually have a double benefit in providing a very good location in terms of its accessibility and its lack of causing business displacement or social displacement or other kinds of environmental concerns and problems, whereas both of the Federal Way locations have been found to result in social concerns and displacements, residential displacements, business displacements, employee reductions and environmental concerns in terms of the wetlands in terms of the forest and in terms of the streams with the network that's very present throughout that area, so indeed my strong recommendation would be the Midway Landfill site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

T Newberry (Communications ID 472446)		
Comment ID	**Comment Text**	**Response**
1	I would just like to kind of say I think the Midway Landfill site probably does have a few things going for it without disrupting other folks and businesses.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I also wanted to comment or ask a question as to whether or not a waste conversion facility may have been thought about for this site, which may help clean up the site, create some economic opportunities possibly for Sound Transit, there being some definite benefits to the Kent and Federal Way areas and have the opportunity to create real sustainability, so I'm just wondering if that had been considered at all.	Sound Transit was formed to provide regional transit. Waste conversion facilities are outside its mission.

From: Diana Mac [redacted]
Sent: Wednesday, March 31, 2021 2:20 PM
To: OMF South <OMFsouth@soundtransit.org>
Cc: [redacted]
Subject: Feedback

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

You have made yourself public enemy #1. I am no longer interested in any of your services.

Diana Mac (Communications ID 472536)		
Comment ID	**Comment Text**	**Response**
1	You have made yourself public enemy #1. I am no longer interested in any of your services.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Concerning the OMF South & S 344th St Federal Way

Cynthia [redacted]

Thu 4/1/2021 3:18 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

[redacted]

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Members of the Sound Transit Board,

I have read the Draft EIS Statement for your OMF South facility. Based on your research, selecting the S 344th Street site would eliminate over 248 jobs from the community, evict 3 churches, level more than 67 affordable homes, and erase 12 small businesses and the last industrial blue-collar jobs in Federal Way. Our community cannot afford to lose this neighborhood.

Please consider the other sites instead of this one. This is an easy choice, backed up by your data, that I expect you to make to benefit our community.

I believe the Midway Landfill would be the most appropriate site for a train yard. The site is already being used to build the infrastructure for the trains. It makes sense to continue to build up that site for the train yard and to not displace established neighborhoods, communities, homes and businesses.

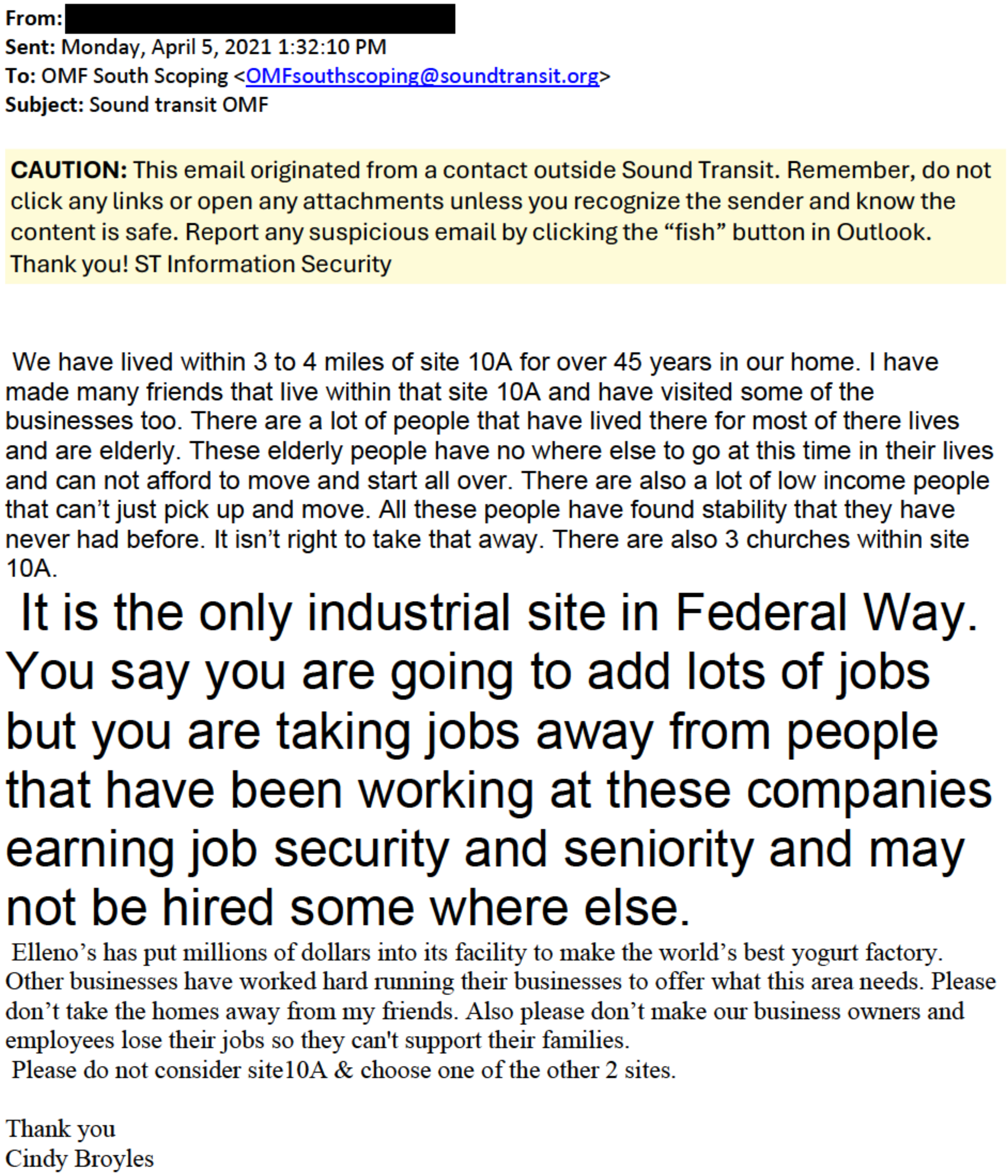
Thank you.

Cynthia Phillips

[redacted]

Sent from Xfinity Connect Application

Cynthia Phillips (Communications ID 472537)		
Comment ID	**Comment Text**	**Response**
1	I believe the Midway Landfill would be the most appropriate site for a train yard. The site is already being used to build the infrastructure for the trains.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.



From: [redacted]
Sent: Monday, April 5, 2021 1:32:10 PM
To: OMF South Scoping <OMFsouthscoping@soundtransit.org>
Subject: Sound transit OMF

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

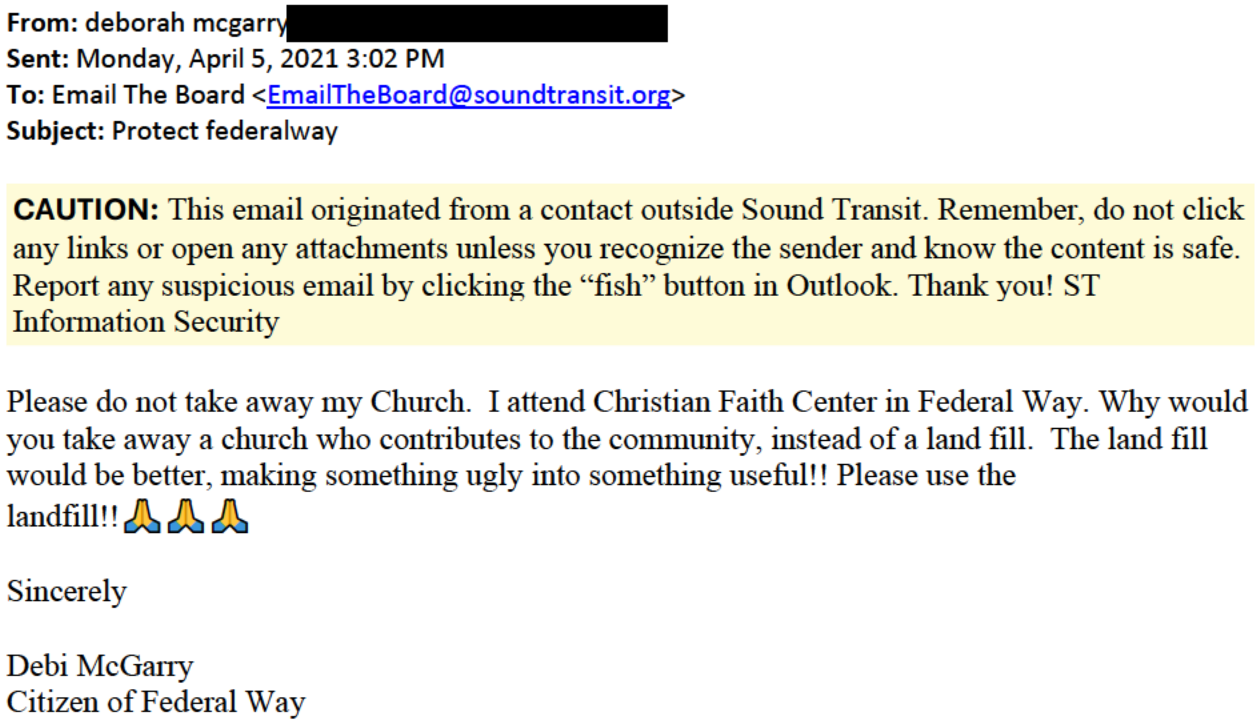
We have lived within 3 to 4 miles of site 10A for over 45 years in our home. I have made many friends that live within that site 10A and have visited some of the businesses too. There are a lot of people that have lived there for most of there lives and are elderly. These elderly people have no where else to go at this time in their lives and can not afford to move and start all over. There are also a lot of low income people that can't just pick up and move. All these people have found stability that they have never had before. It isn't right to take that away. There are also 3 churches within site 10A.

It is the only industrial site in Federal Way. You say you are going to add lots of jobs but you are taking jobs away from people that have been working at these companies earning job security and seniority and may not be hired some where else.

Elleno's has put millions of dollars into its facility to make the world's best yogurt factory. Other businesses have worked hard running their businesses to offer what this area needs. Please don't take the homes away from my friends. Also please don't make our business owners and employees lose their jobs so they can't support their families.
Please do not consider site10A & choose one of the other 2 sites.

Thank you
Cindy Broyles

Cindy Broyles (Communications ID 472538)		
Comment ID	**Comment Text**	**Response**
1	There are a lot of people that have lived there for most of there lives and are elderly. These elderly people have no where else to go at this time in their lives and can not afford to move and start all over. There are also a lot of low income people that can't just pick up and move. All these people have found stability that they have never had before. It isn't right to take that away. There are also 3 churches within site 10A.	Please see the response to Common Comment 2 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	It is the only industrial site in Federal Way. You say you are going to add lots of jobs but you are taking jobs away from people that have been working at these companies earning job security and seniority and may not be hired some where else. Elleno's has put millions of dollars into its facility to make the world's best yogurt factory. Other businesses have worked hard running their businesses to offer what this area needs.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	Please do not consider site10A & choose one of the other 2 sites.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.



From: deborah mcgarry [redacted]
Sent: Monday, April 5, 2021 3:02 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Protect federalway

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Please do not take away my Church. I attend Christian Faith Center in Federal Way. Why would you take away a church who contributes to the community, instead of a land fill. The land fill would be better, making something ugly into something useful!! Please use the landfill!!🙏🙏🙏

Sincerely

Debi McGarry
Citizen of Federal Way

Deborah McGarry (Communications ID 472726)		
Comment ID	**Comment Text**	**Response**
1	Please do not take away my Church. I attend Christian Faith Center in Federal Way. Why would you take away a church who contributes to the community, instead of a land fill.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The land fill would be better, making something ugly into something useful!! Please use the landfill!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Sheryl DeTray [redacted]
Sent: Thursday, April 8, 2021 1:11 PM
To: OMFSouthDEIS@soundtransit.org
Subject: Public comment on Light Rail South Maintenance Facility - Midway Landfill

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I am a resident of Federal Way and greatly concerned about the two alternatives for the LR South Operations and Maintenance Facility proposed for Federal Way. Both options will negatively impact the fragile Hylebos Creek and wetlands ecosystem. Negative environmental impacts affect the local acreage and all the way down the watershed to where it drains directly into the Puget Sound. Both Federal Way locations also displace numerous residential, business and worship centers. The Christian Life Center is a large facility and would be difficult to relocate.

The Midway Landfill alternative is the best choice because it is already publicly owned and mostly vacant. As a Superfund site, I know it will be more expensive and take longer to prepare the site, but it is an excellent use of such property. Additionally, no mainline track needs to be built or maintained.

Federal Way is looking forward to having Light Rail coming to our city, but we do not want the negative environmental and social costs that are proposed.

Please choose the Midway Landfill alternative for the South Operations and Maintenance facility.

Thank you,
Sheryl DeTray
[redacted]

Sheryl DeTray (Communications ID 472727)		
Comment ID	**Comment Text**	**Response**
1	I am a resident of Federal Way and greatly concerned about the two alternatives for the LR South Operations and Maintenance Facility proposed for Federal Way. Both options will negatively impact the fragile Hylebos Creek and wetlands ecosystem. Negative environmental impacts affect the local acreage and all the way down the watershed to where it drains directly into the Puget Sound.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Midway Landfill alternative is the best choice because it is already publicly owned and mostly vacant. As a Superfund site, I know it will be more expensive and take longer to prepare the site, but it is an excellent use of such property. Additionally, no mainline track needs to be built or maintained.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472732

OMF South DEIS OOH Comment 62

04/09/2021

Terri Tollie

After reading your three proposals I believe that the best solution and best choice for them would be the midway site because there's less people affected and less businesses affected. Thank you

Terri Tollie (Communications ID 472732)		
Comment ID	**Comment Text**	**Response**
1	After reading your three proposals I believe that the best solution and best choice for them would be the midway site because there's less people affected and less businesses affected.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472735

OMF South DEIS OOH Comment 61

04/09/2021

Becky Tougher

The 336th street site should be the selected site. The Midway Landfill site has the highest cost, highest probability of significant cost overruns due to unknowns regarding the landfill and the longest construction time. The 344th site displaces more businesses and employees along with more residential displacements. The impact to streams and wetlands is similar for the 336th and 344th sites. The 336th site has less of an impact on businesses and residents than the other options for approximately the same amount of money as the 344th site are the reasons for choosing the 336th site as the preferred site.

Becky Tougher (Communications ID 472735)

Comment ID	Comment Text	Response
1	The Midway Landfill site has the highest cost, highest probability of significant cost overruns due to unknowns regarding the landfill and the longest construction time.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The 344th site displaces more businesses and employees along with more residential displacements.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The 336th site has less of an impact on businesses and residents than the other options for approximately the same amount of money as the 344th site are the reasons for choosing the 336th site as the preferred site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472737

OMF South DEIS OOH Comment 60

04/09/2021

Arthur McIrvin

It appears that the midway site will have the least amount of disruption on peoples dwellings, businesses, the environment (Hylebos drainage system), and traffic flow in the city of Federal Way which also increases the carbon emissions. This is where I believe it should be built.

Arthur McIrvin (Communications ID 472737)		
Comment ID	**Comment Text**	**Response**
1	It appears that the midway site will have the least amount of disruption on peoples dwellings, businesses, the environment (Hylebos drainage system), and traffic flow in the city of Federal Way which also increases the carbon emissions.	Please see the responses to Common Comments 3 and 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472738

OMF South DEIS OOH Comment 59

04/09/2021

Bruce Honda

The human impact of placing the OMF in Federal Way will be devestating beyond any differences in cost to mitigate use of the Midway landfill site. As an engineer I seriously question the cost estimates as well as the potential to get federal super site funding. It could actually cost our taxpayers less in the long run. I would strongly recommend discussions with our Congressional delegation and even President Biden to include the Midway site in the Infrastructure Bill. Thank you

Bruce Honda (Communications ID 472738)		
Comment ID	**Comment Text**	**Response**
1	The human impact of placing the OMF in Federal Way will be devastating beyond any differences in cost to mitigate use of the Midway landfill site. I would strongly recommend discussions with our Congressional delegation and even President Biden to include the Midway site in the Infrastructure Bill	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472739

OMF South DEIS OOH Comment 58

04/09/2021

Susan Johnson

I believe that the Midway site is the best alternative, despite additional costs and time to construct. This landfill site is contaminated and a blight to S. King Co. The construction of an OMF site would bring the property up to its highest and best use without impacting the lives of King Co residents. Perhaps additional federal money could be accessed for this site.

Susan Johnson (Communications ID 472739)		
Comment ID	**Comment Text**	**Response**
1	I believe that the Midway site is the best alternative, despite additional costs and time to construct.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Perhaps additional federal money could be accessed for this site.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472740

OMF South DEIS OOH Comment 57

04/09/2021

Denali Pavlich-Wheeler

The Midway Landfill Alternative should be advanced as the preferred alternative site. The impact on the neighborhood and community members is much more favorable than removing neighbors from their homes at the other alternative sites.

Denali Pavlich Wheeler (Communications ID 472740)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill Alternative should be advanced as the preferred alternative site. The impact on the neighborhood and community members is much more favorable than removing neighbors from their homes at the other alternative sites.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 472741

OMF South DEIS OOH Comment 56

04/09/2021

AnnMichelle Hart

I propose taking the Church property. I will explain my thoughts and how I got to that decision: Of the three sites I favor the Landfill site but I'm concerned about the vast cost differential this site will require. San Diego has a runway on landfill so we know it can be done. I'm not sure post-pandemic our region can afford the extra cost. The industrial business loss to the City of Federal Way would be a huge impact - far beyond the dollars quoted. Those jobs will be lost, a number of the families probably would leave the city for jobs elsewhere. I'm not willing to take that chance. We need all the home-grown businesses we have. We are trying to end our legacy of being a just a bedroom community for other bigger cities like Seattle and Tacoma. That leaves the Church property. Christian Faith Center has moved a number of times in its existence. It can move again without harm to the church community. They will be compensated for the infrastructure and they are free to reinvest in other property. The true "church" is its people, its community of believers, not the building. Please, I urge you to take the Church property so as to do the least harm to our City.

AnnMichelle Hart (Communications ID 472741)		
Comment ID	**Comment Text**	**Response**
1	I propose taking the Church property.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Of the three sites I favor the Landfill site but I'm concerned about the vast cost differential this site will require. San Diego has a runway on landfill so we know it can be done. I'm not sure post-pandemic our region can afford the extra cost.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The industrial business loss to the City of Federal Way would be a huge impact - far beyond the dollars quoted. Those jobs will be lost, a number of the families probably would leave the city for jobs elsewhere. I'm not willing to take that chance. We need all the home-grown businesses we have. We are trying to end our legacy of being a just a bedroom community for other bigger cities like Seattle and Tacoma.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Comment on Maintenance Sight Selection

Bobl Dockstader [redacted]

Fri 4/9/2021 12:39 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

I believe that the only responsible option for Sound Transit's south maintenance facility is the Midway landfill sight. It minimizes commercial and residential disruption. Further, I understand that US Government funds are available for remediation of the site.

The Midway site is truly the responsible choice.

Robert A Dockstader

[redacted]

[Present and future light rail user]

Robert Dockstader (Communications ID 472818)		
Comment ID	**Comment Text**	**Response**
1	I believe that the only responsible option for Sound Transit's south maintenance facility is the Midway landfill sight.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Further, I understand that US Government funds are available for remediation of the site.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

South OMF Site

Michael Brugato [redacted]
Fri 4/9/2021 1:46 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Cc:Ferrell, Jim <Jim.Ferrell@cityoffederalway.com>;council@cityoffederalway.com <council@cityoffederalway.com>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Sound Transit is currently considering potential alternatives for the location of the new South Operations and Maintenance Facility (OMF). The focus seems to be narrowing on two of them: South 336th Street and South 344th Street. This, to me, appears a willful disregard to local area communities when a much more logical alternative exists: use of the Kent Midway Landfill site.

The 336th & 344th Street alternatives are detrimental to the local community with regard to housing and business displacement. The resulting disruption serves to negate much of the positive impact the OMF would have on providing more jobs to the area. Additionally, an OMF in the 336th or 344th Street sites would have a detrimental impact on Hylebos Creek. Building the OMF on the Midway Landfill site would eliminate displacement of residents and businesses further enhancing the OMF's benefits to local communities. Use of the landfill site returns a formerly polluted location to productive use instead of doing environmental harm to another area.

The Kent Midway Landfill Superfund Site has been deemed "Site Ready for Reuse and Redevelopment" since 2007. One of the goals of Superfund Cleanup is to return a site to productive use. What better use for this particular site? The eastern perimeter of the site is already being developed for the widening of I-5 and the Federal Way Link Light Rail Extension Project. To use the site to further support our region's transportation infrastructure by choosing it as the South OMF site is a logical next step.

Developing the Midway Landfill Superfund site will be more expensive in the short term, but the long term benefits brought about by added OMF jobs without disruption to local communities and their ecosystems is more than worth that cost.

Investing in the South OMF at the Kent Midway Landfill site now is not only the right thing to do, it is a social, economic and ecological imperative.

Michael Brugato (Communications ID 472819)		
Comment ID	**Comment Text**	**Response**
1	The 336th & 344th Street alternatives are detrimental to the local community with regard to housing and business displacement. The resulting disruption serves to negate much of the positive impact the OMF would have on providing more jobs to the area.	Please see the response to Common Comment 2 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Additionally, an OMF in the 336th or 344th Street sites would have a detrimental impact on Hylebos Creek.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	Developing the Midway Landfill Superfund site will be more expensive in the short term, but the long term benefits brought about by added OMF jobs without disruption to local communities and their ecosystems is more than worth that cost.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

South King County OMF Site - Kent Midway Landfill

Karen Brugato [redacted]

Fri 4/9/2021 4:21 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Cc:Shinbo Sandy <sandyshinbo@comcast.net>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

April 09, 2021

Dear Sound Transit,

Please consider using the Midway Landfill for your maintenance base. Reclaiming the land would benefit our entire area and show that you are indeed interested in the environment. The other two locations suggested would have a tragic impact on our little community and could possibly cause damage to the Hylebos Wetlands we have ferociously protected and cared for while developing the Federal Way community.

Please think of our children, our community, and our future. Choose the Midway Landfill.

Thank you,
Sandy Shinbo
[redacted]

Sandy Shinbo (Communications ID 472820)		
Comment ID	**Comment Text**	**Response**
1	Please consider using the Midway Landfill for your maintenance base. Reclaiming the land would benefit our entire area and show that you are indeed interested in the environment.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The other two locations suggested would have a tragic impact on our little community and could possibly cause damage to the Hylebos Wetlands we have ferociously protected and cared for while developing the Federal Way community.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Ken Broyles [redacted]
Sent: Monday, April 12, 2021 3:14 PM
To: omfsouthdeis@soundtransit.org
Subject: 344th Site

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Why is GarageTown on site 10A listed as one property when we have 57 owners that pay taxes on 67 garages? It seems very unfair with the numbers on the Draft EIS process. These garages are an extension to our homes. There are businesses operating within Garage Town also.

Best Regards, Kenneth Broyles

Ken Broyles (Communications ID 472853)		
Comment ID	**Comment Text**	**Response**
1	Why is Like a on site 10A listed as one property when we have 57 owners that pay taxes on 67 garages? It seems very unfair with the numbers on the Draft EIS process. These garages are an extension to our homes. There are businesses operating within Garage Town also.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Edward Etheridge [redacted]
Sent: Monday, April 12, 2021 3:11 PM
To: OMFSouthDEIS@soundtransit.org <OMFSouthDEIS@soundtransit.org>; emailtheboard@soundtransit.org
Subject: OMF South Train Yard belongs at the Kent Landfill

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

To whom it may concern:

The Sound Transit railyard belongs at the Kent Midway Landfill.

A mature Superfund landfill next to a busy freeway & major arterial (Pacific Highway South) will have no better opportunity for it to be repurposed in the foreseeable future.

Too contaminated for housing. Too close to the freeway for ball fields. Too small for a golf course (and too noisy). And course the poorly designed cap – shaped to save the PRPs money while limiting future use (which they have no interest in).

Putting the railyard at another location would repeat the eco-imperialism that brought forth this Superfund site to begin with – another example of Seattle (then city of Seattle, now Sound Transit) trying to export their problems to other cities will retaining the benefits for themselves.

The additional costs beyond what Sound Transit wants to pay should be the responsibility of the PRP (city of Seattle), the EPA, the Washington State Department of Ecology and the Washington State Department of Transportation who during the Superfund process helped create an unmanageable landfill cap to begin with.

Thanks,

Ted Etheridge

Sent from Mail for Windows 10

Edward Etheridge (Communications ID 472854)		
Comment ID	**Comment Text**	**Response**
1	The Sound Transit railyard belongs at the Kent Midway Landfill. A mature Superfund landfill next to a busy freeway & major arterial (Pacific Highway South) will have no better opportunity for it to be repurposed in the foreseeable future.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The additional costs beyond what Sound Transit wants to pay should be the responsibility of the PRP (city of Seattle), the EPA, the Washington State Department of Ecology and the Washington State Department of Transportation who during the Superfund process helped create an unmanageable landfill cap to begin with.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Sound Transit Location

tONI Findt [redacted]

Tue 4/13/2021 9:36 AM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

We believe that the Midway Landfill is the best location for this project. Give the unused property a purpose. Accessing super fund dollars for cleanup will lower costs.
The Midway Landfill needs to be cleaned . If not now for this project, later for some other and at a higher cost.
Midway Landfill location dose not disrupt our places of worship, jobs and green spaces we value so much !

Respectfully
Bruce and Toni Findt of Federal Way WA

Sent from my Verizon, Samsung Galaxy smartphone
Get Outlook for Android

Bruce Findt, Toni Findt (Communications ID 472933)		
Comment ID	**Comment Text**	**Response**
1	We believe that the Midway Landfill is the best location for this project. Give the unused property a purpose. Accessing super fund dollars for cleanup will lower costs. The Midway Landfill needs to be cleaned. If not now for this project, later for some other and at a higher cost.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Edward Miller [redacted]
Sent: Tuesday, April 13, 2021 10:16 AM
To: OMFSouthDEIS@soundtransit.org
Subject: Errors in the OMF South Draft EIS

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

The Draft EIS does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site.

The Garage Town facility at 2010 S 344th Street is a condominium consisting of 67 individually-owned tax parcels. The Draft EIS does not classify Garage Town owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels (even though occupants of a 4 plex were so counted). See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the entire South 344th Street Site. Garage Town alone has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS.

This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. These inaccuracies must be corrected before the final EIS is completed so that the true scope of the impact on the Federal Way community is known before the “preferred alternative” is selected.

In addition, there is no indication in the Draft EIS that there is NO other facility like Garage Town in the Puget Sound area. Relocation of those property owners is not feasible because there is NO equivalent facility for them to move into. Multiple businesses, landlords, and private owners would be eliminated from the community as a result. This adverse impact on the community should be clearly stated in the final EIS so that this undesirable outcome can be properly taken into account as the final siting decision is made.

Thank you for your attention in this matter.

Sincerely,
Edward C. Miller

Edward Miller (Communications ID 472935)

Comment ID	Comment Text	Response
1	The Draft EIS does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site. The Garage Town facility at 2010 S 344th Street is a condominium consisting of 67 individually-owned tax parcels. The Draft EIS does not classify Garage Town owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels (even though occupants of a 4 plex were so counted). See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the entire South 344th Street Site. Garage Town alone has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS. This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. These inaccuracies must be corrected before the final EIS is completed so that the true scope of the impact on the Federal Way community is known before the “preferred alternative” is selected.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	In addition, there is no indication in the Draft EIS that there is NO other facility like Garage Town in the Puget Sound area. Relocation of those property owners is not feasible because there is NO equivalent facility for them to move into. Multiple businesses, landlords, and private owners would be eliminated from the community as a result. This adverse impact on the community should be clearly stated in the final EIS so that this undesirable outcome can be properly taken into account as the final siting decision is made.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Yvonne Fors [redacted]
Sent: Tuesday, April 13, 2021 2:43 PM
To: OMFSouthDEIS@soundtransit.org
Subject: New Sound Transit Site

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

I am writing to ask that you take the Garage Town Site (S 344th site) off of your list of potential locations.

There are several reasons for this request as a life time resident in the Puget Sound area I have had to look at the Midway landfill and it would only make sense to use a location as the next Transit Site.

Not only is Garage Town a very new development, but it is a location that affects 58 households whether for business or personal use and would create a hardship for all owners to find a new location especially as construction costs have skyrocketed and property values have continued to go up.

From an economic reason Garage Town is the only site that provides real estate and other taxes (S 344th street has 109 tax parcels) compare to the landfill site and Christian Faith Center site that has exemptions.

Christian Faith Center has shown interest in selling their site and would make it a win win for both buyer and seller.

It does not make sense for Sound Transit to pick a location where people will be losing their jobs and businesses (S 344th Site) compared to two other locations (landfill and Christian Faith Center) that would not affect businesses and employment.

For these reasons, I believe it is very clear that the S 344th site should no longer be a consideration for the new Sound Transit Location.

Yvonne Fors
[redacted]

Yvonne Fors (Communications ID 472936)		
Comment ID	**Comment Text**	**Response**
1	I am writing to ask that you take the Garage Town Site (S 344thsite) off of your list of potential locations.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I have had to look at the Midway landfill and it would only make sense to use a location as the next Transit Site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Scott Carson [redacted]
Sent: Tuesday, April 13, 2021 10:25 AM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: Environmental Impact Statement Comments

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Good morning,

As a potentially affected property owner of the OMF South project I would like to offer a couple of comments/concerns relative to the recently released draft environmental impact statement. I will begin my comments by saying I believe the correct decision would be the Midway site. I fully recognize the potential issues associated with this site but also believe not all avenues associated with mitigation (such as state and/or federal support) have been investigated.

As a property owner affected by the 344th site, I am dismayed that we do not get included as affected property owners because we are "not residents". The 55 + owners of individual condominium garages in the GarageTown complex have, in fact, invested hundreds of thousands of dollars in their units and yet do not get represented as "affected". We pay property taxes on those units, we maintain them and conduct daily activities, in may cases, at those units. Those interests and investments are not addressed in the draft statements and that is grossly unfair to the affected owners.

The second concern I have as a resident of the Federal Way community is the very adverse impact the 344th site would have on the community. The draft document addresses the number of new jobs and the volume of activity the OMF would create. It does not address the very restricted access to the 344th site and the adverse impact to businesses in the area. The 334th site is the only one of the three sites that does not have direct access from Hwy 99. The access routes to the 344th site is via three two lane avenues. If the plan is to improve access, those costs should be included in the cost of developing the site and not added as an afterthought.

As has been stated in a number of public comments that I have made over the last two years or so, the impact to our community is not being adequately addressed. Neighborhoods are being directly affected by property condemnation, noise pollution, environmental challenges, and loss of small businesses which are the heart and sole of our community.

The Board has an opportunity to do the right thing for the long term benefit of the region by choosing to mitigate the Midway site and turn a community eyesore into productive real estate.

Thank you for taking the time to understand the Communities concerns and the concerns of the property owners that support this community.

Scott Carson

Sent from Mail for Windows 10

Scott Carson (Communication ID 473487)		
Comment ID	**Comment Text**	**Response**
1	I will begin my comments by saying I believe the correct decision would be the Midway site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I fully recognize the potential issues associated with this site but also believe not all avenues associated with mitigation (such as state and/or federal support) have been investigated.	Please see the responses to Common Comments 4 and 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	As a property owner affected by the 344thsite, I am dismayed that we do not get included as affected property owners because we are “not residents”. The 55 + owners of individual condominium garages in the GarageTown complex have, in fact, invested hundreds of thousands of dollars in their units and yet do not get represented as “affected”. We pay property taxes on those units, we maintain them and conduct daily activities, in may cases, at those units. Those interests and investments are not addressed in the draft statements and that is grossly unfair to the affected owners.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	The second concern I have as a resident of the Federal Way community is the very adverse impact the 344thsite would have on the community. The draft document addresses the number of new jobs and the volume of activity the OMF would create. It does not address the very restricted access to the 344thsite and the adverse impact to businesses in the area.	Section 3.2, Transportation, and Section 3.5, Economics, of the 2023 Draft EIS and this Final EIS discuss site access and business impacts for each alternative. The South 344th Street Alternative is not expected to increase traffic congestion to surrounding streets.
5	The 334thsite is the only one of the three sites that does not have direct access from Hwy 99. The access routes to the 344thsite is via three two lane avenues. If the plan is to improve access, those costs should be included in the cost of developing the site and not added as an afterthought.	The conceptual capital cost estimates for each alternative include necessary transportation infrastructure improvements for access to and surrounding the site.

From: Ron Anderson [redacted]
Sent: Wednesday, April 14, 2021 8:24 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Board members,

The Draft EIS does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site.

The Garage Town facility at 2010 S 344th Street is a condominium consisting of 67 individually-owned tax parcels. The Draft EIS does not classify Garage Town owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels (even though occupants of a 4 plex were so counted). See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the entire South 344th Street Site. Garage Town alone has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS.

This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. These inaccuracies must be corrected before the final EIS is completed so that the true scope of the impact on the Federal Way community is known before the "preferred alternative" is selected.

In addition, there is no indication in the Draft EIS that there is NO other facility like Garage Town in the Puget Sound area. Relocation of those property owners is not feasible because there is NO equivalent facility for them to move into. Multiple businesses, landlords, and private owners would be eliminated from the community as a result. This adverse impact on the community should be clearly stated in the final EIS so that this undesirable outcome can be properly taken into account as the final siting decision is made.

Thank you for your attention in this matter.

Sincerely,
Ron Anderson
Garage Town Federal Way Owner

Sent from Mail for Windows 10

Ron Anderson (Communications ID 473489)		
Comment ID	**Comment Text**	**Response**
1	The Draft EIS does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site. The Garage Town facility at 2010 S 344th Street is a condominium consisting of 67 individually-owned tax parcels. The Draft EIS does not classify Garage Town owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels (even though occupants of a 4 plex were so counted). See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the entire South 344th Street Site. Garage Town alone has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS. This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. These inaccuracies must be corrected before the final EIS is completed so that the true scope of the impact on the Federal Way community is known before the "preferred alternative" is selected.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	In addition, there is no indication in the Draft EIS that there is NO other facility like Garage Town in the Puget Sound area. Relocation of those property owners is not feasible because there is NO equivalent facility for them to move into. Multiple businesses, landlords, and private owners would be eliminated from the community as a result. This adverse impact on the community should be clearly stated in the final EIS so that this undesirable outcome can be properly taken into account as the final siting decision is made.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Suzanne Vargo [redacted]
Sent: Thursday, April 15, 2021 4:27 PM
To: OMF South <OMFsouth@soundtransit.org>; Susan Honda <Susan.Honda@cityoffederalway.com>; linda.kochmar@cityofederslway.com <linda.kochmar@cityofederslway.com>
Subject: O & M South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

I am looking to have a representative speak to me about alternative sites and environmental impacts.
Please return a phone call to [redacted]

Is Sound Transit SERIOUS about finding another OMF site other than the 2 in Federal Way?
What is the appeal process and fees for Sound Transit?
Will the link line be elevated as it travels south bound I-5 @ S. 336th St.?
When will the rezoning process begin? This is zoned as multifamily currently.
Is Sound Transit aware of the Concomitant Agreement that runs with the Christian Faith Center Property? Citizens have fought against thoughtless development, and upheld the CA. What enables Sound Transit to think they are above this document that runs into purtuity.?
The proposed 2 sites in FW lie within Major Streams. The Hylebos is listed as Class A waters under State water quality standards.
The western portion of the first site lies within a Resource Stream Protection Area. This area was significantly altered to accommodate the Church in 2007. Should we allow further destruction to these wetlands, and tributaries, when they have already sustained the maximum mitigations?

Is Sound Transit considering the cumulative impacts of not only an OMF, but the link line, as well as the development planned for the Weyerhaeuser Campus. Supreme Court ruled the City and IRG (owners of Campus) will utilize the Hylebos Watershed Plan and that all development be seen through cumulative eyes and the impacts to environment. The CFC property runs with a Concomitant Agreement. This document runs forever. How will Sound Transit go about opening up this agreement? The OMF is a part of that cumulative response. This area CAN NOT take any more pressure. i-5 and your link line will already cause significant problems, adding the 24/7 OMF site in this area will undoubtedly spell the end of the East Branch. How can ST justify this?

While this property lies just outside of the aquifer recharge area, the Milton Redondo resources are fed by groundwater runoff from Northlake (head waters) Weyerhauser Campus and Christian FC. there is a well head capture zone on what I believe is DOT property, (next to Ellenos Yogurt. Also this business is our largest employer in Federal Way. They have spent over 5 million dollars in upgrading their facility. We should not be forcing this business or any others out of their property.

Do we think it is a conflict of interest for Parametrix to do the survey work when they are the same company that did the work for the Christian Faith Center?

Two other sites were chosen in 2017 Fife and S. 352nd St. What happened to these sites? They are both landfills. If the Midway dump is being dangled to the citizens (and let's be honest here, Midway is NEVER going to happen.) Sound Transit needs 3 options and putting a non-viable site in front of the people when it is NOT an option is less than transparent. So, if we would entertain the Midway landfill in all the time and $$ it would take to create, why can't we clean up The Kits Corner Puyallup landfill or the Fife landfill and place your facility in either spot. King County should clean this up as it is toxic to the land and residents. Heck you could easily buy the LLOYDs landfill, not technically a landfill, but yes, it is) clean that up, and have great access for trains coming off of I-5. The property recently sold and 2 million sq. ft of warehouses will occupy the site. I think your impervious impact would be less. Another option.

In this climate when Sound Transit is deficient in funds, these spots would be far less expensive and costly to the environment. The Kits Corner/Puyallup landfill is very doable. Public records request show emails from Sound Transit individuals all saying that for 20 million they can make anything flat, the census is that ST can do whatever they choose. Don't tell the public theses are possibilities, and that ST is open to new sites if that is not the case. According to one of your representatives, I was told that there will be NO other options to entertain. Your website and zoom meeting, all said this is NOT a done deal, and you will look at any viable site. Knowing the history to this property is key. I know what has been done in the past, anymore development, especially of this size, would forever eliminate, the Hylebos East Branch. This simply stated, CAN NOT HAPPEN.
I know another option can be had. I am forwarding these emails to Federal Way Council persons so we are all aware of other possibilities for the South OMF site.
I would enjoy a knowledgable representative to reach out some urgency. With the public comment ending on the 19th, I know you will want to do your due diligence and provide the public with information requested.

Thank you for your time.

Suzanne
[redacted]

Suzanne Vargo (Communication ID 473494)		
Comment ID	**Comment Text**	**Response**
1	Is Sound Transit SERIOUS about finding another OMF site other than the 2 in Federal Way?	Sound Transit conducted an extensive alternative site assessment process in 2019 that resulted in the Sound Transit Board identifying the Midway Landfill, South 336th Street, and South 344th Street alternatives to study in the Draft EIS. More information can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).
2	What is the appeal process and fees for Sound Transit?	Sound Transit Resolution R2018-17 describes the agency's SEPA appeal process. Appeals must be filed in writing within 14 calendar days following the date the Final EIS is issued. The letter of appeal must be accompanied by a $200 fee.
3	Will the link line be elevated as it travels south bound I-5 @ S. 336th St.?	Under the current design, the mainline would be elevated along I-5 as it passes S 336th Street. See Figure ES-3 in the Final EIS Executive Summary.
4	When will the rezoning process begin? This is zoned as multifamily currently.	An Essential Public Facility is allowable under any zoning. As stated in Section 3.4, Land Use, of the 2023 Draft EIS and this Final EIS, OMF South is generally consistent with the city of Federal Way Comprehensive Plan as well as the intent of the zones that it would occupy within the footprints of the South 336th Street and South 344th Street alternatives. Sound Transit acknowledges that light rail transit facility uses are explicitly recognized only in the portion of the site zoned Commercial Enterprise (CE) and City Center Core (CC-E). Where the use is not explicitly recognized, Sound Transit will continue to meet zoning code and intent to the maximum extent practicable during the land use approval process.
5	Is Sound Transit aware of the Concomitant Agreement that runs with the Christian Faith Center Property? Citizens have fought against thoughtless development, and upheld the CA. What enables Sound Transit to think they are above this document that runs into perpetuity.?	Sound Transit is aware of the Concomitant Agreement and Development Agreement between the city of Federal Way and the Christian Faith Center for Development of Church and Private School. Sound Transit anticipates that a similar agreement would be developed with the city if OMF South is built in Federal Way.
6	The proposed 2 sites in FW lie within Major Streams. The Hylebos is listed as Class A waters under State water quality standards. The western portion of the first site lies within a Resource Stream Protection Area. This area was significantly altered to accommodate the Church in 2007. Should we allow further destruction to these wetlands, and tributaries, when they have already sustained the maximum mitigations?	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Suzanne Vargo (Communication ID 473494)		
Comment ID	**Comment Text**	**Response**
7	Is Sound Transit considering the cumulative impacts of not only an OMF, but the link line, as well as the development planned for the Weyerhaeuser Campus. Supreme Court ruled the City and IRG (owners of Campus) will utilize the Hylebos Watershed Plan and that all development be seen through cumulative eyes and the impacts to environment. The CFC property runs with a Concomitant Agreement. This document runs forever. How will Sound Transit go about opening up this agreement? The OMF is a part of that cumulative response. This area CAN NOT take any more pressure. i-5 and your link line will already cause significant problems, adding the 24/7 OMF site in this area will undoubtedly spell the end of the East Branch. How can ST justify this?	Chapter 4 of the Draft EIS considers the cumulative effects of OMF South with other proposed projects in the area. It was updated for the 2023 Draft EIS and again for the Final EIS. Sound Transit would likely enter into a new Development Agreement with the city of Federal Way in addition to obtaining the environmental and development permits and approvals necessary to construct the project if the Board selects either the Preferred Alternative or South 344th Street Alternative to be built. The purpose of an EIS is to identify and disclose the impacts a project has the potential to cause and identify measures to avoid and minimize those impacts, ensuring that environmental considerations are part of project planning.
8	While this property lies just outside of the aquifer recharge area, the Milton Redondo resources are fed by groundwater runoff from Northlake (head waters) Weyerhauser Campus and Christian FC. there is a well head capture zone on what I believe is DOT property, (next to Ellenos Yogurt.	The area described in the comment is part of the regulated area defined by the city of Federal Way 100-year wellhead capture zone and is discussed in Section 3.11, Water Resources of the 2023 Draft EIS and this Final EIS.
9	Do we think it is a conflict of interest for Parametrix to do the survey work when they are the same company that did the work for the Christian Faith Center?	Parametrix prepared the EIS for the Christian Faith Center in 2004. No conflict of interest was identified for the OMF South project.
10	Two other sites were chosen in 2017 Fife and S. 352nd St. What happened to these sites? They are both landfills. If the Midway dump is being dangled to the citizens (and let's be honest here, Midway is NEVER going to happen.) Sound Transit needs 3 options and putting a non-viable site in front of the people when it is NOT an option is less than transparent. So, if we would entertain the Midway landfill in all the time and $$ it would take to create, why can't we clean up The Kits Corner Puyallup landfill or the Fife landfill and place your facility in either spot. King County should clean this up as it is toxic to the land and residents. Heck you could easily buy the LLOYDs landfill, not technically a landfill, but yes, it is) clean that up, and have great access for trains coming off of I-5.	The 2019 OMF South Alternatives Evaluation Technical Memorandum discusses the reasons that various sites were discounted as viable alternatives for OMF South. (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).

"My name is Ben Gearford and my address is [redacted] and I think that you should choose the farthest South 344th Street location for an OMF South because it gets-us closest to Tacoma that's the most important it's got the least impact on wetlands and environment compared to the other two because I don't know if we wanna be digging up the dump and trucking it down the freeway for 6 1/2 years when we could be over and done with that and have a functioning OMF for a lot cheaper I don't know less urban place. I guess that's it. Thanks."

Ben Gearheard (Communication ID 473522)		
Comment ID	**Comment Text**	**Response**
1	I think that you should choose the farthest South 344th Street location for an OMF South because it gets-us closest to Tacoma that's the most important it's got the least impact on wetlands and environment compared to the other two because I don't know if we wanna be digging up the dump and trucking it down the freeway for 6 1/2 years when we could be over and done with that and have a functioning OMF for a lot cheaper I don't know less urban place	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Barry Warner [redacted]
Sent: Friday, April 16, 2021 12:53 PM
To: OMF South Scoping <OMFsouthscoping@soundtransit.org>
Subject: comment

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

For certain your staff has a difficult task in presenting an unbiased picture of the choices to the board. So what I say I say only to be certain that my view of the matter is clear.

1 In the executive summary it is said that GT (Garage Town Association) has 50 owners, which sounds to me like a large partnership, which it is not. GT's owners have title to individual units, and they pay the tax thereon. Yet, they are not counted as businesses or as residents in the EIC enumeration.

2 GT is a unique entity in Western Washington. The EIC acknowledges that resettling us will be difficult. I suspect that it will be nigh impossible..

3 The EIC also acknowledges that it will be difficult for Ellenos yogurt to survive relocation. While the pandemic continues to be a threat I would hope that Sound Transit would wish to minimize collateral damage.

4 Every jurisdiction needs its tax money. Of the three sites under review, only one pays significant taxes. Let it be.

5 Like every other public transportation system in the World, Sound Transit is suffering a lack of riders and revenue at this moment. What looks at first glance to be a weakness of the site in Kent: that it will take several more years to complete, may offer the chance to save money now..

Barry Warner (Communication ID 473534)		
Comment ID	**Comment Text**	**Response**
1	1 In the executive summary it is said that GT (Garage Town Association) has 50 owners, which sounds to me like a large partnership, which it is not. GT's owners have title to individual units, and they pay the tax thereon. Yet, they are not counted as businesses or as residents in the EIC enumeration.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

April 18, 2021

To: Sound Transit Board:

Subject: OMF South Best Option

To consider already developed sites containing business, churches, residences, and natural habitat for the OMF site is a counterproductive use of King County land. Public input in prior rounds of comments overwhelmingly supported using the Midway landfill site as the Prime Spot for this OMF facility. We The People - Tax Payers - Voters have made it clear to those we elected that Midway is our choice for OMF location. At this point that should be loud and clear to Sound Transit.

Regarding Midway site:

>> Public preferers using this site. Building at this location is done with consent of the electorate.

>> Business (jobs), churches, residences and natural habitat are not impacted.

>> Does not remove land availability from commercial/private use in an ever more densely populated

South King County. Therefore, is a better long-term stewardship of our finite land.

>> Places OMF immediately next to tracks already under construction. Supports fleet maintenance despite possible realignment and funding issues delaying expansion beyond Federal Way. Earlier start date possible.

>> Creates more south end jobs by not displacing those currently situated on Alternative Federal Way locations.

>> Cost delta between Midway and other projects is dwarfed compared to TDLE, Ballard, Everett, and Kirkland-Issaquah links costs.

>> Given lower revenues and higher costs focus on completing projects where dirt is currently being moved. Midway has equipment on site and freeway access. Build OMF there. It will support south end operations until such time it is financially feasible to expand south of Federal Way station.

Regarding South 344th Street site:

>> Business (jobs), churches, residences, natural habitat are impacted.

>> Ellenos Yogurt factory has approximately 150 employees, multi-millions of dollars in equipment and special licensing. Is the only industrial business in Federal Way.

>> Garage Town a community of 67 individually owned units (same as owning a condominium unit). Has modern substantial buildings including a clubhouse. They are used as extensions of households and to support businesses. Hence involves not just owners, units involve families/relatives and business owners/employees. Draft EIS does not classify Garage Town owners as commercial owners or residential owners. Only facility of its kind in western Washington.

>> Supports a broadcasting tower. Radio towers have certain land-configuration needs which must be addressed and special licensing.

>> This site is a hill with businesses and residences on all sides. Is not near level like other two sites.

>> Loss of existing family homes.

>> Loss of tax revenue for City of Federal Way and King County.

>> The City of Federal Way has conveyed to Sound Transit disapproval of any further acquisition of properties in their city. Loss of a portion of downtown retail acreage for rail station is plenty. Another municipality (Kent) would like to accommodate the OMF. Neither of the two Federal Way alternatives should be considered for use.

>> Loss of approximately 250 jobs. EIS needs to be updated to reflect the true facts on job losses.

Regarding both Federal Way sites:

>> Intersections supporting Interstate 5 access via South 320th and South 348th are very busy. Federal Way Police report that 348th & 16th Ave intersection is among busiest in the state. Increased traffic from construction will exacerbate this situation.

>> Those with connections to these sites are wearied from two years of OMF anxiety/suspense. Announcing selection of Midway site sooner rather than another year out will better serve these citizen's plans and nerves.

In closing:

Listen to the people's choice Sound Transit, the best land choice for the OMF is the Midway Landfill area. Will be a lot of unhappy voters out there if you choose otherwise.

Bill Pugnetti

Auburn and Federal Way, WA

Bill Pugnetti (Communication ID 473625)		
Comment ID	**Comment Text**	**Response**
1	Public input in prior rounds of comments overwhelmingly supported using the Midway landfill site as the Prime Spot for this OMF facility. We The People - Tax Payers - Voters have made it clear to those we elected that Midway is our choice for OMF location. Business (jobs), churches, residences and natural habitat are not impacted. Does not remove land availability from commercial/private use in an ever more densely populated South King County. Therefore, is a better long-term stewardship of our finite land. Places OMF immediately next to tracks already under construction. Supports fleet maintenance despite possible realignment and funding issues delaying expansion beyond Federal Way. Earlier start date possible. Creates more south end jobs by not displacing those currently situated on Alternative Federal Way locations. Cost delta between Midway and other projects is dwarfed compared to TDLE, Ballard, Everett, and Kirkland-Issaquah links costs. Given lower revenues and higher costs focus on completing projects where dirt is currently being moved. Midway has equipment on site and freeway access. Build OMF there. It will support south end operations until such time it is financially feasible to expand south of Federal Way station. Business (jobs), churches, residences, natural habitat are impacted. Ellenos Yogurt factory has approximately 150 employees, multi-millions of dollars in equipment and special licensing. Is the only industrial business in Federal Way. Garage Town a community of 67 individually owned units (same as owning a condominium unit). Has modern substantial buildings including a clubhouse. They are used as extensions of households and to support businesses. Hence involves not just owners, units involve families/relatives and business owners/employees. Draft EIS does not classify Garage Town owners as commercial owners or residential owners. Only facility of its kind in western Washington. Supports a broadcasting tower. Radio towers have certain land-configuration needs which must be addressed and special licensing.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Loss of tax revenue for City of Federal Way and King County. The City of Federal Way has conveyed to Sound Transit disapproval of any further acquisition of properties in their city. Loss of a portion of downtown retail acreage for rail station is plenty. Another municipality (Kent) would like to accommodate the OMF. Neither of the two Federal Way alternatives should be considered for use. Loss of approximately 250 jobs. EIS needs to be updated to reflect the true facts on job losses.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Bill Pugnetti (Communication ID 473625)		
Comment ID	**Comment Text**	**Response**
3	Intersections supporting Interstate 5 access via South 320th and South 348th are very busy. Federal Way Police report that 348th & 16th Ave intersection is among busiest in the state. Increased traffic from construction will exacerbate this situation.	Section 3.1, Transportation, and Appendix G1, Transportation Technical Report, in the 2023 Draft EIS and this Final EIS describe traffic impacts during construction and acknowledge that truck traffic would increase volumes at these intersections.

From: Peter Barbin [redacted]
Sent: Saturday, April 17, 2021 11:02 PM
To: OMFSouthDEIS@soundtransit.org
Subject: OMF South Draft EIS Flawed Data

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello Sound Transit,

Of the 3 OMF South locations, only one will have a negative impact on residential homes, businesses, living wage jobs, and tax revenues.

I ask that the S. 344th St / Site 10A not be selected.

From the beginning of the scoping process, data has been flawed as recognized on the record by Dave Upthegrove, Claudia Balducci, Joe Mcdermott, Dow Constantine, Bruce Dammeier, Nancy Backus, and Peter Von Reichbauer.

Here are some errors found in the Draft EIS Document...there may be more:

The Draft EIS does not correctly count the number of property owners and businesses that would be impacted by building the OMF S on the South 344th St. / Site 10A.

The Garage Town facility at 2010 S 344th Street is a condominium consisting of 67 individually-owned tax parcels. The Draft EIS does not classify Garage Town owners as commercial owners or residential owners and these individuals are not included in the count of property owners or parcels (even though occupants of a 4 plex were so counted). See Table ES-1 on page ES-17 of the Executive Summary. The table only shows 20 Residential and 11 Business Displacements for the entire South 344th Street Site. Garage Town alone has 67 separate individual Condominium parcels and owners. Also see Table 3.5-5 in the Draft EIS.

This inaccurate count distorts the true number of individuals impacted in the data for the South 344th Street site contained in the Executive Summary. These inaccuracies must be corrected before the final EIS is completed so that the true scope of the impact on the Federal Way community is known before the “preferred alternative” is selected.

In addition, there is no indication in the Draft EIS that there is NO other facility like Garage Town in the Puget Sound area. Relocation of those property owners is not feasible because there is NO equivalent facility for them to move into. Multiple businesses, landlords, and private owners would be eliminated from the community as a result. This adverse impact on the community should be clearly stated in the final EIS so that this undesirable outcome can be properly taken into account as the final siting decision is made.

These are the same inaccuracies communicated to the board when Dave Upthegrove, Claudia Balducci, Joe Mcdermott, Dow Constantine, Bruce Dammeier, Nancy Backus, and Peter Von Reichbauer were present for public comment. This is very disappointing.

There is a role for government and it is to raise us to a better place without negatively impacting the lives and jobs in our community.

I ask that you not select the South 344th St. / 10A Site because the data you are receiving is flawed, and the impact to our homeowners, businesses, and working wage jobs would be significant.

Sincerely,

Peter Barbin
[redacted]

Peter Barbin (Communication ID 473639		
Comment ID	**Comment Text**	**Response**
1	I ask that the S. 344th St / Site 10A not be selected.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Malcolm Klug [redacted]
Sent: Sunday, April 18, 2021 2:14 PM
To: OMFSouthDEIS@soundtransit.org
Subject: OMF South Draft Environmental Impact Statement comments

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello,

I am an owner of one of the units in the Garagetown (GT) complex which is part of the South 344th Street site being evaluated for the OMF South facility. My comments concerning the DEIS document and Executive Summary follow:

1) The DEIS did not include the 58 owners at GT as residential or business property owners. All 58 owners should be included as property owners. All 58 owners will be displaced if the S 344th site is chosen.

2) Table 3.3-2 in the DEIS should be changed to include an accurate count of the tax parcels. The S 336th site contains 19 tax parcels. The S 344th site contains 109 tax parcels. Each GT unit is a separate tax parcel.

3) The Midway landfill site is not on any tax rolls and its use would not negatively impact tax revenue for any of the surrounding communities.

4) The DEIS states, on Page 3.6-9: "The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared with the other build alternatives." This statement of fact was not in the Executive Summary and should be included.

5) Using the MIdway landfill site would displace the fewest number of businesses, churches and individuals. It also would have the lowest economic impact on the surrounding communities. If the S 336th site is chosen, 94 jobs will be lost. If the S 344th site is chosen, 248 jobs will be lost. These are the reasons I strongly urge and support the use of the Midway landfill site for OMF South.

Sincerely,

Malcolm L. Klug
[redacted]

Malcom Klug (Communication ID 473642)		
Comment ID	**Comment Text**	**Response**
1	The DEIS did not include the 58 GT owners as residential or business property owners. All 58 Garage Town owners should be included as property owners. All 58 owners will be displaced if the S 344th site is chosen.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Table 3.3-2 in the DEIS, should be changed to include an accurate count of the tax parcels. The S 336th site contains 19 tax parcels; The S 344th Street site contains 109 tax parcels. Each GT unit is a separate tax parcel.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The Midway landfill site is not on any tax rolls and its use would not negatively impact tax revenue for any of the surrounding communities.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	The Draft EIS states, on page 3.6-9: “The South 344th Street alternative would impact the most social resources and would have the greatest number of business and residential displacements as compared with the other build alternatives.” This statement of fact was not in the DEIS Executive Summary, and it should be included.	Table ES-1 in the Final EIS Executive Summary includes a comparison of key characteristics and impacts of all three build alternatives. Within the table, the Acquisitions subsection contains the total number of displaced businesses and residences, and the Environmental Justice, Social Resources, Community Facilities, and Neighborhoods subsection contains the number of displaced social and community resources. Additionally, Figure ES-9 and the associated Acquisitions, Land Use, and Economics text within Section ES.3, Comparison of Alternatives of the Executive Summary expands on these impacts.
5	Using the Midway landfill site would displace the fewest number of businesses, churches and individuals. It also would have the lowest economic impact on the surrounding communities. If the S 336th site is chosen, 94 jobs will be lost. If the S 344th site is chosen, 248 jobs will be lost. These are the reasons I strongly urge and support the use of the Midway landfill site for OMF South.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: James Haigh [redacted]
Sent: Sunday, April 18, 2021 9:12 PM
To: OMFSouthDEIS@soundtransit.org
Subject: Sound Transit Operations and Maintenance Facility South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Mr. Rehmat:

I understand that letters expressing opinions regarding the Sound Transit Operations and Maintenance Facility - South should be directed to you.

Having taken a look at DEIS comments on the topic, I hope that the Sound Transit Board chooses the Midway Landfill site for the new facility. It would be a great use of public resources to put to good public use a landfill site that is mostly vacant property. This use of property would be the best from an environmental perspective, since it puts to productive use, and cleans up, a historical environmental problem. The DEIS comments note that no wetlands or water sources would be adversely effected. Also, this site is best for people: it would preserve the most jobs, businesses, and residences.

The worst possible location is the South 344th Street site. I urge you not to select that site. Doing so would negatively affect the greatest number of businesses (and therefore employees), and residences (and therefore families) of Federal Way. It would also have the greatest negative effect on the tax base of Federal Way, resulting in increased costs for other residents of Federal Way.

I hope Sound Transit takes seriously its responsibility to be a good neighbor and to limit as much as possible the harm cause to people and the environment by the selection of the new OMF site. I’m confident that if Sound Transit does focus on that responsibility, it will select the mostly-empty Landfill site and avoid the South 344th Street site.

Thank you,

James Haigh

James Haigh (Communications ID 473671)		
Comment ID	**Comment Text**	**Response**
1	Having taken a look at DEIS comments on the topic, I hope that the Sound Transit Board chooses the Midway Landfill site for the new facility. It would be a great use of public resources to put to good public use a landfill site that is mostly vacant property.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The worst possible location is the South 344thStreet site. I urge you not to select that site. Doing so would negatively affect the greatest number of businesses (and therefore employees), and residences (and therefore families) of Federal Way. It would also have the greatest negative effect on the tax base of Federal Way, resulting in increased costs for other residents of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: gia haigh [redacted]
Sent: Monday, April 19, 2021 5:49 AM
To: OMFSouthDEIS@soundtransit.org
Subject: Sound Transit Maintenance Facility South

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

Dear Mr. Rehmat:

I write in support of the Sound Transit Board selecting the Midway Landfill site for its new maintenance facility. That site would be a great use of vacant property, would not harm the environment other than a small number of trees, would not cause anyone to lose their homes, would not cause anyone to lose their jobs, and would not cause Federal Way and other governments to lose needed tax revenue.

The second best option is the South 336th Street site because an old church facility can more easily be replaced than other facilities and Federal Way tax revenue, jobs and residences would not be adversely effected.

The worst option is the South 344th Street site, which would displace the greatest number of jobs, businesses, and residences, thereby significantly adversely affecting the tax base and people of Federal Way.

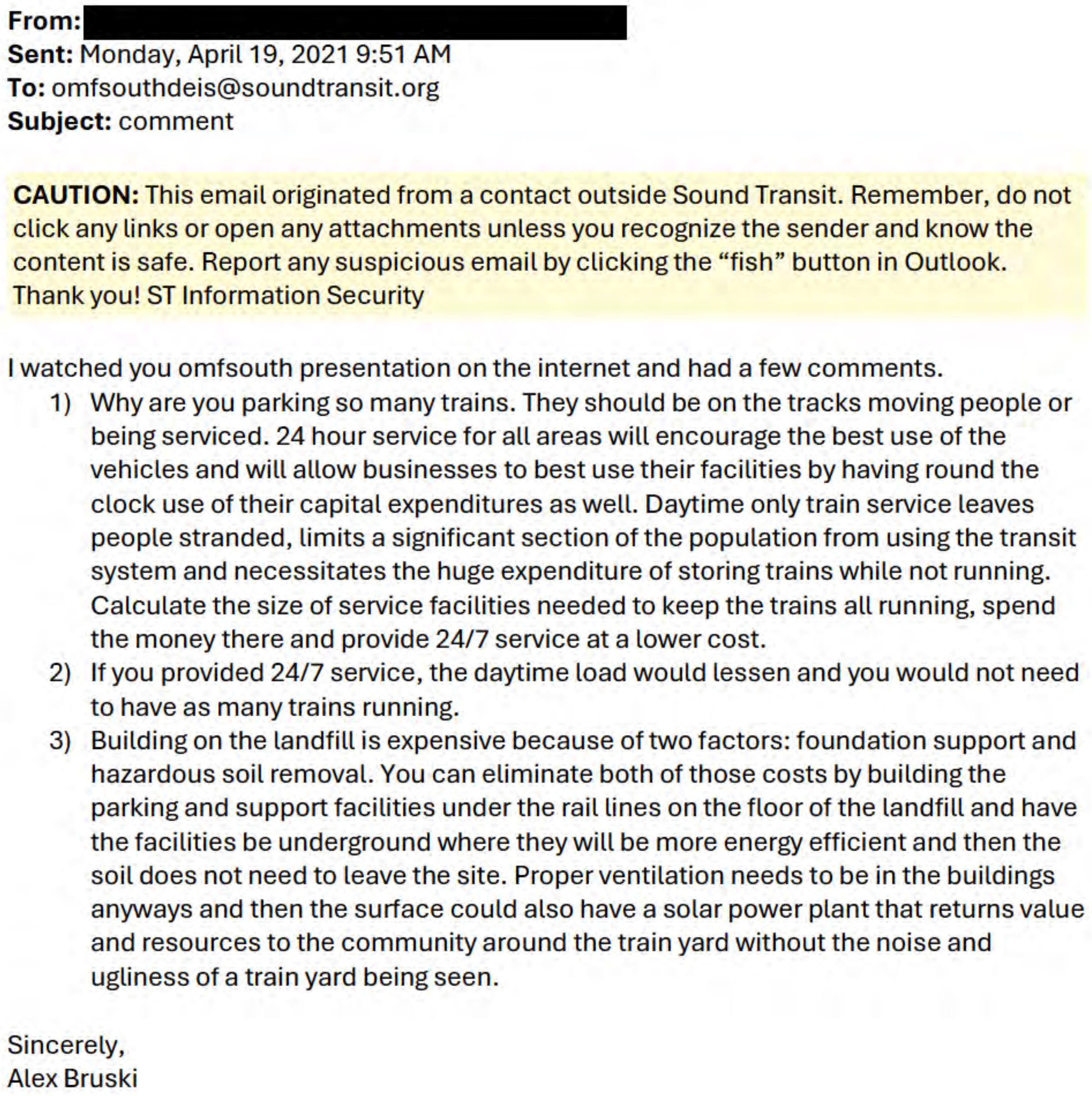
I hope the Sound Transit Board makes the right decision for people and for the environment and selects the Midway Landfill site, and avoids the South 344th St. site that would be by far the worst outcome for the businesses, employees, and residents of Federal Way.

Regards,

Gia Haigh

Gia Haigh (Communications ID 473685)

Comment ID	Comment Text	Response
1	I write in support of the Sound Transit Board selecting the Midway Landfill site for its new maintenance facility. That site would be a great use of vacant property, would not harm the environment other than a small number of trees, would not cause anyone to lose their homes, would not cause anyone to lose their jobs, and would not cause Federal Way and other governments to lose needed tax revenue.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The second best option is the South 336th Street site because an old church facility can more easily be replaced than other facilities and Federal Way tax revenue, jobs and residences would not be adversely effected.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The worst option is the South 344th Street site, which would displace the greatest number of jobs, businesses, and residences, thereby significantly adversely affecting the tax base and people of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.



From: [redacted]
Sent: Monday, April 19, 2021 9:51 AM
To: omfsouthdeis@soundtransit.org
Subject: comment

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I watched you omfsouth presentation on the internet and had a few comments.

1) Why are you parking so many trains. They should be on the tracks moving people or being serviced. 24 hour service for all areas will encourage the best use of the vehicles and will allow businesses to best use their facilities by having round the clock use of their capital expenditures as well. Daytime only train service leaves people stranded, limits a significant section of the population from using the transit system and necessitates the huge expenditure of storing trains while not running. Calculate the size of service facilities needed to keep the trains all running, spend the money there and provide 24/7 service at a lower cost.
2) If you provided 24/7 service, the daytime load would lessen and you would not need to have as many trains running.
3) Building on the landfill is expensive because of two factors: foundation support and hazardous soil removal. You can eliminate both of those costs by building the parking and support facilities under the rail lines on the floor of the landfill and have the facilities be underground where they will be more energy efficient and then the soil does not need to leave the site. Proper ventilation needs to be in the buildings anyways and then the surface could also have a solar power plant that returns value and resources to the community around the train yard without the noise and ugliness of a train yard being seen.

Sincerely,
Alex Bruski

Alex Bruski (Communication ID 473725)		
Comment ID	**Comment Text**	**Response**
1	Why are you parking so many trains. They should be on the tracks moving people or being serviced. 24 hour service for all areas will encourage the best use of the vehicles and will allow businesses to best use their facilities by having round the clock use of their capital expenditures as well. Daytime only train service leaves people stranded, limits a significant section of the population from using the transit system and necessitates the huge expenditure of storing trains while not running. Calculate the size of service facilities needed to keep the trains all running, spend the money there and provide 24/7 service at a lower cost.	A new OMF is needed in the South Sound to receive, test, commission, store, and service a larger train fleet to support future light rail extensions to Tacoma and West Seattle and throughout the region. An OMF is where LRVs go for necessary cleaning and care. Link light rail operates 20 hours a day and is closed from 1 to 5 a.m. except on Sundays, when service ends at midnight. These overnight closures are vital for maintaining the system and ensuring it is in good working order over the long run.
2	Building on the landfill is expensive because of two factors: foundation support and hazardous soil removal. You can eliminate both of those costs by building the parking and support facilities under the rail lines on the floor of the landfill and have the facilities be underground where they will be more energy efficient and then the soil does not need to leave the site. Proper ventilation needs to be in the buildings anyways and then the surface could also have a solar power plant that returns value and resources to the community around the train yard without the noise and ugliness of a train yard being seen.	Building and operating a below-grade OMF would be prohibitively expensive and pose concerns over worker safety and exposure to landfill gases.

Re: OMF South Scoping

[redacted]

Mon 4/19/2021 4:15 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

I am writing to you in opposition of the south sound OMF being built along/at 20th Ave S. or 16th Ave S. in Federal Way. Out of the three options available both of these options would create significant environmental, residential, business related impacts for our community. The current zoning at the Christain Faith Center is multi family. Zoning for the OMF would be Heavy Industrial Equipment. Heavy equipment zoning in not tolerated so close to the protected Hybelos Creek as it lies within a Resource Protection area. Both of the mentioned sites have portions Hylebos waterway within them. Federal Way has inventoried and classified these creeks as MAJOR STREAMS. The Hylebos is listed as Class A waters under State Water quality standards. Residential neighborhoods pre- existing the Business Park zoning in the area and has persisted as a single- family residential area for more than two decades. This also does not account for the residential areas near the proposed locations that would experience elevated levels of environmental pollution.

Ellenos Yogurt is the large employer in the city of Federal Way. The OMF would displace this business. This company has spent over 5 million dollars upgrading their facility in the last few years. They and the other surrounding businesses should not have to vacate, especially in today's climate, where small businesses are struggling to survive. We are proud of this local business and they have our full support. d

The collective impacts to businesses/residents in Federal Way from Sound Transit is extensive. The presence of your facilities/stations/lines/link should not be wherever one happens to be in Federal Way. Sound Transit please find another location for your OMF.

During the construction of the church in 2004, 35,936 sq. ft. of wetlands were displaced/filled in order to create the largest church campus in the state. This area is a part of the International Flight Pathway. Over 150 migratory birds depend on the Hylebos and the surroundings for rest, food and water. The Resource Protection area would be eliminated/buried if the link line is not elevated, as it is in direct line of the Hylebos. This land cannot tolerate any more abuses or alterations. The allotted percentage for this space to be developed, was taken 20 years ago. This land needs to remain as is.

The head waters for the East Branch of the Hylebos are received viaf North Lake less than 1/8 of a mile from this proposed site. These waters are paramount for downstream

juvenile salmon recovery. Macrobenthic invertebrate must travel freely along trees, rocks and water.   Culverting the Hylebos at this critical junction goes against the entire purpose of the Executive Proposed Hyebos and Lower Puget Sound Watershed Plan. This document created in the 1990’s is a roadmap for thoughtful development to the Hylebos. Allowing not only the link line, but the extra line of track to reach OMF, on top of an OMF, at either site in Federal Way is utterly mindboggling in regards to environmental impacts. The residents of Federal Way remember the planning process for the church, vividly!   It took 4 years to finally settle on a compromise and protections for the waterway. The citizens of Federal Way are not going to allow your facility to be built here. The once beautiful forest and its inhabitants was taken from us once. Any further manipulations to the property will destroy what is left of the wetland connectivity and water quantity in the East Branch of the Hylebos.
Sound Transit please find another location for your OMF.

The Midway Landfill is the most obvious choice and one I support. While the costs and time frame for construction are both higher than the Federal Way options, we (the smaller and greater community) are the reason the landfill is a landfill. Why not take the opportunity to invest in our environment and in our communities and give the landfill land a new purpose instead of passing the buck and significantly impacting yet another community. Or could you please revisit your #1 (S. 352nd St.) & #4 (Fife) site options that WERE discussed 2017?

Both of these options are landfills that received toxic dumping’s from Boeing and Ararco. Site #1 is an environmental nightmare because this land was never created to serve or function as a land fill, nor was this dumping site closed properly. The Petroleum pipeline that runs parallel with I-5, also runs through a portion of this land. This line was installed with NO protective barriers. The line now serves as a conduit for leachates, and aids their distribution into our aquifer/ Hylebos watershed.

Couldn’t this be a win win for the environment, residents and Sound transit?

The citizens of Federal Way have spent the last 5 years fighting to protect and preserve the former Weyerhaeuser Campus that lies just East of these proposed sites. We have fought against the unprecedented traffic impacts that will result if the Campus is fully built out. With Highway 18 and 320th St. at maximum failure today, the S. 336th St. offers residents a way to reach our city establishments. Supreme Court recently ruled the City of Federal Way and IRG WILL adhere to the Executive Proposed Hylebos Watershed Plan as well as view any developments through cumulative eyes in regards to environmental impacts. The church site demands this total lens as it is a part of the original Weyerhaeuser Campus/Forest. Our city is already being accommodating for the link line and transfer stations being built along 320th. How much more will Federal Way have to endure?

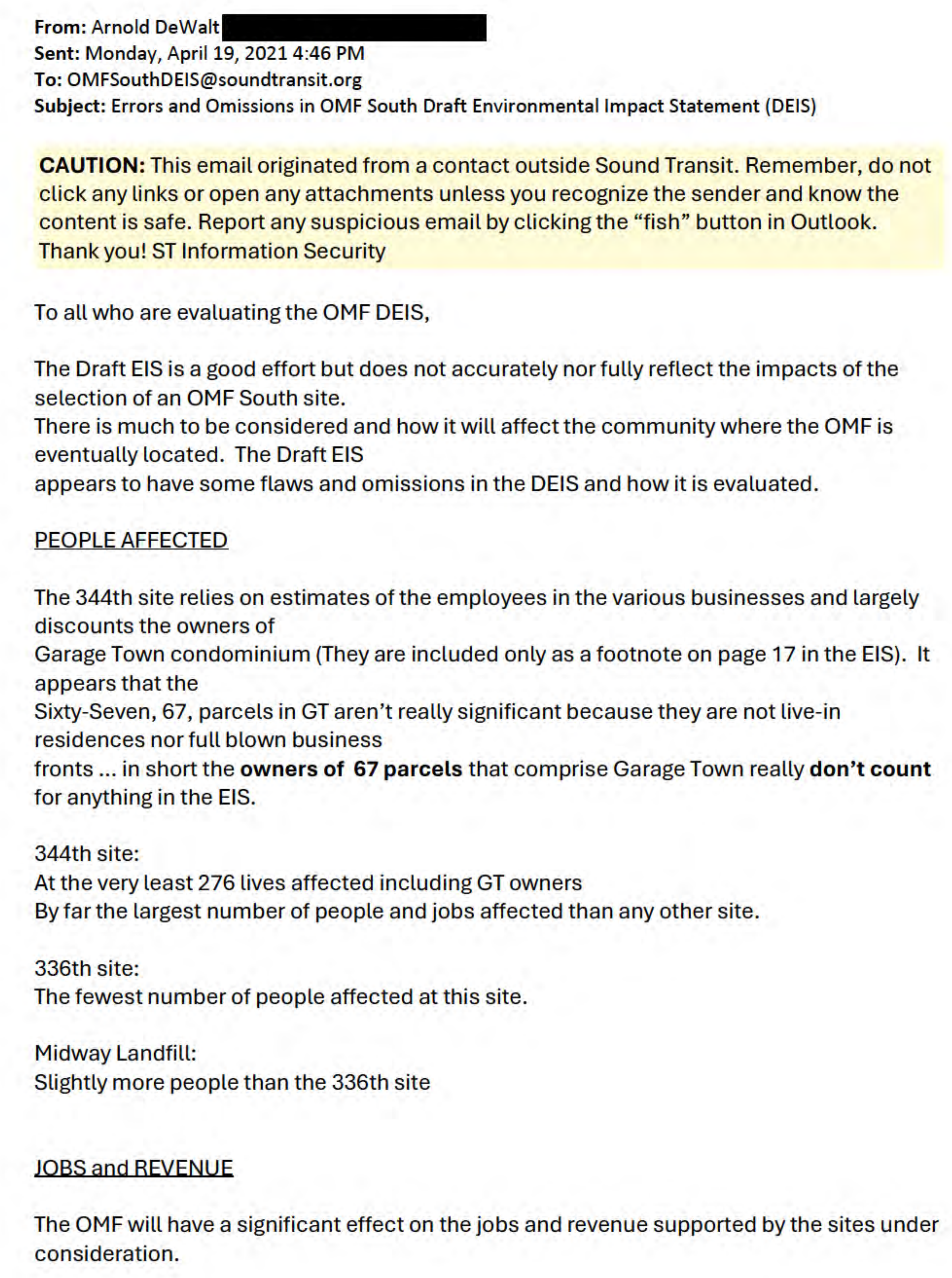
We will not allow Sound Transit to hold us hostage for the next 10 years. You must work with the citizens of Federal Way. Mayor Strong council leaves our Council members and citizens very little voice in how our city functions. Sound Transit is NOT the city of Federal Way and the citizens should be heard and respected as our concerns are valid.

You told citizens in print as well as at Zoom meeting, that this was not a done deal. One of your representatives along with FW council members have shared bluntly that the decision HAS been made to put the OMF at either FW sites. This certainly shows a serious conflict of interest and one that needs to made transparent to all going forward. Sound Transit is said to be misleading and confuses the public. For instance: staging public meetings and telling the public their input is needed and valued, only to find out events are for trivial items like art installations. Sound Transit then takes public input on Art and transfers that into dialogue and discussion on the important items like an OMF. Transparency is vital and should be upheld to the highest standards.
I am confident a better solution for your facility can and will be found. It will not be within the city limits.

Thank you for your time and thoughtful consideration.

Milana Michalek

Milana Michalek (Communications ID 473814)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill is the most obvious choice and one I support. While the costs and time frame for construction are both higher than the Federal Way options, we (the smaller and greater community) are the reason the landfill is a landfill.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.



From: Arnold DeWalt [redacted]
Sent: Monday, April 19, 2021 4:46 PM
To: OMFSouthDEIS@soundtransit.org
Subject: Errors and Omissions in OMF South Draft Environmental Impact Statement (DEIS)

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

To all who are evaluating the OMF DEIS,

The Draft EIS is a good effort but does not accurately nor fully reflect the impacts of the selection of an OMF South site.
There is much to be considered and how it will affect the community where the OMF is eventually located. The Draft EIS appears to have some flaws and omissions in the DEIS and how it is evaluated.

PEOPLE AFFECTED

The 344th site relies on estimates of the employees in the various businesses and largely discounts the owners of Garage Town condominium (They are included only as a footnote on page 17 in the EIS). It appears that the Sixty-Seven, 67, parcels in GT aren’t really significant because they are not live-in residences nor full blown business fronts … in short the **owners of 67 parcels** that comprise Garage Town really **don’t count** for anything in the EIS.

344th site:
At the very least 276 lives affected including GT owners
By far the largest number of people and jobs affected than any other site.

336th site:
The fewest number of people affected at this site.

Midway Landfill:
Slightly more people than the 336th site

JOBS and REVENUE

The OMF will have a significant effect on the jobs and revenue supported by the sites under consideration.

344th site:
How many jobs will be eliminated by the OMF if this site is chosen .... Many more than the estimate in the EIS,
especially if you count the people working for the businesses in Garage Town and surrounding areas. Sound Transit making a guess of how many jobs are affected is not a good way, when the demographics aren't a simple matter of assigning "x" jobs to this business and a "y" to that business and so on. What about the jobs that will be lost to outside companies that come in to support all the business and GT units.

GT is a concentration of taxable properties Together with the other properties this site generates twice the revenue of
the 336th site and over three times the revenue of the Midway Landfill site.

336th site:
A large portion of this site generates little revenue for the for King County and Federal Way.
Less than half of the344th site.

Midway Landfill
This site generate one-sixth of the revenue of the 344th site.

Although I am not a "resident" or operate a store front at this site I do pay approximately $3,000 every year to King County and Federal Way in property tax. I also concentrate a lot of my shopping in Federal Way because I often go to Garage Town to work on various projects. Multiply this by the the Garage Town owners and other businesses and by not choosing the Midway Landfill you will be denying a significant source of increasing revenue to King County, Federal Way and local businesses each and every year.

COSTS

In the long run the Midway Landfill is probably the cheapest alternative when you consider that the other two options take away hundreds of jobs and valuable tax base from the community forever, while the Midway Landfill takes away the least and adds the most in terms of jobs and mitigates the most environmental impact if done correctly. I don't feel enough emphasis has been given in the EIS to these costs to the community.

The long term benefits to choosing the landfill are enormous in terms of minimal environmental impact (not messing with forests and streams that would be best left alone). Using the Midway Landfill would help fix an existing environmental problem without creating new environmental concerns and ecological costs to the Federal Way Community.

ESTHETICS & ENVIRONMENT

Using either the 336th or 334th site would add an eye-sore to the Federal Way community, light pollution and noise pollution to the
community. Federal Way has precious few undisturbed habitats ... why disturb more ecological niches more by not using the Midway landfill. These Environmental problems can be avoided by choosing the Federal Way Landfill.

SUMMARY

While the DEIS appears to be impartial in its evaluation criteria, it seems that several important data and concerns have been downplayed or omitted in it. There are far more people than indicated in the DEIS that would have to be relocated were the 344th site be chosen, yet there is NO place to relocate to!

These is NO WHERE in King County to relocate a facility like Garage Town. Garage Town is an unique facility, with no peer in King County or any other surrounding county. Likewise Elenos Yogurt was specifically located where it is now because of the environment of the surrounding area, not just the property where it is located.

It's obvious the OMF Team has done its best to create a fair and balanced evaluation of the three sites being considered for the
OMF. However, I believe they have inadvertently overlooked some of the unique circumstances involved with the various properties, property owners and "resident" population. Just because people don't operate a business or live on their property, doesn't mean people aren't significantly affected by the decisions to be made about and have a vested the OMF South location.

Since the Midway Landfill is a "Superfund" site, it would appear that some funds might be available to help clean it up decreasing the estimated costs to Sound Transit significantly.

This e-mail is an attempt to bring some of these concerns and considerations to be included and properly weighed in the final EIS

Sincerely,

Arnold DeWalt

Arnold Dewalt (Communication ID 473818)		
Comment ID	**Comment Text**	**Response**
1	The 344th site relies on estimates of the employees in the various businesses and largely discounts the owners of Garage Town condominium (They are included only as a footnote on page 17 in the EIS). It appears that the Sixty-Seven, 67, parcels in GT aren't really significant because they are not live-in residences nor full blown business fronts … in short the owners of 67 parcels that comprise Garage Town really don't count for anything in the EIS.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	344th site: How many jobs will be eliminated by the OMF if this site is chosen …. Many more than the estimate in the EIS, especially if you count the people working for the businesses in Garage Town and surrounding areas. Sound Transit making a guess of how many jobs are affected is not a good way, when the demographics aren't a simple matter of assigning "x" jobs to this business and a "y" to that business and so on. What about the jobs that will be lost to outside companies that come in to support all the business and GT units. GT is a concentration of taxable properties. Together with the other properties this site generates twice the revenue of the 336th site and over three times the revenue of the Midway Landfill site.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	In the long run the Midway Landfill is probably the cheapest alternative when you consider that the other two options take away hundreds of jobs and valuable tax base from the community forever, while the Midway Landfill takes away the least and adds the most in terms of jobs and mitigates the most environmental impact if done correctly. I don't feel enough emphasis has been given in the EIS to these costs to the community.	Section 3.4, Economics, of the 2023 Draft EIS and this Final EIS compares the potential job displacement and tax base impacts associated with each alternative. Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, discusses potential impacts to communities.
4	Using either the 336th or 334th site would add an eye-sore to the Federal Way community, light pollution and noise pollution to the community. Federal Way has precious few undisturbed habitats … why disturb more ecological niches more by not using the Midway landfill. These Environmental problems can be avoided by choosing the Federal Way Landfill.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
5	These is NO WHERE in King County to relocate a facility like Garage Town. Garage Town is an unique facility, with no peer in King County or any other surrounding county. Likewise Elenos Yogurt was specifically located where it is now because of the environment of the surrounding area, not just the property where it is located.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.
6	Since the Midway Landfill is a "Superfund" site, it would appear that some funds might be available to help clean it up decreasing the estimated costs to Sound Transit significantly.	Please see the response to Common Comment 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Paula Baerenwald [redacted]
Sent: Monday, April 19, 2021 10:46 PM
To: OMFSouthDEIS@soundtransit.org
Subject: OMF facility

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello,

My name is Paula Baerenewald. I am a 23-year resident of Federal Way. I am strongly opposed to the OMF facility being built anywhere but the Superfund site. Building the OMF on any of the other proposed sites would be extremely disruptive to businesses that have decided to call Federal Way home. Cities in South West King County have the lowest socioeconomic status in King County. In order to lift South West King County up, and create economic diversity, we need to boost economic development not destroy it. Destroying businesses for the OMF will cause them to leave South West King County and will be counter-productive to our goal of economic improvements. Destroying businesses in South West King County will disproportionately impact the lowest-wage earners, earners who live and work in Federal Way, many of whom are people of color. To mitigate the economic impact to the lowest wage earners, Sound Transit needs to find a site with the least economic impact on the community.

While I have heard that the Superfund site would be more expensive to build on, it will have the least impact on existing Federal Way businesses and therefore on Federal Way's economic base. The Superfund site is the most useful for the OMF and construction on Superfund sites for the greater good of a community is not a novel concept. One of the most successful Superfund Re-purposing projects has been the Ruston Waterfront project in Tacoma as an example. Re-purposing one of the Midway Landfills, which are capped Superfund sites, is not new in WA state as there are many such projects where community improvements have been built upon capped sites. In this link below, you will be able to read about a variety of successful uses for Superfund Sites across the nation and you can read specifically about capped sites. https://www.epa.gov/superfund-redevelopment-initiative/superfund-site-use-spotlights

Building on the Midway Landfill site is the most desireable and makes the most sense so not to have a disproportionate impact on the Federal Way community, the part of South West King County that needs the most economic development to lift up South West King County's lowest income earners. It was reported that you anticipate that there may be problems with development of the Midway Landfill that may delay your opening in 2026. For this reason, I urged you to begin working on taking care of the EPA issues early on in this process. About 2-3 years ago. If you did not, then there I believe that this midway landfill was not really a choice. In fact it was presented as a false choice, a decoy. There is precedent for developments of these capped Superfund sites. You can do it. Preserve the businesses of South West King County. Preserve the potential for improved economic development. Develop the Superfund site for the greater good of our struggling community. If you can not, I urge you instead to re-consider your previous options #1 and #4 that you presented in 2017. Show South West King County, its businesses, its employees and residents that they are an important part of the future of the Puget Sound with your thoughtful action on this request.

Regards,
Paula Baerenwald

Sent from Yahoo Mail for iPhone

Paula Baerenwald (Communications ID 473820)		
Comment ID	**Comment Text**	**Response**
1	I am strongly opposed to the OMF facility being built anywhere but the Superfund site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Building the OMF on any of the other proposed sites would be extremely disruptive to businesses that have decided to call Federal Way home. Cities in South West King County have the lowest socioeconomic status in King County. In order to lift South West King County up, and create economic diversity, we need to boost economic development not destroy it. Destroying businesses for the OMF will cause them to leave South West King County and will be counter-productive to our goal of economic improvements. Destroying businesses in South West King County will disproportionately impact the lowest-wage earners, earners who live and work in Federal Way, many of whom are people of color. To mitigate the economic impact to the lowest wage earners, Sound Transit needs to find a site with the least economic impact on the community.	When developing the OMF South alternatives, Sound Transit used several measures to avoid and minimize potential property impacts, including business displacements. Section 3.5, Economics, of the Draft EIS and this Final EIS describes the impacts to businesses and employees for each build alternative. For all build alternatives, the estimated number of displaced employees is small compared with the employment base in the study area. These estimates do not necessarily reflect job losses in the region because some businesses may choose to relocate in the area. As discussed in Section 3.3, Acquisitions, Displacements, and Relocations, of the 2023 Draft EIS and this Final EIS, Sound Transit would provide relocation assistance to displaced businesses. While relocation is up to the individual business owner, the relocation analysis found that adequate commercial and industrial spaces are available to relocate displaced businesses.
3	Re-purposing one of the Midway Landfills, which are capped Superfund sites, is not new in WA state as there are many such projects where community improvements have been built upon capped sites. In this link below, you will be able to read about a variety of successful uses for Superfund Sites across the nation and you can read specifically about capped sites. https://www.epa.gov/superfund-redevelopment-initiative/superfund-site-use-spotlights	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	If you can not, I urge you instead to re-consider your previous options #1 and #4 that you presented in 2017.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

EIS Draft needs correct some numbers

Ken Broyles [redacted]

Sat 4/17/2021 10:45 AM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I looked over the Draft EIS & it does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site. I not sure why because Sound Transit send out fliers to all of the 67 owners & businesses within GarageTown.

Even at the 1st meeting I went to back in 2019 Sound Transit said on the 344th site there were only 35 residents & businesses that would be effected if the OMF was built on site. When an owner at GarageTown got up to speak for the 3 minutes and said I'm not sure where you came up with that 35 number because we have 67 units that pay taxes ever year on their owned property at GarageTown.

I just want the EIS daft to be fair and accurate. Hopefully this mistake can be fixed in the draft before it is put up to a vote by the board members of Sound Transit.

I have looked all over to try & find a similar facility in Western Washington to buy & move if my garage to if Sound Transit decided to build the OMF on the 344th site. I have not been able to find anything similar.

Best Regards, Kenneth Broyles

Ken Broyles (Communications ID 473888)		
Comment ID	**Comment Text**	**Response**
1	I looked over the Draft EIS & it does not correctly count the number of property owners and businesses that would be impacted by building the OMFS on the South 344th site. I not sure why because Sound Transit send out fliers to all of the 67 owners & businesses within GarageTown.	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

From: Tylerrb14[redacted]
Sent: Monday, April 19, 2021 7:09 PM
To: Email The Board <EmailTheBoard@soundtransit.org>
Subject: OMF SITE

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Board Members,

I just would like to let you know you need to choose another site for your OMF and leave the 344th site alone. My brother and I have spend a lot of time at my Grandpa's garage learning how to use tools and work on projects. My Grandpa told me that when he was growing up there were classes in school to teach woodworking, metal shop, welding automotive classes. He has taught us so much and we love going there to learn. Also there are a lot of new friends and neighbors that we have met over the years at the 344th site. So please consider one of the other 2 sites for the OMF and leave my Grandpa's garage alone. We have a lot more to learn because schools don't offer classes like this anymore.

Thank you, Tyler Broyles

Tyler Broyles (Communications ID 473891)		
Comment ID	**Comment Text**	**Response**
1	I just would like to let you know you need to choose another site for your OMF and leave the 344th site alone.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474296

OMF South DEIS OOH Comment 55

04/09/2021

Deidre Daly

We strongly support the Midway landfill alternative!!

Deidre Daly (Communications ID 474296)		
Comment ID	**Comment Text**	**Response**
1	We strongly support the Midway landfill alternative!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474297

OMF South DEIS OOH Comment 63

04/10/2021

I think the best site is Midway Landfill. It would have the least impact on adjacent communities.   Added cost to cleanup the landfill are appropriate for this type of project.

Anonymous (Communications ID 474297)		
Comment ID	**Comment Text**	**Response**
1	I think the best site is Midway Landfill. It would have the least impact on adjacent communities. Added cost to cleanup the landfill are appropriate for this type of project.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474298

OMF South DEIS OOH Comment 65

04/11/2021

Anna Patrick

I strongly oppose both Federal Way sites in favor of the Midway Landfill Full Excavation alternative. The full excavation appears to be the least expensive of the options at the landfill. The only reason provided in the draft EIS not to build on the Midway Landfill is the higher cost. With the increasing economic division across the county, Federal Way cannot afford to lose jobs, homes, community connections, and funding from property tax revenue. It is time that King County invest in the south end of the county. The impacts to our wetlands and streams are an important and lasting environmental impact as well. The cost to our community long term of putting the OMF South in Federal Way could be far greater than the immediate expense consideration. If the funds are not immediately available, I would hope that there could be Federal Grand funding for the superfund site or other sources of funding that are unique to this site. Building the OMF site in Federal Way is not an equitable option and the Midway site is a win-win for all communities and worth the investment for our communities.

Anna Patrick (Communications ID 474298)		
Comment ID	**Comment Text**	**Response**
1	I strongly oppose both Federal Way sites in favor of the Midway Landfill Full Excavation alternative. The full excavation appears to be the least expensive of the options at the landfill. The only reason provided in the draft EIS not to build on the Midway Landfill is the higher cost.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	With the increasing economic division across the county, Federal Way cannot afford to lose jobs, homes, community connections, and funding from property tax revenue. It is time that King County invest in the south end of the county. The impacts to our wetlands and streams are an important and lasting environmental impact as well. The cost to our community long term of putting the OMF South in Federal Way could be far greater than the immediate expense consideration. If the funds are not immediately available, I would hope that there could be Federal Grand funding for the superfund site or other sources of funding that are unique to this site. Building the OMF site in Federal Way is not an equitable option and the Midway site is a win-win for all communities and worth the investment for our communities.	Please see the response to Common Comments 3, 4, and 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474299

OMF South DEIS OOH Comment 64

04/11/2021

Charae Ashcraft

My first question needs to be - why do you need so many maintenance facilities? How many over paid union screwdrivers do we need to pay for? How many businesses and residences have to be bought (with my tax dollars)? Build these facilities in the least dense areas. Only an engineer comes up with crazy ideas like this. The train goes each direction, you only need 4 trains, there could be a couple ready for a breakdown, but there is no reason for a fleet of trains doing nothing. I am uncertain when this project will pay off, as it is unlikely to get used as you think. It's going to become a day/night trip for the homeless. Extend the line now, and build in Fife. Right now, it's all about how to waste the tax dollars. How about finishing one project before moving to another - just look at the airport -- what a mess.

Charae Ashcraft (Communications ID 474299)		
Comment ID	**Comment Text**	**Response**
1	why do you need so many maintenance facilities?	The OMF South project is necessary to support the addition of approximately 144 LRVs as part of the Sound Transit 3 system expansion. See Final EIS Chapter 1, Purpose and Need for the Project, for additional information about the need for a maintenance facility in Sound Transit's South Corridor.

Communication ID: 474300

OMF South DEIS OOH Comment 67

04/13/2021

Carol Qually

The Christian Faith Center is the worse site of all. It is too close to the west side of North Lake which had Herons, Eagles and Osprey fishing on the lake. Just yesterday (4/13/21) I was able to watch a heron fishing from several points along the lake on the unpopulated west side. The eagles fly to the west with their catches to feed their young and immature chicks. The Midway property is the best as there are no huge trees to shelter eagles and osprey nests. Midway is closer to a non-residential area and easier to reach than the North Lake property. Runoff and noise will impact these birds and drive them away. Please think of our environment while making your plans. Thank you

Carol Qually (Communications ID 474300)		
Comment ID	**Comment Text**	**Response**
1	The Christian Faith Center is the worse site of all. It is too close to the west side of North Lake which had Herons, Eagles and Osprey fishing on the lake.	The South 336th Street site is on the west side of the I-5 corridor and would therefore not have any anticipated impacts to North Lake or its surrounding vegetation or wildlife.
2	The Midway property is the best as there are no huge trees to shelter eagles and osprey nests. Midway is closer to a non-residential area and easier to reach than the North Lake property.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474302

OMF South DEIS OOH Comment 69

04/14/2021

James Kostohris

I think the Midway Land fill is the best sight with less disruption to personal and business in the other locations.

James Kostohris (Communications ID 474302)		
Comment ID	**Comment Text**	**Response**
1	I think the Midway Land fill is the best sight with less disruption to personal and business in the other locations.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474304

OMF South DEIS OOH Comment 95

04/15/2021

Kimberly Conner

Please buy us out. This neighborhood isn't that great. We don't have kids playing at each other's houses and riding bikes and whatnot. We're not a super friendly street. Plus, the proximity to Walmart means we have a lot of random people walking by, good and bad. We've also had a lot of vehicle break ins. Anyway, I know the public seems to have a concern for the forested space between the buildings and I5, and there's really not much there. Its mostly blackberry brambles taking over some trees. There isn't much wildlife back there. The only concern is the amount of wildlife around the retention pond by the mega church, but I'm sure they'll be able to find a new home in Weyerhaeuser. Also, there are often homeless people living back there, so, its not like anyone can enjoy it anyway. I think the saddest loss would be Ellenos Yogurt. For some reason they're saying they won't be able to start over, but with the right amount, I'm sure they could. I just hope they don't give up. But its not like they have a storefront, so they don't really involve the community. The company just exists in an old sports equipment building and then you see their yogurt in stores. Actually, most of the businesses in that area don't involve the public with a storefront. So its not like it'll be a big blow to the community.

Kimberly Conner (Communications ID 474304)		
Comment ID	Comment Text	Response
1	Please buy us out. This neighborhood isn't that great.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474305

OMF South DEIS OOH Comment 94

04/15/2021

S. Sheridan

I like the mid-way site. It is more open grown. Better location and transportation is easy to get to. It would be an excellent site.

S. Sheridan (Communications ID 474305)		
Comment ID	**Comment Text**	**Response**
1	I like the mid-way site. It is more open grown. Better location and transportation is easy to get to. It would be an excellent site.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474306

OMF South DEIS OOH Comment 93

04/15/2021

Cynthia Jones

our Family have been Federal Way residents since 1994. Home prices had started to escalate out or reach in Seattle so we purchased in FW. We DO NOT SUPPORT & WOULD NOT WELCOME the displacement of Christian Faith Center's FW Campus to accommodate the proposed site in Federal Way

Cynthia Jones (Communications ID 474306)		
Comment ID	**Comment Text**	**Response**
1	We DO NOT SUPPORT & WOULD NOT WELCOME the displacement of Christian Faith Center's FW Campus to accommodate the proposed site in Federal Way	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474307

OMF South DEIS OOH Comment 90

04/15/2021

Shannan StClair

The Midway Landfill is the best overall option. Even with the additional cost for site environmental mitigation. Both Federal Way sites will disrupt/remove local important local businesses and community organizations which are integral to that community's growth. If either FW site is chosen, the traffic impact to the main SW Federal Way arterials/roadways would be enormous. It is already incredibly difficult to get around that area with all the new truck traffic from Port of Tacoma as well as the enormous strain that would be placed on the Enchanted Parkway from SW 348th southward. I would like to add that the continued targeting of Federal Way as the depository for all things "industrial" and "dirty" is not doing our community any good. We are struggling to build/rebuild a positive identity and being continually targeted as King County's dumping ground is not acceptable. There are many long time citizens of Federal Way who have worked too long and too hard to try and keep Federal Way a nice place to live and raise a family. Placing the maintenance facility in Federal Way will put a coffin in the city's ability to work on growing as a family-centric community, as opposed to being a dumping site. Please choose the Midway Landfill site. It makes the best, overall sense.

Shannan StClair (Communications ID 474307)		
Comment ID	**Comment Text**	**Response**
1	The Midway Landfill is the best overall option. Even with the additional cost for site environmental mitigation. Both Federal Way sites will disrupt/remove local important local businesses and community organizations which are integral to that community's growth.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	If either FW site is chosen, the traffic impact to the main SW Federal Way arterials/roadways would be enormous. It is already incredibly difficult to get around that area with all the new truck traffic from Port of Tacoma as well as the enormous strain that would be placed on the Enchanted Parkway from SW 348th southward.	Section 3.2, Transportation, and Appendix G1, Transportation Technical Report, of the 2023 Draft EIS and this Final EIS evaluate traffic impacts of the OMF South. The analysis found that there would be no long-term impacts to arterial and local street operations from either the Preferred or South 344th Street alternatives.
3	I would like to add that the continued targeting of Federal Way as the depository for all things "industrial" and "dirty" is not doing our community any good. We are struggling to build/rebuild a positive identity and being continually targeted as King County's dumping ground is not acceptable. There are many long time citizens of Federal Way who have worked too long and too hard to try and keep Federal Way a nice place to live and raise a family. Placing the maintenance facility in Federal Way will put a coffin in the city's ability to work on growing as a family-centric community, as opposed to being a dumping site.	As described in Chapter 1, Purpose and Need, of the 2023 Draft EIS and this Final EIS, the expansion of Link light rail service under Sound Transit 3 requires four operations and maintenance facilities to operate. There are two existing operation and maintenance facilities: OMF Central in Seattle and OMF East in Bellevue. Two new operation and maintenance facilities would be needed in the North and South corridors of the Link light rail system. Section 2.2, Alternatives Development and Scoping, of the Final EIS describes the sites Sound Transit evaluated in the South Corridor of the system as part of the alternatives development process. This included locations in Kent, Federal Way, Fife, and Tacoma. The Sound Transit Board identified three sites for further study in the Environmental Impact Statement, one in Kent and two in Federal Way.

Communication ID: 474308

OMF South DEIS OOH Comment 89

04/15/2021

Julie Aulava

I'm writing to encourage the selection of the landfill site for the OMF rather than locating it in Federal Way. The disruption of families and businesses in Federal Way are too great especially considering the landfill location availability.

Julie Aulava (Communications ID 474308)		
Comment ID	**Comment Text**	**Response**
1	I'm writing to encourage the selection of the landfill site for the OMF rather than locating it in Federal Way. The disruption of families and businesses in Federal Way are too great especially considering the landfill location availability.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474309

OMF South DEIS OOH Comment 88

04/15/2021

Katie Lee

I believe that the midway landfill should be selected as the preferred alternative. By developing the landfill it would be less impactful to the community and the environment. It would cause fewer displacements to organizations, businesses and homes that my be impacted due to light rail construction.

Katie Lee (Communications ID 474309)		
Comment ID	**Comment Text**	**Response**
1	I believe that the midway landfill should be selected as the preferred alternative. By developing the landfill it would be less impactful to the community and the environment. It would cause fewer displacements to organizations, businesses and homes that may be impacted due to light rail construction.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474311

OMF South DEIS OOH Comment 86

04/15/2021

Glenn Chouinard

I am a resident and manager of a business in Federal Way. I bought my home 21 years ago based on the vision of Light Rail in Federal Way. It was not perceived that it would take a quarter of a century for it to happen. My business is located off S. 336th Street so I am well aware of the conditions on both sites. As a transportation professional, since day 1 I have believed that the Midway Landfill alternative should be the preferred alternative, regardless of costs and schedule to construct. The most important aspect of this site is that it allows the reclamation of the landfill site through a costly but public infrastructure investment. As a superfund site, the federal and state government would allow this site to remain as wasted property and a risk to future opportunities. In addition the environmental impacts are minimal when compared to the southern sites. In particular, the disruption to the man-made and natural environment are clearly less as are the socioeconomic impacts. It is recognized that Sound Transits position is to charge ahead without obstacles at this phase of the project. The track record I have observed is one that often lacks in true mitigation, such as traffic access and impacts not controlled by federal or state agencies, at the cost to the local communities. That mitigation is far simpler and more easily identifiable for the landfill site. A lock in of this decision is forever in the project development process. Please do not be short sighted.

Glenn Chouinard (Communications ID 474311)		
Comment ID	**Comment Text**	**Response**
1	As a transportation professional, since day 1 I have believed that the Midway Landfill alternative should be the preferred alternative, regardless of costs and schedule to construct. The most important aspect of this site is that it allows the reclamation of the landfill site through a costly but public infrastructure investment. As a superfund site, the federal and state government would allow this site to remain as wasted property and a risk to future opportunities. In addition the environmental impacts are minimal when compared to the southern sites. In particular, the disruption to the man-made and natural environment are clearly less as are the socioeconomic impacts.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474312

OMF South DEIS OOH Comment 85

04/15/2021

Marlys Dupleich

Factoring in cost, years to build and displacements, it is my opinion the 336th site would be the best choice.

Marlys Dupleich (Communications ID 474312)		
Comment ID	**Comment Text**	**Response**
1	Factoring in cost, years to build and displacements, it is my opinion the 336th site would be the best choice.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474313

OMF South DEIS OOH Comment 84

04/15/2021

I think the 344th location would be best for all of the impact listed.

Anonymous (Communications ID 474313)		
Comment ID	**Comment Text**	**Response**
1	I think the 344th location would be best for all of the impact listed.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474315

OMF South DEIS OOH Comment 82

04/15/2021

Lisa Gardiner

Use midway landfill area it's the best for this . Other areas are already congested and would be made much worse !!!

Lisa Gardiner (Communications ID 474315)		
Comment ID	**Comment Text**	**Response**
1	Use midway landfill area it's the best for this . Other areas are already congested and would be made much worse !!!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474316

OMF South DEIS OOH Comment 81

04/15/2021

Al Levine

None of these options make any financial sense. Renegotiate if necessary restrictions on SODO BASE and expand or double deck. Postpone South base until line gets to Fife or Tacoma where more reasonable sites and construction costs should be available.

Al Levine (Communications ID 474316)		
Comment ID	**Comment Text**	**Response**
1	None of these options make any financial sense. Renegotiate if necessary restrictions on SODO BASE and expand or double deck. Postpone South base until line gets to Fife or Tacoma where more reasonable sites and construction costs should be available.	In 2019, Sound Transit conducted an extensive alternative site assessment process that resulted in the Sound Transit Board identifying the Midway Landfill, South 336th Street, and South 344th Street alternatives for study in the Draft EIS. More information on the alternatives evaluation process and considerations can be found in the OMF South Alternatives Evaluation Technical Memorandum (https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-alternatives-evaluation-technical-memorandum.pdf).

Communication ID: 474317

OMF South DEIS OOH Comment 80

04/15/2021

Steven Dent

I would like to express my concerns about location the OMF south at either of the Federal Way sites. The Kent Landfill site seems better suited for the OMF site with simplified access to existing tracks, cleaner access to Hwy 99 and I-5 for staff, and less impact to surrounding residential property and businesses. The Federal Way site may be "cheaper" to build and have a lower projected operating cost but has more negative impacts to surrounding wet-lands and residential property.

Steven Dent (Communications ID 474317)		
Comment ID	**Comment Text**	**Response**
1	The Kent Landfill site seems better suited for the OMF site with simplified access to existing tracks, cleaner access to Hwy 99 and I-5 for staff, and less impact to surrounding residential property and businesses.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Federal Way site may be "cheaper" to build and have a lower projected operating cost but has more negative impacts to surrounding wet-lands and residential property.	Please see the response to Common Comments 3 and 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474318

OMF South DEIS OOH Comment 79

04/15/2021

Leonard Barrett

I strongly believe that the Midway Landfill is the best option.

Leonard Barrett (Communications ID 474318)		
Comment ID	**Comment Text**	**Response**
1	I strongly believe that the Midway Landfill is the best option.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474319

OMF South DEIS OOH Comment 78

04/15/2021

Loss of city revenue as land goes off the tax rolls dollars generated at both FW sites. Elimination of some of the only vacant lots for industry. In concert with the proposed ARG development directly east of these sites with semi truck traffic of 900 plus per day not counting for hundreds of workers on the ARG site and the hundreds of transit workers will stop function of the Highway 18 and Weyerhaeuser Way interchange making that area to be very unsafe and totally backed up .

Anonymous (Communications ID 474319)		
Comment ID	**Comment Text**	**Response**
1	Loss of city revenue as land goes off the tax rolls dollars generated at both FW sites. Elimination of some of the only vacant lots for industry. In concert with the proposed ARG development directly east of these sites with semi truck traffic of 900 plus per day not counting for hundreds of workers on the ARG site and the hundreds of transit workers will stop function of the Highway 18 and Weyerhaeuser Way interchange making that area to be very unsafe and totally backed up.	OMF South could result in an initial loss of tax revenue, though it would generate new economic activity. Please see Section 3.5, Economics, in the Final EIS. Chapter 4 of the Final EIS discusses the cumulative effects of the OMF South project and other planned projects in the area.

Communication ID: 474320

OMF South DEIS OOH Comment 77

04/15/2021

Please use the Midway landfill for the OMF site. This is a great opportunity to make this area usable for an important public resource with the least amount of impact on businesses in the area. This would be great PR for South Transit

Anonymous (Communications ID 474320)		
Comment ID	**Comment Text**	**Response**
1	Please use the Midway landfill for the OMF site. This is a great opportunity to make this area usable for an important public resource with the least amount of impact on businesses in the area.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474321

OMF South DEIS OOH Comment 76

04/15/2021

Greg Luke

I believe the 336th st. site would be the best place for the OMF. It has the least impact on the residential population, businesses and environmental issues. It's also one of the least expensive to build and maintain. There are too many variables and issues to consider at the Midway Landfill site. Although it doesn't impact businesses or residents it would be too costly and lengthy to build.

Greg Luke (Communications ID 474321)

Comment ID	Comment Text	Response
1	I believe the 336th st. site would be the best place for the OMF. It has the least impact on the residential population, businesses and environmental issues. It's also one of the least expensive to build and maintain.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	There are too many variables and issues to consider at the Midway Landfill site. Although it doesn't impact businesses or residents it would be too costly and lengthy to build.	Please see the response to Common Comment 4 in Table 5.5-1L.1-1, Response, Responses to Common Comments, in the Final EIS.

Communication ID: 474322

OMF South DEIS OOH Comment 75

04/15/2021

Clark Ressler

I get the uneasy felling that Sound Transit has made their decision not to use the Midway site. The old landfill site does pose some construction challenges they wants to avoid. The maintenance facility in South Seattle was built over tide flats that were filled in. The tracks and buildings appear to be doing OK in that area. I fell the Midway site would put to use a large vacant land area and not displace any residents or businesses.

Clark Ressler (Communications ID 474322)		
Comment ID	**Comment Text**	**Response**
1	I get the uneasy feeling that Sound Transit has made their decision not to use the Midway site. The old landfill site does pose some construction challenges they wants to avoid. The maintenance facility in South Seattle was built over tide flats that were filled in. The tracks and buildings appear to be doing OK in that area. I feel the Midway site would put to use a large vacant land area and not displace any residents or businesses.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474323

OMF South DEIS OOH Comment 74

04/15/2021

I. Believe the landfill option is too expensive and will delay the process. I think the church option is not desirable because of the 2 streams that will need to be rerouted. I think the 3rd option is best. The Elenos Yogurt plant and other businesses can find other places to relocate their business within Federal Way. There are lots of empty buildings available. Same with the residents. With the help of Sound Transit's relocation team, the residents will find other places to call home. This is not a desirable place to live because of the crime. My choice is the 3rd option. Thanks for listening.

Anonymous (Communications ID 474323)		
Comment ID	**Comment Text**	**Response**
1	I. Believe the landfill option is too expensive and will delay the process.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I think the church option is not desirable because of the 2 streams that will need to be rerouted.	Please see the response to Common Comments 3 and 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474324

OMF South DEIS OOH Comment 73

04/15/2021

Michael Andrews

344th is the best bet

Michael Andrews (Communications ID 474324)		
Comment ID	**Comment Text**	**Response**
1	344th is the best bet	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474325

OMF South DEIS OOH Comment 72

04/15/2021

Greg Moak

I think you should locate the new maintenance facility at the Midway Landfill. It's the only site that doesn't require existing businesses to relocate. Even though there may be some site cleanup required from the landfill it has to be more cost effective and less disruptive than the other two options. Plus, what else would the old landfill site ever be used for if not the maintenance facility. It is adjacent to I-5 for easy freeway access. I think the landfill site is a no brainer.

Greg Moak (Communications ID 474325)		
Comment ID	**Comment Text**	**Response**
1	I think you should locate the new maintenance facility at the Midway Landfill. It's the only site that doesn't require existing businesses to relocate. Even though there may be some site cleanup required from the landfill it has to be more cost effective and less disruptive than the other two options. Plus, what else would the old landfill site ever be used for if not the maintenance facility. It is adjacent to I-5 for easy freeway access.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474326

OMF South DEIS OOH Comment 71

04/15/2021

I think midway landfill is best. This is not very good economic use of properties in Federal Way.

Anonymous (Communications ID 474326)		
Comment ID	**Comment Text**	**Response**
1	I think midway landfill is best. This is not very good economic use of properties in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 474327

OMF South DEIS OOH Comment 70

04/15/2021

David Kingstone

I'm an owner of Unit B22 at Garage Town, which will be impacted if the South 344th Street is chosen. Three comments: 1. Having visited both the Seattle and Bellevue Maintenance Facilities, they are built on 'billiard table' flat land. This makes the Midway Landfill site the most suitable location, as it uninhabited and flat and immediately adjacent to the light rail tracks already under construction to Federal Way. All these criteria make Midway the most obvious choice, especially if there is any delay in the further extension to Tacoma. 2. Given the South 344th site impacts the highest number of properties, businesses and jobs, I found it difficult to believe that the cost of developing this site was the same as that at South 336th, especially given the physical geography of this site is even to the untrained eye more difficult to navigate/excavate, plus the large number of properties to purchase alone) must make this option significantly more expensive. 3. Throughout the EIS, there is no mention of the weighting given to each of the different assessed study criteria, i.e. what are the most important criteria that the Board will consider. I would request, in the interests of transparency, that these weightings be shared publicly, so we can understand how the final decision will be calculated and arrived at. Midway is the way to go. I trust the Board will make its decision in this direction. Best for the community at large. Many thanks for your consideration, Dave Kingstone, Kenmore, WA (04/15/2021)

David Kingstone (Communications ID 474327)		
Comment ID	**Comment Text**	**Response**
1	Having visited both the Seattle and Bellevue Maintenance Facilities, they are built on 'billiard table' flat land. This makes the Midway Landfill site the most suitable location, as it uninhabited and flat and immediately adjacent to the light rail tracks already under construction to Federal Way. All these criteria make Midway the most obvious choice, especially if there is any delay in the further extension to Tacoma.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Given the South 344th site impacts the highest number of properties, businesses and jobs, I found it difficult to believe that the cost of developing this site was the same as that at South 336th, especially given the physical geography of this site is even to the untrained eye more difficult to navigate/excavate, plus the large number of properties to purchase alone must make this option significantly more expensive.	Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives, in Chapter 2 of the Final EIS shows the opinion of probable cost estimates for each OMF South build alternative broken out by real estate and relocation, final design and construction, and total capital preliminary estimate. At this early stage of the project, these numbers are provided for comparative purposes only. A more detailed estimate will be developed as the project advances through design.
3	Throughout the EIS, there is no mention of the weighting given to each of the different assessed study criteria, i.e. what are the most important criteria that the Board will consider. I would request, in the interests of transparency, that these weightings be shared publicly, so we can understand how the final decision will be calculated and arrived at.	The different elements of the environment studied in the EIS are not weighted. The Sound Transit Board will consider the findings in the Final EIS, comments on the Draft EIS, and other factors when selecting the project to be built.

April 19, 2021

Mr. Hussein Rehmat
Sound Transit
401 S. Jackson Street
Seattle, WA 98104

RE: OMF location in South King County

Dear Mr. Hussein Rehmat;

Sound Transit is currently considering three (3) potential alternatives for the location of the new South Operations and Maintenance Facility (OMF). Two locations are in Federal Way and one location is the **Kent Midway Landfill** site. The focus is narrowing on two locations in Federal Way This, to me, is a willful disregard to local area communities when a much more logical alternative exists: use of the **Kent Midway Landfill** site.

The Federal Way locations are detrimental to the local community with regard to housing, business and institution displacement. The resulting disruption serves to negate any positive impact the OMF would have on providing more jobs to the area. Additionally, an OMF at the Federal Way sites would have a detrimental impact to the Hylebos Creek. Building the OMF on the **Kent Midway Landfill** site would eliminate displacement of residents, businesses and institutions further enhancing the OMF's benefits to local communities. Use of the **Kent Midway Landfill** site returns a formerly polluted location to productive use instead of doing environmental harm to another area.

The **Kent Midway Landfill** Superfund Site has been deemed "Site Ready for Reuse and Redevelopment" since 2007. One of the goals of Superfund Cleanup is to return a site to productive use. What better use for this particular site? The eastern perimeter of this site is already being developed for track to be laid for the Federal Way Link Light Rail Extension Project. To use the site to further support our region's transportation infrastructure by choosing it as the South OMF site is a logical next step.

Developing the **Kent Midway Landfill** Superfund site will be more expensive in the short term, but the long term benefits brought about by added OMF jobs without disruption to local communities and their ecosystems is more than worth that cost. To date, you have not indicate any exploration of federal assistance. With the present administration's goal toward reclaiming land, this is myopic in the extreme.

Investing in the South OMF at the Kent Midway Landfill site now is not only the right thing to do, it is a social, economic and ecological imperative.

Sincerely,

[redacted]

Karen Brugato

[redacted]

CC:

Senator Patty Murray
154 Russell Senate Office Building
Washington DC 20510

Senator Maria Cantwell
511 Hart Senate Office Building
Washington DC 20510

Governor Jay Inslee
Office of the Governor
PO Box 40002
Olympia, WA 98504-0002

Claire Wilson
PO Box 40430
Olympia, WA 98504-0430

Jesse Johnson
JLOB 369
PO Box 40600
Olympia, WA 98504

Jamila Taylor
JLOB 418
PO Box 40600
Olympia, WA
98504-0600

Federal Way City Council
33325 8th Ave., South
Federal Way, WA 98003

Mayor Jim Ferrell
33325 8th Ave., South
Federal Way, WA 98003

Karen Brugato (Communications ID 474908)		
Comment ID	**Comment Text**	**Response**
1	The Federal Way locations are detrimental to the local community with regard to housing and business displacement. The resulting disruption serves to negate much of the positive impact the OMF would have on providing more jobs to the area. Additionally, an OMF at the Federal Way sites would have a detrimental impact on Hylebos Creek.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Building the OMF on the Kent Midway Landfill site would eliminate displacement of residents, businesses and institutions further enhancing the OMF's benefits to local communities. Use of the Kent Midway Landfill site returns a formerly polluted location to productive use instead of doing environmental harm to another area.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Operations and Maintenance Facility South

Appendix L2: 2023 Draft EIS Comments and Responses

Federal Transit Administration

SOUNDTRANSIT

Table of Contents

Tribes and Agencies L2-1

  Suquamish Tribe (Communication ID 538027) L2-2

  EPA (Communication ID 539079) L2-4

  FHWA (Communication ID 539007) L2-27

  WSDOT (Communication ID 539078) L2-54

  City of Federal Way (Communication ID 539072) L2-64

Public Commenters L2-165

  Barry Turnbull (Communications ID 537037) L2-166

  Glenn Sawyer (Communications ID 537189) L2-168

  Anonymous/OOH (Communications ID 537204) L2-170

  Anonymous/OOH (Communications ID 537207) L2-172

  Jacob Davidson (Communications ID 537209) L2-174

  Anonymous/OOH (Communications ID 537210) L2-176

  Anonymous/OOH (Communication ID 537211) L2-178

  Eric Johnson (Communication ID 537212) L2-180

  Sue Cornell (Communication ID 537213 ....L2-182

  Glenn Sawyer (Communication ID 537214) L2-184

  Anonymous/OOH (Communications ID 537215) L2-186

  Dusty Wilson (Communications ID 537217) L2-188

  Kay Vallejo (Communications ID 537218) L2-190

  Eduardo Munoz (Communications ID 537672) L2-192

  Rick Barnett (Communications ID 537673) L2-194

  Francois Ryf (Communication ID 537687) L2-196

  Leota Miller (Communications ID 537872) L2-198

  Karl Hallesy (Communications ID 538026) L2-200

  Patricia Clayton (Communications ID 538156) L2-202

  Anonymous/OOH (Communications ID 538473) L2-204

  Bill Pugnetti (Communications ID 538475 and 538479) L2-206

  Patricia Pugnetti (Communications ID 538480) L2-208

  Susan Strong (Communications ID 539015) L2-210

  Kerry Lesinski (Communications ID 539016) L2-212

  Miguel Torres, Olivia Torres (Communications ID 539020) L2-217

Helen Price (Communications ID 539021) L2-219
Tilena Cooper (Communications ID 539023) L2-221
Anonymous/Belmor Briefing (Communications ID 539026) L2-223
Patricia Pugnetti (Communications ID 539033) L2-226
Bob Strong (Communication ID 539034) L2-229
Vickie Chynoweth (Communications ID 539042) L2-231
Michael Hoag (Communications ID 539043) L2-233
Bill Pugnetti (Communications ID 539044) L2-235
Karen Brugato (Communications ID 539045) L2-237
Suzanne Vargo (Communications ID 539046) L2-239
Francine Martin (Communications ID 539047) L2-241
Lawson Bronson (Communications ID 539048) L2-243
Susan Strong (Communications ID 539049) L2-245
Eugene Onishchenko (Communications ID 539051) L2-247
Russ Hibbard (Communications ID 539052) L2-249
William Terrance (Communications ID 539053) L2-251
Bruce Tecklenburg (Communications ID 539054) L2-253
Finn S (Communications ID 539055) L2-255
Jacob Davidson (Communication ID 539056) L2-257
Lani Akers (Communication ID 539057) L2-259
Suzanne Vargo (Communications ID 539061) L2-264
Dave Lesinski (Communications ID 539062) L2-269
Bob Strong (Communications ID 539063) L2-274
Julie Seitz (Communications ID 539077) L2-276
Jacob Davidson (Communications ID 539081) L2-281
GarageTown Federal Way Condominium Association (Communication ID 539132) L2-283
Roger Flygare (Communications ID 539987) L2-291

Tribes and Agencies

From: Stephanie Trudel <strudel@Suquamish.nsn.us>
Sent: Wednesday, October 11, 2023 1:32 PM
To: OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>
Subject: NEPA Draft/SEPA Supplemental Draft EIS for the Operations and Maintenance Facility (OMF) South project

Thank you for the opportunity to review and comment on the NEPA Draft/SEPA Supplemental Draft EIS for the Operations and Maintenance Facility (OMF) South project. I have reviewed the Historical and Archaeological Resources Technical Report and attachments and have no comments or concerns regarding cultural resources at this time.

Sincerely,
Stephanie

Stephanie Trudel
Tribal Historic Preservation Officer
Suquamish Tribe
PO Box 498
Suquamish, WA 98392-0498
360-394-8533
strudel@suquamish.nsn.us

Suquamish Tribe (Communication ID 538027)		
Comment ID	**Comment Text**	**Response**
1	I have reviewed the Historical and Archaeological Resources Technical Report and attachments and have no comments or concerns regarding cultural resources at this time.	Thank you for your review.

REGION 10
SEATTLE, WA 98101

November 6, 2023

Justin Zweifel, Environmental Protection Specialist
Federal Transit Administration
915 2nd Ave, Suite 3192
Seattle, Washington 98174

Erin Green, South Corridor Environmental Manager
Sound Transit
401 S Jackson Street
Seattle, Washington 98194

Dear Justin Zweifel and Erin Green:

The U.S. Environmental Protection Agency has reviewed Federal Transit Administration's Draft Environmental Impact Statement for the Operations and Maintenance Facility South Project (CEQ number 20230122, EPA Project Number 23-0027-FTA). EPA has conducted its review pursuant to the National Environmental Policy Act and our review authority under Section 309 of the Clean Air Act. The CAA Section 309 role is unique to EPA and requires EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement. EPA is one of the cooperating agencies on the project and offered its scoping comments and recommendations in August 2023.

The DEIS evaluates the potential environmental impacts with the construction and operation of a light rail facility in south King County. The proposed facility will be used for light rail vehicle storage, inspection, maintenance and repair, cleaning, and testing and commissioning of new light rail vehicles. The DEIS includes a No-Build Alternative and three build alternatives: the South 336th Street Alternative (Preferred Alternative), South 344th Street Alternative, and Midway Landfill (a Superfund site) Alternative. The Preferred Alternative is also identified as the Preferred Alternative in the 2021 State Environmental Policy Act DEIS for this project.

EPA supports the project's plan to expand mobility in the region for transit dependent people, low-income populations, and communities of color. EPA supports the goals to provide regional transit in a manner that preserves and promotes a healthy environment and economy by minimizing adverse impacts on the environment and people through sustainable practices. Regional public transit has an important role in reducing vehicle miles traveled and vehicle emissions in an area with heavy traffic congestion.

In reviewing the DEIS, EPA identified that the proposed action has the potential to disproportionately impact communities with environmental justice concerns, including tribal, minority, and low-income communities, and provides recommendations to address these impacts in the Final EIS, including:

- Consistent with Executive Orders 14096 and 12898, further evaluate and identify communities with EJ concerns who may be impacted by the proposed project. Consider utilizing EPA's EJScreen tool, as well as Washington State Department of Health Environmental Health Disparities map to determine environmental risks to the communities with EJ concerns and implications for the proposed project.
- Continue to meaningfully engage with communities with EJ concerns who may be disproportionately impacted by the project, including adjacent neighborhoods, tribes, and statewide and local organizations.
- Describe the efforts to meaningfully engage these communities when analyzing for disproportionate impacts; developing ways to avoid, mitigate and minimize those impacts; and the outcome of the engagement efforts on the proposed project.
- Mechanisms to assess and address potential air quality impacts from the proposed project on communities with EJ concerns.

The enclosed Detailed Comments provide greater detail of these and other concerns, as well as recommendations for the Final EIS.

Thank you for the opportunity to review the DEIS for this project. If you have questions about this review, please contact Theogene Mbabaliye of my staff at (206) 553-6322 and mbabaliye.theogene@epa.gov, or me, at (206) 553-1774 or at chu.rebecca@epa.gov.

Sincerely,

Rebecca Chu, Chief
Policy and Environmental Review Branch

Enclosure

U.S. EPA Detailed Comments on the
Operations and Maintenance Facility South Project DEIS
King County, Washington
November 2023

Environmental Justice (EJ)
EPA has concerns about the conclusions made in the DEIS regarding EJ impacts and recommends the FEIS identify, analyze, and address disproportionate impacts in accordance with Executive Order 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All* and the *Guidance from the Council on Environmental Quality on Environmental Justice and the National Policy Act* (CEQ EJ Guidance).[1]

EO 14096 directs federal agencies, as appropriate and consistent with applicable law, to identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities, including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns. It builds upon Executive Order 12898 *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations.* EO 14096 further states that EPA will carry out responsibilities under Section 309 of the Clean Air Act, 42 U.S.C. 7609, to assess whether each agency analyzes and avoids or mitigates disproportionate human health and environmental effects on communities with EJ concerns.

EPA recommends the EJ topic be analyzed further in Chapter 3 of the Final EIS as its own section, rather than in Appendix E, to highlight the importance of EJ as a part of the affected environment. EPA also offers the following recommendations to fully identify, analyze, and address disproportionate impacts from the proposed project to communities with EJ concerns.

Potential Disproportionate Impacts on Communities with EJ Concerns
The DEIS concludes that "[a]fter considering the project's potential effects, mitigation, and avoidance measures and anticipated benefits to minority and low-income populations, FTA has made a preliminary determination that the OMF South would not result in disproportionately adverse effects on minority and low-income populations."[2] EPA has concerns that the project may have disproportionate impacts and recommends the Final EIS further analyze impacts to communities.

Assessing EPA's Environmental Justice Screening and Mapping Tool (EJScreen) information is a useful first step in understanding or highlighting locations that may be candidates for further review or outreach.[3] EPA considers a project to be in an area of potential EJ concern when an EJScreen for the impacted area shows one or more of the EJ Indexes at or above the 80th percentile in the nation and/or state. We note the DEIS only includes a 0.5-mile radius around the project site to identify communities with EJ concerns. At a minimum, EPA recommends an EJScreen analysis consider EJScreen information for the block groups which contains the proposed action and a one-mile radius around those areas.

---

[1] https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf. Accessed 9/25/2023.
[2] DEIS page 3.6-12.
[3] https://ejscreen.epa.gov/mapper/. Accessed 10/24/2023.

EPA ran EJScreen with a 1-mi buffer around the project area and found that 10 out of the 12, and 11 out of the 12 EJ Indexes exceeded the 80th percentile when compared to the state, for the preferred alternative location and the midway landfill location, respectively. Exceeded EJ indexes include indicators relating to air quality, including diesel particulate matter at the 98th percentile at the preferred location and the 97th percentile for the Midway Landfill location.

EPA also recommends considering the Washington State Department of Health Environmental Health Disparities map.[4] This map depicts cumulative health impact as a ranking from 1 to 10, with 10 indicating the highest impact. These rankings reflect the risk each community faces from multiple environmental hazards and the degree to which a community is more vulnerable to those hazards because of certain sociodemographic factors. Rankings for this map can be interpreted as a way to measure relative environmental risk factors in communities. The project area for all alternatives and the surrounding census tracts all rank at 10.

These screening tools indicate that the proposed project is located within an area with potential EJ concerns and that these communities face significant environmental disparities. EPA has concerns that the cumulative impacts of this project and the historically over-burdened nature of the area could have significant potential disproportionate adverse impacts on communities with EJ concerns.

EPA recommends the Final EIS include a more robust analysis of the project's potential impacts to communities with EJ concerns including but not limited to community cohesion, affordable housing, public health impacts, and public safety. EPA is concerned that the project development will further exacerbate a historically over-burdened community.

Mitigation

The DEIS states that disproportionate impacts will not occur due to identified mitigation measures and community benefits. It is unclear in the DEIS if identified mitigation measures will fully offset the disproportionate impacts from the project, especially considering the prior recommendations related to fully identifying where EJ concerns may occur and be impacted by the proposed project. In addition, the benefits identified are not specific to the impacted communities. Finally, it is unclear if mitigation measures and benefits were identified through robust community involvement (e.g., informed by meaningful engagement with the impacted community).

The CEQ EJ Guidance identifies important ways to consider mitigation for EJ under NEPA, including:

- "Mitigation measures identified as part of . . .an environmental impact statement (EIS), or a record of decision (ROD), should, whenever feasible, address significant and adverse environmental effects of proposed federal actions on minority populations, low-income populations, and Indian tribes."

---

[4] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map. Accessed 10/24/2023.

- "Each Federal agency must provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents, and notices."

The DEIS indicates that one of the key benefits to the community would be the generation of 11,200 to 20,000 jobs in the region.[5] EPA recommends the FEIS provide clarification on this benefit to communities with EJ concerns that are impacted by the project, specifically:

- If job training will be provided to communities most impacted,
- Will additional measures to be taken to hire within the impacted communities for these 11,200 to 20,0000 jobs, and
- The types of jobs available to the impacted community (e.g., permanent or temporary; professional or nonprofessional).

If there are no additional tailored mitigation measures to be implemented, provide clarification that the benefit received will be regional job opportunities and are not tailored to the communities with EJ concerns impacted by the proposed project.

EPA recommends developing specific mitigation measures to address the potential disproportionate EJ impacts. In developing mitigation measures, consider mechanisms to minimize impacts of the proposed project to communities. It is important to shape mitigation efforts through engagement with each uniquely impacted group.

An example of a mitigation measure EPA has seen applied in other federal projects to address impacts on communities with EJ concerns is the development of a community benefits agreement (CBA). CBAs have been used to mitigate impacts to displaced communities and those with disrupted community cohesion from displacement of community gathering places like churches. Developing a CBA involves robust community involvement and meaningful engagement to ensure mitigation measures benefit the most impacted communities. Consider neighborhood plans and goals when identifying mitigation measures to help inform mitigation to offset disproportionate impacts. Community benefits may vary from community to community depending on their unique attributes. Consider reviewing previous strategies to develop a CBA such as FHWA's South End Park neighborhood redevelopment project in which community members helped inform innovative mitigation measures.[6]

EPA notes that CEQ's EJ Guidance states that "agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruptions on the community structure associated with the proposed action; and the nature and degree of the impact on the physical and social structure of the community."[7]

---

[5] DEIS page E-25.

[6] https://www.fhwa.dot.gov/environment/environmental_justice/resources/ej_and_nepa/case_studies/case08.cfm. Accessed 10/24/2023.

[7] CEQ EJ Guidance, page 9.

To address these interrelated factors that may amplify the natural and physical environmental effects of the proposed agency action, EPA further recommends the Final EIS include specific information and measures related to compensation and relocation assistance for low-income and minority residences and minority-owned businesses that could be acquired, displaced, and relocated by the project. Include in the Final EIS additional information and measures to address the temporary or long-term loss of services to low-income and minority communities provided by community organizations, such as the Christian Faith Center that has daycare services, that will either be relocated by the project or affected during construction of the project. It will also be important for FTA to discuss in the Final EIS plans to resolve conflicts that could arise from businesses and residents that might refuse easement offers.

Meaningful Public Engagement
In addition to fully characterizing the communities with EJ concerns who may be impacted by the proposed project, EPA recommends conducting meaningful engagement to ensure community feedback is reflected in the decision-making process. EPA appreciates FTA's efforts to inform the public and has recommendations to involve the public more meaningfully to help identify mitigation measures to disproportionate impacts on communities with EJ concerns.

EPA recommends mitigation efforts be guided by meaningful public engagement with impacted communities. CEQ guidance states that "agencies should elicit the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect…and should carefully consider community views in developing mitigation strategies."[8]

EO 14096 states [federal agencies are] to "provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns who are potentially affected by Federal activities including by providing timely opportunities for members of the public to share information or concerns and participate in decision-making processes, fully considering public input provided as part of decision-making processes, and providing notice of and engaging in outreach to communities or groups of people who are potentially affected and who are not regular participants in Federal decision-making."

Given the above, EPA recommends:

- Designing robust community engagement practices to maximize participation opportunities for communities that would be affected by the project, such as community-based workshops to facilitate discussion and issue resolution.
- Creating community advisory committees with representatives from impacted communities to help facilitate guidance and feedback from community members.
- Hosting focus group discussions to have robust conversations around mitigation that is appropriate to each impacted community.

EPA has concerns that while efforts have been made to inform the public, the public's feedback has not been fully incorporated into the decision-making process and/or addressed in the NEPA process. EPA recommends the Final EIS include more details on how input from impacted communities is considered in this process, including the selection of the preferred alternative, and ensure that public input is fully considered and responded too in the decision-making process.

---

[8] CEQ EJ Guidance, page 16.

The CEQ EJ Guidance specifies that "[u]nder NEPA, the identification of a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe does not preclude a proposed agency action from going forward, nor does it necessarily compel a conclusion that a proposed action is environmental unsatisfactory. Rather, the identification of such an effect should heighten agency attention to alternatives (including alternative sites), mitigation strategies, monitoring needs, and preferences expressed by the affected community or population."[9]

Potential Impacts to Air Quality

The DEIS states that, "[a]lthough portions of the Puget Sound region are in maintenance areas for $PM_{2.5}$ and PM_{10}, none of the build alternatives are located within nonattainment or maintenance areas." While this may be true, it is also possible that local air quality may still be impacted due to cumulative impacts from surrounding activities such as road construction and site operations, traffic on unpaved roads and others, including use of woodstoves, agriculture, fire, and air traffic. EJScreen indicates EJ indexes above the 90th percentile for diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index at all alternative locations, and above the 80th percentile for particulate matter at the preferred alternative location. This is consistent with the WA Health Disparities Map which ranks diesel exhaust $PM_{2.5}$ emissions at a 9 out of 10 for all locations. Changes in climate may also result in increased air pollution from future wildfires.[10] In our scoping comments for the project in August, EPA had also indicated that evaluation of cumulative impacts on air quality will be important because of this project sites proximity to the Tacoma $PM_{2.5}$ maintenance area.

Because of this project's potential air quality impacts, EPA recommends the Final EIS:

- Estimate air emissions from all sources (e.g., stationary and mobile sources) for the analysis area; discuss the timeframe for release of these emissions; and determine whether the emissions will exceed National Ambient Air Quality Standards (NAAQS). For accurate air emission estimates, use the latest version of EPA's Motor Vehicle Emission Simulator (MOVES3).[11] The DEIS does not currently provide baseline data on air quality to help determine the extent to which the project will impact air quality in the project area and vicinity. EPA recommends an assessment of baseline conditions be conducted and disclosed in the Final EIS, including a summary of representative background concentration of criteria air pollutants and any relevant information regarding local air toxics, if available.
- Expand the fugitive dust plan for the alternative project sites, particularly to identify nearby sensitive receptors and measures to protect these from dust impacts. Describe in the plan how the nearby public will be kept informed of the project and be provided contact methods to report fugitive dust impacts.

---

[9] Council on Environmental Quality. Environmental Justice Guidance Under the National Environmental Policy Act, pg. 10. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf. Accessed 10/25/2023.

[10] https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-wa.pdf. Accessed 10/26/2023.

[11] https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves. Accessed 10/29/2023.

- Include a summary of the project-related Mobile Source Air Toxics analysis results using the most recent EPA model for analysis of these emissions and related health risks.[12] If there will be significant air toxics emissions, consider giving preference to contractors using highest engine Tier available (Tier 3 or 4) machinery to reduce air toxics emissions during implementation of the project. During project site preparation, the DEIS indicates there will be up to 564 truck trips per day traveling to and from the project site. As this number does not account for the project construction and overall cumulative traffic in the area, it is possible that mobile source air toxics emissions from the project and other surrounding sources could be significant and warrant further analysis.
- Ensure the above analyses include off-site mobile source air emissions of vehicles and trucks along likely corridors to and from the facility from both the construction and operations of the project with respect to criteria air pollutants and air toxics, including diesel particulate matter emissions. Consider sensitive receptors and vulnerable populations such as communities with EJ concerns, park/recreational users, schools, daycares, seniors/nursing homes, hospitals, and other healthcare facilities. The air quality analysis does not currently include health-related risks associated with diesel exhaust emissions. Providing a diesel exhaust emissions analysis of the long-term increased truck traffic and its impact on the surrounding community will be helpful.
- Identify appropriate mitigation measures and best management practices to reduce emissions and comply with federal and state air quality regulations.
- Discuss plans to monitor air quality in the project area and take corrective action if the NAAQS are not met. This is important because there are sensitive receptors in the project area and motor vehicle traffic may increase in the area, particularly during project construction. Localized air quality conditions can be substantial (e.g., during wildfire burns), even though area-wide and/or long-term emissions monitoring may show compliance with NAAQS. Consideration of the cumulative health impacts caused by the project (construction, operation, and maintenance phases) and other sources to communities with EJ concerns will also be important, as well as coordination with public health agencies and industry, which often have data on human health and environmental hazards.
- Clarify whether the project analysis area is adjacent to the maintenance area for $PM_{2.5}$ and discuss when the maintenance period will end or be renewed. If the site is adjacent to this maintenance area and a conformity determination analysis is conducted, then, provide results of such analysis in the Final EIS. It may also be prudent to monitor air locally and take corrective action if NAAQS are exceeded, even if temporarily.
- Provide information on coordination with other entities in the area, such as the State of Washington Departments of Ecology and Social and Health Services and local air organizations, to ensure emissions due to the proposed project are reduced and effectively mitigated throughout the proposed project lifespan.

Potential Impacts to Surface Water Quality and Beneficial Uses

As construction and operation activities may impact water resources, resulting in alterations of local hydrology and long-term impacts to water quality parameters and designated beneficial uses due to increased turbidity and sedimentation of these pollutant receiving waters, EPA recommend that the Final EIS:

---

[12] https://www.epa.gov/AirToxScreen. Accessed 10/29/2023.

- Include information on the most recent EPA-approved Water Quality Standards (WQS) for the State of Washington and implications for water quality protection within waterbodies in the analysis area and vicinity. It would be important for the public to know the State WQS to determine the extent to which the proposed action would impact water quality. The DEIS indicates that Build Alternatives will likely impact two already impaired tributaries on current Washington State's 303(d) list due to exceedances of copper, lead, polycyclic aromatic hydrocarbons (PAHs), pH, and zinc WQS within the West Fork Hylebos tributary; and bacteria, dissolved oxygen in McSorley Creek. Under the Preferred Alternative, there will also be a loss of riparian vegetation which may contribute to long-term impacts to water resources in the project area and downstream areas, including increased stream temperatures; decreased runoff interception and pollutant filtration functions; reduced groundwater recharge; increased erosion and sedimentation; and loss of stream channel stabilization.[13]
- Discuss the project impacts analyses and conclusions based on the most recent WQS information. Where WQS are exceeded, it will be important for the FEIS to discuss how these impaired waterbodies will be restored.
- Provide the most current information regarding the status of the Clean Water Act § 401 certification and **§** 404 permit application processes, as well as conditions to protect water quality and wetlands.
- Include up-to-date information on the anticipated Pollutant Discharge Elimination System (NPDES) permit application process including measures to protect water quality and development of Storm Water Pollution Prevention Plans, reporting, and monitoring. The DEIS indicates that project construction will disturb more than 1 acre of land (up to 68 acres), which will subject the project to NPDES permitting requirements for discharges to waters of the United States and related Stormwater Pollution Prevention Plan and construction best management practices.
- Consider implementation of low impact development techniques, which have the potential to further reduce stormwater volumes and thus mimic natural conditions as closely as possible. The techniques also lessen impacts of stormwater runoff from impervious surfaces such as paved roads, parking lots, and roofs and can provide energy and other utility savings.
- Describe plans to coordinate with the Washington State Department of Ecology and all affected tribes to assure that state and tribal water resources are protected from impacts associated with the proposed project's construction, operation, and maintenance activities.

The DEIS indicates that water quality may be adversely affected if the project construction activities (excavation, digging, bulldozing, surface pavement, earthwork and grading, stream relocation, etc.) alter the hydrology of springs and surface runoff such that erosion carries sediment to surface waters and pollutants to local drainages and the underlying aquifer. In addition, land disturbance, material storage, waste disposal, inadvertent chemical or hazardous liquid spills, and compaction produced by vehicular traffic can all affect recharge to the local aquifer and groundwater quality. The Build

---

[13] DEIS, p. 3.11-12.

Alternatives may also result in unavoidable permanent direct, indirect, and temporary impacts to wetlands and their buffers.

Potential Impacts on Contaminated Sites and Monitoring

If the FTA and Sound Transit reconsider the Midway Landfill Alternative, EPA recommends FTA coordinate with EPA R10 Superfund Program as the project is implemented so that project activities are consistent with agreed upon remedies for the Midway Landfill Superfund site. The EPA Remedial Program Manager is Ashley Grompe, and she may be reached at (206) 553-1284 or grompe.ashley@epa.gov. It will also be helpful to coordinate with Washington State Department of Ecology so that the FEIS identifies all the contaminated sites in the planning area and vicinity and discusses measures to take to minimize project impacts and meet state requirements.

The DEIS identifies several existing contaminated sites in the project area (up to 64 sites), and the possibility that more contaminated sites could be discovered during construction and operation of the project. Identification of the sites was also limited to a 1/8-mile radius, which is less than the suggested 1-mile radius used for identification of contaminated sites.[14]

Potential Impacts to Biological Resources

We recommend that the Final EIS include information on working with the U.S. Fish and Wildlife Service and National Marine Fisheries Service, and, as appropriate, with the Washington Department of Fish and Wildlife, including recommended measures to reduce risks and protect biota and habitat. The DEIS indicates the proposed project activities may impact federally and state protected species occurring in the project area and vicinity, such as the threatened Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout. Because of their potential to support fish use, the East and West Fork Hylebos tributaries in the project area are also designated as essential fish habitat for Pacific salmon.

The impacts to biological resources will be due to the anticipated loss and degradation of suitable habitats and cover; increased sediment delivery to streams, resulting in increased turbidity; and higher than optimal noise levels during project construction activities that will involve use of excavators and other heavy equipment or machinery. EPA also encourages the FTA to include in the FEIS information on the outcomes of consultations with the Services and coordination with the state agency.

Coordination with Tribes

EPA encourages FTA to incorporate feedback from Tribes when making decisions regarding the project and recommends the FEIS describe the issues raised during government-to-government consultations and how those issues were addressed.

Monitoring of the Project and Adaptive Management

EPA recommends the FEIS include a monitoring program designed to assess both impacts from activities and effectiveness of mitigation measures for the impacts and indicate how the program will use an effective feedback mechanism, such as adaptive management, so that any needed adjustments can be made to the activities to meet environmental objectives during project implementation. For example, there could be a plan to monitor noise impacts during project construction and take corrective action if noise complaints or damage claims exceed existing levels.

---

[14] https://wsdot.wa.gov/sites/default/files/2021-10/Env-HazMat-ERSECSGuidance.pdf. Accessed 10/30/2023.

Social Cost of Greenhouse Gases

EPA acknowledges the DEIS quantifies the greenhouse gas emissions for operations, maintenance, and construction, including haul truck emissions, for the proposed alternatives. EPA continues to recommend the FEIS estimate the social cost of GHG emissions (SC-GHG) for each alternative to facilitate decisionmakers' and the public's evaluation of the proposed alternatives by monetizing the calculated GHG emissions. This is in alignment with CEQ's January 9, 2023 interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews.[15] This guidance was in response to EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*.[16] Alternatively, if choosing to not include SC-GHG in the analysis, provide a basis for that decision.

---

[15] https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate. Accessed 11/3/2023.

[16] https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate. Accessed 11/3/2023.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
1	**Environmental Justice (EJ)** EPA has concerns about the conclusions made in the DEIS regarding EJ impacts and recommends the FEIS identify, analyze, and address disproportionate impacts in accordance with Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All and the Guidance from the Council on Environmental Quality on Environmental Justice and the National Policy Act (CEQ EJ Guidance). EO 14096 directs federal agencies, as appropriate and consistent with applicable law, to identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities, including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns. It builds upon Executive Order 12898 Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 14096 further states that EPA will carry out responsibilities under Section 309 of the Clean Air Act, 42 U.S.C. 7609, to assess whether each agency analyzes and avoids or mitigates disproportionate human health and environmental effects on communities with EJ concerns.	FTA recognizes EPA's oversight responsibilities under Executive Order (EO) 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, which was enacted on April 21, 2023. EO 14096 does not rescind EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which has been in effect since February 11, 1994, and is currently implemented through DOT Order 5610.2C. FTA continues this implementation for all projects, including OMF South, until further guidance is provided regarding the implementation of EO 14096 on environmental justice. This has been clarified in Appendix E, Environmental Justice Assessment, of the Final EIS.
2	EPA recommends the EJ topic be analyzed further in Chapter 3 of the Final EIS as its own section, rather than in Appendix E, to highlight the importance of EJ as a part of the affected environment. EPA also offers the following recommendations to fully identify, analyze, and address disproportionate impacts from the proposed project to communities with EJ concerns.	A summary of the Environmental Justice Assessment is included in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, in the Final EIS. This section was renamed between the publication of the 2023 Draft EIS and the Final EIS to include "Environmental Justice" in the title. Additionally, an environmental justice summary is included in the Executive Summary of the Draft and Final EIS.
3	***Potential Disproportionate Impacts on Communities with EJ Concerns*** The DEIS concludes that "[a]fter considering the project's potential effects, mitigation, and avoidance measures and anticipated benefits to minority and low-income populations, FTA has made a preliminary determination that the OMF South would not result in disproportionately adverse effects on minority and low-income populations." EPA has concerns that the project may have disproportionate impacts and recommends the Final EIS further analyze impacts to communities.	Based on EPA's comments, FTA and Sound Transit conducted additional analysis on potential impacts to minority and low-income populations. This has included evaluating potential impacts at the block group level and evaluating potential cumulative impacts using the EJScreen tool. FTA and Sound Transit also expanded the discussion on the project mitigation and benefits. These updates are reflected in Appendix E, Environmental Justice Assessment, of the Final EIS. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.
4	Assessing EPA's Environmental Justice Screening and Mapping Tool (EJScreen) information is a useful first step in understanding or highlighting locations that may be candidates	Appendix E, Environmental Justice Assessment, of the Final EIS uses census data to characterize the study area consistent with FTA's guidance. This is

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
	for further review or outreach. EPA considers a project to be in an area of potential EJ concern when an EJScreen for the impacted area shows one or more of the EJ Indexes at or above the 80th percentile in the nation and/or state. We note the DEIS only includes a 0.5-mile radius around the project site to identify communities with EJ concerns. At a minimum, EPA recommends an EJScreen analysis consider EJScreen information for the block groups which contains the proposed action and a one-mile radius around those areas. EPA ran EJScreen with a 1-mi buffer around the project area and found that 10 out of the 12, and 11 out of the 12 EJ Indexes exceeded the 80th percentile when compared to the state, for the preferred alternative location and the midway landfill location, respectively. Exceeded EJ indexes include indicators relating to air quality, including diesel particulate matter at the 98th percentile at the preferred location and the 97th percentile for the Midway Landfill location.	the same census data used by EJScreen and results in a similar characterization of EJ populations. Sound Transit updated Appendix E, Environmental Justice Assessment of the Final EIS to reflect the EJScreen outputs in Section 5.3, Cumulative Impacts, and Attachment A, EJ Screen Reports. The 0.5-mile study area was used because it captures (1) the area of potential direct and indirect impacts from project construction and operation and (2) the demographic characteristics of the population that is most likely to experience impacts of the project. For example, a larger study area of 1.0 mile would reduce the percent of low-income and minority populations and include populations that would not be as directly affected by the project. This approach is consistent with FTA's Circular C-4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients, that states, "The boundaries of your unit of geographic analysis should be large enough to include the area likely to experience adverse effects, but not so large as to artificially dilute the minority population and/or low-income population." Appendix E Section 2.1, Study Area, has been updated to provide additional information on why a 0.5-mile study area is used.
5	EPA also recommends considering the Washington State Department of Health Environmental Health Disparities map. This map depicts cumulative health impact as a ranking from 1 to 10, with 10 indicating the highest impact. These rankings reflect the risk each community faces from multiple environmental hazards and the degree to which a community is more vulnerable to those hazards because of certain sociodemographic factors. Rankings for this map can be interpreted as a way to measure relative environmental risk factors in communities. The project area for all alternatives and the surrounding census tracts all rank at 10.	Appendix E, Environmental Justice Assessment, of the Final EIS has been updated to include a summary of Washington Department of Health Environmental Health Disparities map data. This provides an additional level of information about the affected environment and existing conditions but does not change the impact analysis because the project is not anticipated to compound issues identified by the Disparities Map.
6	These screening tools indicate that the proposed project is located within an area with potential EJ concerns and that these communities face significant environmental disparities. EPA has concerns that the cumulative impacts of this project and the historically over-burdened nature of the area could have significant potential disproportionate adverse impacts on communities with EJ concerns. EPA recommends the Final EIS include a more robust analysis of the project's potential impacts to communities with EJ concerns including but not limited to community cohesion, affordable housing, public health impacts, and public safety. EPA is concerned that the project development will further exacerbate a historically over-burdened community.	Section 5.3, Cumulative Impacts, of Final EIS Appendix E, Environmental Justice Assessment, has been updated to include consideration of the EJScreen tool outputs. It identifies that the project study area is in the 80th and 90th percentiles for many of the environmental indexes when compared to national and state data. One of the EJScreen indexes is Superfund proximity. The Midway Landfill Alternative would affect a Superfund site. As described in Section 3.13, Hazardous Materials, of the Final EIS, Sound Transit would coordinate with EPA and Ecology to identify and implement appropriate mitigation measures. The project would not have adverse impacts related to other EJScreen indexes.

	Comment Text	Response
		The Environmental Justice Assessment also evaluates potential impacts to environmental justice populations for all elements of the environment, including community cohesion, affordable housing, public health, and public safety. Potential impacts to community cohesion and affordable housing, public health, and public safety are also described in more detail in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods; Section 3.8, Air Quality and Greenhouse Gases; Section 3.13, Hazardous Materials; and Section 3.14, Public Services, of the Final EIS. With implementation of best management practices and mitigation for hazardous materials related to the Midway Landfill Alternative, no adverse impacts are identified for these elements of the environment.
7	***Mitigation*** The DEIS states that disproportionate impacts will not occur due to identified mitigation measures and community benefits. It is unclear in the DEIS if identified mitigation measures will fully offset the disproportionate impacts from the project, especially considering the prior recommendations related to fully identifying where EJ concerns may occur and be impacted by the proposed project. In addition, the benefits identified are not specific to the impacted communities. Finally, it is unclear if mitigation measures and benefits were identified through robust community involvement (e.g., informed by meaningful engagement with the impacted community). The CEQ EJ Guidance identifies important ways to consider mitigation for EJ under NEPA, including: • “Mitigation measures identified as part of ... an environmental impact statement (EIS), or a record of decision (ROD), should, whenever feasible, address significant and adverse environmental effects of proposed federal actions on minority populations, low-income populations, and Indian tribes.” • “Each Federal agency must provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, crucial documents, and notices.”	Sound Transit has updated Appendix E, Environmental Justice Assessment, of the Final EIS to include additional information on project mitigation and benefits. Impacts to environmental justice populations would be mitigated with the exception of visual impacts from the Preferred and South 344th Street alternatives. The project would also provide direct and indirect benefits. Direct benefits include: • Enhanced community connectivity for the Preferred Alternative through public space and a multi-use trail integrated into the site design that would benefit the surrounding community • Construction jobs with project labor agreements and a DBE program to support hiring of minority populations • Creation of new jobs to operate the facility that could benefit both environmental justice and non-environmental justice populations Indirect benefits include supporting the Sound Transit 3 system expansion by providing capacity to ensure transit reliability, access, connectivity, and frequency. Sound Transit and FTA have completed robust community engagement for the project. Engagement methods included online and in-person outreach, existing community efforts, media advertisements, English and translated materials (in Spanish, Korean, and Russian), and additional outreach efforts to ensure continual engagement and availability of information throughout Early Scoping, Scoping, 2021 SEPA Draft EIS publication, and 2023 NEPA Draft/SEPA Supplemental Draft EIS publication. Public input on proposed mitigation measures was solicited through the community engagement for the 2021 and 2023 Draft EIS publications.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
		Appendix E, Environmental Justice Assessment, of the Final EIS was also updated to reflect the community engagement activities that occurred as part of the 2023 Draft EIS publication. Additional information on this engagement is described in Appendix B, Public Involvement and Agency Coordination, of the Final EIS.
8	The DEIS indicates that one of the key benefits to the community would be the generation of 11,200 to 20,000 jobs in the region. EPA recommends the FEIS provide clarification on this benefit to communities with EJ concerns that are impacted by the project, specifically: • If job training will be provided to communities most impacted, • Will additional measures to be taken to hire within the impacted communities for these 11,200 to 20,0000 jobs, and • The types of jobs available to the impacted community (e.g., permanent or temporary; professional or nonprofessional). If there are no additional tailored mitigation measures to be implemented, provide clarification that the benefit received will be regional job opportunities and are not tailored to the communities with EJ concerns impacted by the proposed project.	Section 3.5, Economics, of the Final EIS has been updated to provide additional information on the direct and indirect economic output generated by the project. Direct employment generated by construction of OMF South would equate to between approximately 5,600 and 12,000 job years (defined as full-time employment for one person over the course of a year), depending on alternative. Final EIS Appendix E, Environmental Justice Assessment, clarifies that OMF South would result in approximately 610 permanent high-skilled, living wage jobs and that Sound Transit would implement Project Labor Agreements and a Disadvantaged Business Enterprise Program that are targeted to benefit minority or low-income populations and promote a local workforce. Sound Transit acknowledges that the potential for jobs may or may not benefit the affected EJ population of the project or within the study area.
9	EPA recommends developing specific mitigation measures to address the potential disproportionate EJ impacts. In developing mitigation measures, consider mechanisms to minimize impacts of the proposed project to communities. It is important to shape mitigation efforts through engagement with each uniquely impacted group. An example of a mitigation measure EPA has seen applied in other federal projects to address impacts on communities with EJ concerns is the development of a community benefits agreement (CBA). CBAs have been used to mitigate impacts to displaced communities and those with disrupted community cohesion from displacement of community gathering places like churches. Developing a CBA involves robust community involvement and meaningful engagement to ensure mitigation measures benefit the most impacted communities. Consider neighborhood plans and goals when identifying mitigation measures to help inform mitigation to offset disproportionate impacts. Community benefits may vary from community to community depending on their unique attributes. Consider reviewing previous strategies to develop a CBA such as FHWA's South End Park neighborhood redevelopment project in which community members helped inform innovative mitigation measures.	Appendix E, Environmental Justice Assessment, of the Final EIS has been updated to provide more detail on the mitigation proposed for project impacts. This includes more robust information on the relocation assistance Sound Transit would provide to displaced residents and businesses. With the exception of visual impacts, all impacts would be mitigated. The analysis has also been updated to provide more information on project benefits. Throughout the OMF South project, Sound Transit has engaged with the affected community. This is documented in the Final EIS in Appendix B, Public Involvement and Agency Coordination, and summarized in Appendix E, Environmental Justice Assessment. Public input on proposed mitigation measures was solicited through the community engagement and public comment processes for the 2021 and 2023 Draft EIS publications. No substantive comments on the proposed mitigation measures were received. Information on impacts and potential mitigation for the project was also shared with property owners and residents throughout the EIS process.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
10	EPA notes that CEQ's EJ Guidance states that "agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruptions on the community structure associated with the proposed action; and the nature and degree of the impact on the physical and social structure of the community." To address these interrelated factors that may amplify the natural and physical environmental effects of the proposed agency action, EPA further recommends the Final EIS include specific information and measures related to compensation and relocation assistance for low-income and minority residences and minority-owned businesses that could be acquired, displaced, and relocated by the project. Include in the Final EIS additional information and measures to address the temporary or long-term loss of services to low-income and minority communities provided by community organizations, such as the Christian Faith Center that has daycare services, that will either be relocated by the project or affected during construction of the project. It will also be important for FTA to discuss in the Final EIS plans to resolve conflicts that could arise from businesses and residents that might refuse easement offers.	Section 5.1.1.2 in Appendix E, Environmental Justice Assessment, of the Final EIS has been updated to provide more detailed information on the compensation and relocation assistance that would be provided to residents, businesses, and community facilities that would be displaced by the project. It describes Sound Transit's relocation program, which ensures that all persons displaced by the project are treated consistently and equitably and that Sound Transit tailors the relocation to meet residents' specific needs. It also describes the additional considerations that are taken into account for low-income residents who rent.
11	***Meaningful Public Engagement*** In addition to fully characterizing the communities with EJ concerns who may be impacted by the proposed project, EPA recommends conducting meaningful engagement to ensure community feedback is reflected in the decision-making process. EPA appreciates FTA's efforts to inform the public and has recommendations to involve the public more meaningfully to help identify mitigation measures to disproportionate impacts on communities with EJ concerns. EPA recommends mitigation efforts be guided by meaningful public engagement with impacted communities. CEQ guidance states that "agencies should elicit the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect…and should carefully consider community views in developing mitigation strategies." EO 14096 states [federal agencies are] to "provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns who are potentially affected by Federal activities including by providing timely opportunities for members of the public to share information or concerns and participate in decision-making processes, fully considering public input provided as part of decision-making processes, and providing notice of and engaging in outreach to communities or groups of people who are potentially affected and who are not regular participants in Federal decision-making." Given the above, EPA recommends:	Sound Transit and FTA have completed robust community engagement with property owners and residents that could be affected by the project, including those in Belmor. Engagement methods included online and in-person outreach, existing community efforts, media advertisements, English and translated materials (in Spanish, Korean, and Russian), and additional outreach efforts to ensure continual engagement and availability of information throughout Early Scoping, Scoping, 2021 SEPA Draft EIS publication, and 2023 NEPA Draft/SEPA Supplemental Draft EIS publication. Public input on proposed mitigation measures was solicited through the community engagement for the 2021 and 2023 Draft EIS publications. Additional information on this engagement is described in Appendix B, Public Involvement and Agency Coordination, of the Final EIS. An example of the meaningful engagement includes changes in the Preferred Alternative design to address comments from the 2021 Draft EIS. As part of the ongoing community and agency coordination, Sound Transit received comments from Federal Way on the 2021 Draft EIS identifying the need to replace 20th Avenue S and concerns from the community about ecosystem impacts of the project. In response to those comments, Sound Transit collaborated with city staff to modify the site design of the Preferred Alternative to replace 20th Avenue S with 18th Place S. Sound Transit also

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
	- Designing robust community engagement practices to maximize participation opportunities for communities that would be affected by the project, such as community-based workshops to facilitate discussion and issue resolution. - Creating community advisory committees with representatives from impacted communities to help facilitate guidance and feedback from community members. - Hosting focus group discussions to have robust conversations around mitigation that is appropriate to each impacted community. EPA has concerns that while efforts have been made to inform the public, the public's feedback has not been fully incorporated into the decision-making process and/or addressed in the NEPA process. EPA recommends the Final EIS include more details on how input from impacted communities is considered in this process, including the selection of the preferred alternative, and ensure that public input is fully considered and responded too in the decision-making process. The CEQ EJ Guidance specifies that "[u]nder NEPA, the identification of a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe does not preclude a proposed agency action from going forward, nor does it necessarily compel a conclusion that a proposed action is environmental unsatisfactory. Rather, the identification of such an effect should heighten agency attention to alternatives (including alternative sites), mitigation strategies, monitoring needs, and preferences expressed by the affected community or population."	modified the design for the Preferred Alternative to allow for a wider stream corridor on the east side of the site, reduce wetland impacts on the west side of the site, and daylight additional stream segments. As the project moves into final design, Sound Transit will continue to engage with Federal Way and the community on design elements of the facility to address visual and community impacts.
12	**Potential Impacts to Air Quality** The DEIS states that, "[a]lthough portions of the Puget Sound region are in maintenance areas for $PM_{2.5}$ and PM_{10}, none of the build alternatives are located within nonattainment or maintenance areas." While this may be true, it is also possible that local air quality may still be impacted due to cumulative impacts from surrounding activities such as road construction and site operations, traffic on unpaved roads and others, including use of woodstoves, agriculture, fire, and air traffic. EJScreen indicates EJ indexes above the 90th percentile for diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index at all alternative locations, and above the 80th percentile for particulate matter at the preferred alternative location. This is consistent with the WA Health Disparities Map which ranks diesel exhaust $PM_{2.5}$ emissions at a 9 out of 10 for all locations. Changes in climate may also result in increased air pollution from future wildfires. In our scoping comments for the project in August, EPA had also indicated that evaluation of cumulative impacts on air quality will be important because of this project site's proximity to the Tacoma $PM_{2.5}$ maintenance area.	The cumulative impacts analysis for Air Quality in Chapter 4, Cumulative Effects Analysis of the Final EIS, concludes that, while there is a potential for construction schedules to overlap with other projects in the area, the temporary nature of air quality construction impacts and the use of standard construction best management practices make it unlikely that air quality standards would be exceeded. Section 3.8, Air Quality and Greenhouse Gas Emissions has been updated to include more detail about existing air quality conditions in the study area from the EJScreen and the Washington Environmental Health Disparities Map, as well as from Puget Sound Clean Air Authority (PSCAA) monitoring data. There are no anticipated cumulative impacts expected from the Tacoma $PM_{2.5}$ maintenance area because it is over 2 miles south of the OMF South alternative project sites. Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS has been revised to include a discussion of a fugitive dust plan, sensitive receptors near the project sites, and

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
		estimated construction durations of each build alternative.
13	Because of this project's potential air quality impacts, EPA recommends the Final EIS: • Estimate air emissions from all sources (e.g., stationary and mobile sources) for the analysis area; discuss the timeframe for release of these emissions; and determine whether the emissions will exceed National Ambient Air Quality Standards (NAAQS). For accurate air emission estimates, use the latest version of EPA's Motor Vehicle Emission Simulator (MOVES3).The DEIS does not currently provide baseline data on air quality to help determine the extent to which the project will impact air quality in the project area and vicinity. EPA recommends an assessment of baseline conditions be conducted and disclosed in the Final EIS, including a summary of representative background concentration of criteria air pollutants and any relevant information regarding local air toxics, if available.	Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS has been revised to include more detail on the types of operational emissions that would be expected and their relative location on the sites. Through coordination with EPA Air Quality staff, EPA affirmed that a MOVES analysis for this project is not warranted because the number of daily trips generated by OMF South is relatively low. As stated in the Final EIS, the project alternatives are in areas that are in attainment for current NAAQS. While $PM_{2.5}$ is a recognized concern throughout the PSCAA region, it is not on the verge of falling into nonattainment. Section 3.8, Air Quality and Greenhouse Gas Emissions, has been updated to include more detail about existing air quality conditions in the study area from the EJScreen and the Washington Environmental Health Disparities Map, as well as from PSCAA monitoring data. According to PSCAA air quality data, diesel emissions (measured as black carbon) have been trending downward, and $PM_{2.5}$ levels have met standards, though wildfire smoke days have posed a concern in recent years. The Final EIS concludes that operational impacts to air quality would be very minor, and while construction-related impacts could affect air quality within localized areas of construction activity (including traffic congestion), those impacts could be avoided or reduced through the use of BMPs. Similarly, the cumulative impacts analysis did not identify any substantial adverse impacts, even with consideration of other construction projects in the vicinity of the site alternatives. In addition, Sound Transit has a robust community outreach program designed to keep the public informed of the project and a lead ombudsman to respond to and address community concerns and questions throughout construction.
14	• Expand the fugitive dust plan for the alternative project sites, particularly to identify nearby sensitive receptors and measures to protect these from dust impacts. Describe in the plan how the nearby public will be kept informed of the project and be provided contact methods to report fugitive dust impacts.	Avoidance and minimization measures have been updated in Section 3.8, Air Quality and Greenhouse Gas Emissions, to add specific measures that could be included in a fugitive dust plan. The contractor will be responsible for preparing and following a fugitive dust plan that will identify corrective actions to be taken if dust from the project site reaches unacceptable levels.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
15	• Include a summary of the project-related Mobile Source Air Toxics analysis results using the most recent EPA model for analysis of these emissions and related health risks. If there will be significant air toxics emissions, consider giving preference to contractors using highest engine Tier available (Tier 3 or 4) machinery to reduce air toxics emissions during implementation of the project. During project site preparation, the DEIS indicates there will be up to 564 truck trips per day traveling to and from the project site. As this number does not account for the project construction and overall cumulative traffic in the area, it is possible that mobile source air toxics emissions from the project and other surrounding sources could be significant and warrant further analysis. • Ensure the above analyses include off-site mobile source air emissions of vehicles and trucks along likely corridors to and from the facility from both the construction and operations of the project with respect to criteria air pollutants and air toxics, including diesel particulate matter emissions. Consider sensitive receptors and vulnerable populations such as communities with EJ concerns, park/recreational users, schools, daycares, seniors/nursing homes, hospitals, and other healthcare facilities. The air quality analysis does not currently include health-related risks associated with diesel exhaust emissions. Providing a diesel exhaust emissions analysis of the long-term increased truck traffic and its impact on the surrounding community will be helpful.	OMF South does not meet the threshold for conducting a Mobile Source Air Toxics (MSAT) analysis. According to FHWA guidance, projects that should complete MSAT analysis include those that have potential for a meaningful difference in MSAT emissions, such as major intermodal freight facilities or projects that would add significant capacity to highways or roads with average annual daily traffic volumes of 140,000 to 150,000 vehicles per day. The OMF South project does not affect any roadways with such traffic volumes, nor would it add capacity to any highways or roads. Through coordination with EPA Air Quality staff, EPA affirmed that MSAT for this project is not warranted.
16	• Identify appropriate mitigation measures and best management practices to reduce emissions and comply with federal and state air quality regulations.	Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS lists the avoidance and minimization measures, including best management practices to reduce emissions and comply with federal and state air quality regulations. With implementation and consistent use of BMPs to minimize on-site emissions, construction and operation of the proposed project would not be expected to substantially affect air quality, and therefore no mitigation is anticipated.
17	• Discuss plans to monitor air quality in the project area and take corrective action if the NAAQS are not met. This is important because there are sensitive receptors in the project area and motor vehicle traffic may increase in the area, particularly during project construction. Localized air quality conditions can be substantial (e.g., during wildfire burns), even though area-wide and/or long-term emissions monitoring may show compliance with NAAQS. Consideration of the cumulative health impacts caused by the project (construction, operation, and maintenance phases) and other sources to communities with EJ concerns will also be important, as well as coordination with public health agencies and industry, which often have data on human health and environmental hazards.	Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS found no indication that constructing or operating OMF South would lead to NAAQS exceedances; therefore, no monitoring is proposed. The contractor will be responsible for preparing and following a fugitive dust plan that will identify corrective actions to be taken if dust from the project site reaches unacceptable levels.

EPA (Communication ID 539079)

Comment ID	Comment Text	Response
18	• Clarify whether the project analysis area is adjacent to the maintenance area for $PM_{2.5}$ and discuss when the maintenance period will end or be renewed. If the site is adjacent to this maintenance area and a conformity determination analysis is conducted, then, provide results of such analysis in the Final EIS. It may also be prudent to monitor air locally and take corrective action if NAAQS are exceeded, even if temporarily.	The project alternatives are over 2 miles north of the $PM_{2.5}$ maintenance area in Tacoma/Pierce County (the maintenance area ends at the county line), which will end in March 2035. Accordingly, FTA and Sound Transit determined that a conformity determination analysis is not required for the project, as described in Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS.
19	• Provide information on coordination with other entities in the area, such as the State of Washington Departments of Ecology and Social and Health Services and local air organizations, to ensure emissions due to the proposed project are reduced and effectively mitigated throughout the proposed project lifespan.	The project did not consult with other agencies over air quality concerns because no air quality impacts were identified beyond short-term construction impacts that can be mitigated through BMPs.
20	**Potential Impacts to Surface Water Quality and Beneficial Uses** As construction and operation activities may impact water resources, resulting in alterations of local hydrology and long-term impacts to water quality parameters and designated beneficial uses due to increased turbidity and sedimentation of these pollutant receiving waters, EPA recommend that the Final EIS: • Include information on the most recent EPA-approved Water Quality Standards (WQS) for the State of Washington and implications for water quality protection within waterbodies in the analysis area and vicinity. It would be important for the public to know the State WQS to determine the extent to which the proposed action would impact water quality. The DEIS indicates that Build Alternatives will likely impact two already impaired tributaries on current Washington State’s 303(d) list due to exceedances of copper, lead, polycyclic aromatic hydrocarbons (PAHs), pH, and zinc WQS within the West Fork Hylebos tributary; and bacteria, dissolved oxygen in McSorley Creek. Under the Preferred Alternative, there will also be a loss of riparian vegetation which may contribute to long-term impacts to water resources in the project area and downstream areas, including increased stream temperatures; decreased runoff interception and pollutant filtration functions; reduced groundwater recharge; increased erosion and sedimentation; and loss of stream channel stabilization. • Discuss the project impacts analyses and conclusions based on the most recent WQS information. Where WQS are exceeded, it will be important for the FEIS to discuss how these impaired waterbodies will be restored.	The project will comply with current stormwater and water quality regulations in effect at the time of construction. As detailed in Section 3.11, Water Resources, these regulations concern stormwater flow control and treatment in order to protect receiving waterbodies. Section 3.11 lists the specific avoidance and minimization measures that the project would implement to protect water quality during construction and operation. Section 3.10, Ecosystems, details avoidance, minimization, and mitigation measures for impacts related to the removal of riparian vegetation. The EIS acknowledges that contamination can bypass stormwater treatment facilities in some instances and that Ecology has evaluated the effectiveness of stormwater facilities in providing treatment that prevents or reduces the toxicity of contaminants in receiving waters. Under any of the build alternatives, treatment effectiveness would be a key consideration in the selection and design of stormwater management facilities. The Final EIS was updated to include a list of regulations that govern the protection or use of water resources in the study area, including the most recent EPA-approved Water Quality Standards (WQS) for the State of Washington. See Appendix H5, Water Resources Technical Appendix. In 2022, EPA approved the 2018 water quality standards for Washington state, which are the most current standards. No WQS exceedances are anticipated as a result of the project.
21	• Provide the most current information regarding the status of the Clean Water Act § 401 certification and § 404 permit application processes, as well as conditions to protect water quality and wetlands.	The need for a Clean Water Act (CWA) Section 401 certification and 404 permit is listed in the Anticipated or Potential Licenses, Permits, and Approvals table in the Fact Sheet of the 2023 Draft EIS and Final EIS. Section 3.10, Ecosystems, and Section 3.11, Water Resources of the 2023 Draft

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
		EIS and Final EIS discuss the need to protect water quality and wetlands. Actual permit conditions will be determined through the permit application processes with Ecology and the U.S. Army Corps of Engineers. No permit applications under the CWA have been made to date; these will occur after publication of the Final EIS and once the Sound Transit Board selects the project to be built.
22	• Include up-to-date information on the anticipated Pollutant Discharge Elimination System (NPDES) permit application process including measures to protect water quality and development of Storm Water Pollution Prevention Plans, reporting, and monitoring. The DEIS indicates that project construction will disturb more than 1 acre of land (up to 68 acres), which will subject the project to NPDES permitting requirements for discharges to waters of the United States and related Stormwater Pollution Prevention Plan and construction best management practices.	The need for a compliance review by the local jurisdiction of the NPDES stormwater discharge requirements before discharge to the local stormwater system is listed in the Anticipated or Potential Licenses, Permits, and Approvals table in the Fact Sheet of the 2023 Draft EIS and Final EIS. Section 3.11, Water Resources, of the 2023 Draft EIS and Final EIS lists the potential avoidance and minimization measures and BMPs that could be used during construction, including the development of a Stormwater Pollution Prevention Plan.
23	• Consider implementation of low impact development techniques, which have the potential to further reduce stormwater volumes and thus mimic natural conditions as closely as possible. The techniques also lessen impacts of stormwater runoff from impervious surfaces such as paved roads, parking lots, and roofs and can provide energy and other utility savings.	Low-impact development measures will be considered as part of final design and were discussed in the avoidance and minimization measures listed in Section 3.11, Water Resources, of the 2023 Draft EIS.
24	• Describe plans to coordinate with the Washington State Department of Ecology and all affected tribes to assure that state and tribal water resources are protected from impacts associated with the proposed project's construction, operation, and maintenance activities.	Appendix B, Public Involvement and Agency Coordination, of the Final EIS describes Sound Transit's coordination efforts with regulatory agencies and Tribal governments, including Ecology, throughout the course of the project. Sound Transit will continue coordinating with the Tribes and regulatory agencies throughout the final environmental review, permitting, design, and construction of the project.
25	The DEIS indicates that water quality may be adversely affected if the project construction activities (excavation, digging, bulldozing, surface pavement, earthwork and grading, stream relocation, etc.) alter the hydrology of springs and surface runoff such that erosion carries sediment to surface waters and pollutants to local drainages and the underlying aquifer. In addition, land disturbance, material storage, waste disposal, inadvertent chemical or hazardous liquid spills, and compaction produced by vehicular traffic can all affect recharge to the local aquifer and groundwater quality. The Build Alternatives may also result in unavoidable permanent direct, indirect, and temporary impacts to wetlands and their buffers.	See response to Comment ID 20.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
26	**Potential Impacts on Contaminated Sites and Monitoring** If the FTA and Sound Transit reconsider the Midway Landfill Alternative, EPA recommends FTA coordinate with EPA R10 Superfund Program as the project is implemented so that project activities are consistent with agreed upon remedies for the Midway Landfill Superfund site. The EPA Remedial Program Manager is Ashley Grompe, and she may be reached at (206) 553-1284 or grompe.ashley@epa.gov. It will also be helpful to coordinate with Washington State Department of Ecology so that the FEIS identifies all the contaminated sites in the planning area and vicinity and discusses measures to take to minimize project impacts and meet state requirements.	Section 3.13, Hazardous Materials, includes information on the contaminated sites in the planning area and vicinity and discusses measures to take to minimize project impacts and meet state requirements. If the Midway Landfill Alternative is selected as the project to be built, Sound Transit will coordinate with the EPA, Ecology, and other regulatory agencies as appropriate.
27	The DEIS identifies several existing contaminated sites in the project area (up to 64 sites), and the possibility that more contaminated sites could be discovered during construction and operation of the project. Identification of the sites was also limited to a 1/8-mile radius, which is less than the suggested 1-mile radius used for identification of contaminated sites.	The study area for the hazardous materials analysis included the area within a 1/8-mile radius of the construction limits for each build alternative because properties farther than 1/8-mile away present a low probability of having hazardous materials releases that could affect the study area. Please see Section 3.13, Hazardous Materials.
28	**Potential Impacts to Biological Resources** We recommend that the Final EIS include information on working with the U.S. Fish and Wildlife Service and National Marine Fisheries Service, and, as appropriate, with the Washington Department of Fish and Wildlife, including recommended measures to reduce risks and protect biota and habitat. The DEIS indicates the proposed project activities may impact federally and state protected species occurring in the project area and vicinity, such as the threatened Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout. Because of their potential to support fish use, the East and West Fork Hylebos tributaries in the project area are also designated as essential fish habitat for Pacific salmon. The impacts to biological resources will be due to the anticipated loss and degradation of suitable habitats and cover; increased sediment delivery to streams, resulting in increased turbidity; and higher than optimal noise levels during project construction activities that will involve use of excavators and other heavy equipment or machinery. EPA also encourages the FTA to include in the FEIS information on the outcomes of consultations with the Services and coordination with the state agency.	Appendix B, Public Involvement and Agency Coordination, describes Sound Transit's coordination efforts with regulatory agencies and Tribal governments, including the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Washington Department of Fish and Wildlife (WDFW), throughout the course of the project. Sound Transit will continue coordinating with the Tribes and regulatory agencies throughout the final environmental review, permitting, design, and construction of the project. Section 3.10, Ecosystem Resources, of the Final EIS includes a discussion of Endangered Species Act (ESA)-listed species. Additionally, Sound Transit and FTA have prepared a Biological Assessment that evaluates potential impacts of the Preferred Alternative to federally listed species including listed fish. ESA consultation is currently underway with the National Marine Fisheries Service and U.S. Fish and Wildlife Service.
29	**Coordination with Tribes** EPA encourages FTA to incorporate feedback from Tribes when making decisions regarding the project and recommends the FEIS describe the issues raised during government-to-government consultations and how those issues were addressed.	Appendix B, Public Involvement and Agency Coordination, of the Final EIS describes Sound Transit's coordination efforts with regulatory agencies and Tribal governments throughout the course of the project. Sound Transit will continue coordinating with the Tribes and regulatory agencies throughout the final environmental review, permitting, design, and construction of the project.

EPA (Communication ID 539079)		
Comment ID	**Comment Text**	**Response**
30	**Monitoring of the Project and Adaptive Management** EPA recommends the FEIS include a monitoring program designed to assess both impacts from activities and effectiveness of mitigation measures for the impacts and indicate how the program will use an effective feedback mechanism, such as adaptive management, so that any needed adjustments can be made to the activities to meet environmental objectives during project implementation. For example, there could be a plan to monitor noise impacts during project construction and take corrective action if noise complaints or damage claims exceed existing levels.	The OMF South project requirements will require the contractor to conduct noise and vibration monitoring during construction to confirm noise levels are below FTA threshold values. Additionally, the contractor must conduct noise and vibration verification tests before revenue service can begin. Regulatory agencies may require monitoring as part of permit conditions. Sound Transit will comply with all permitting requirements.
31	**Social Cost of Greenhouse Gases** EPA acknowledges the DEIS quantifies the greenhouse gas emissions for operations, maintenance, and construction, including haul truck emissions, for the proposed alternatives. EPA continues to recommend the FEIS estimate the social cost of GHG emissions (SC-GHG) for each alternative to facilitate decisionmakers' and the public's evaluation of the proposed alternatives by monetizing the calculated GHG emissions. This is in alignment with CEQ's January 9, 2023 interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews. This guidance was in response to EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. Alternatively, if choosing to not include SC-GHG in the analysis, provide a basis for that decision.	Section 3.8, Air Quality and Greenhouse Gas Emissions, of the Final EIS has been updated to include a discussion of the social cost of the greenhouse gases that could be emitted under each alternative.

From: Handel, Lindsey (FHWA) <lindsey.handel@dot.gov>
Sent: Monday, October 30, 2023 9:13 AM
To: Green, Erin <erin.green@soundtransit.org>
Cc: Zweifel, Justin (FTA) <justin.zweifel@dot.gov>; Chris Moelter <cmoelter@anchorqea.com>; Borbe, Elma <elma.borbe@soundtransit.org>; Hawkins, Curvie <Curvie.Hawkins@soundtransit.org>; Neilson, Austin <Austin.Neilson@soundtransit.org>; Ramachandra, Sagar <sagar.ramachandra@soundtransit.org>; Maggioncalda, Daniel <daniel.maggioncalda@soundtransit.org>; Eskenazi, Zachary <Zachary.Eskenazi@soundtransit.org>; Love, Sharon (FHWA) <sharon.love@dot.gov>; Albury, Elisa (FHWA) <elisa.albury@dot.gov>; Young, Autumn (FHWA) <autumn.young@dot.gov>; Barnett, Joel (FHWA) <joel.barnett@dot.gov>; McKeon, Dianna (FHWA) <dianna.mckeon@dot.gov>; Callahan, Cindy (FHWA) <Cindy.Callahan@dot.gov>; Bridgers, Mystery (FHWA) <Mystery.Bridgers@dot.gov>; Rizzo, Ralph J (FHWA) <Ralph.J.Rizzo@dot.gov>; Roberson, Melinda (FHWA) <melinda.roberson@dot.gov>; Martindale, Gary (FHWA) <Gary.Martindale@dot.gov>
Subject: RE: Notice of Availability - Operations and Maintenance Facility South Draft EIS

Good Morning Erin,

Attached are the FHWA comments on the OMF South Draft EIS. We are also including two reference documents for a review comment on the Ecosystems section.

Let us know if you have any questions or need to meet to resolve our comments.

Thank you,

Lindsey L. Handel, P.E., Senior Level III FAC-P/PM
Urban Transportation Engineer
Federal Highway Administration
711 S. Capitol Way, Suite 501
Olympia, WA 98501-1284
Lindsey.Handel@dot.gov
360-753-9550

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
B-9	3.1	Appendix B			Are project updates via listserv provided in languages other than English? Is there an option for individuals to request updates in languages other than English? If so, which languages?
B-9	3.2	Appendix B			How are language access services provided during open house and drop-in sessions? Are multi-lingual staff present?
B-10	3.3	Appendix B			Were language services provided for virtual public hearings? If so, how were they provided? (Break-out sessions in multiple languages, etc.?)Was a sign language interpreter present?
B-11	3.6	Appendix B, 8th Bullet			Simple typo creates significan difference: Title VI (6), instead of Title IV (4)
B-11	3.6	Appendix B			The project web page provides a Google translate feature at the bottom right hand corner of the home page where it blends with the rest of the page. It isn't highlighted or easily identified by bold color or font. This means LEP individuals must scan the entire, English-only, page before locating the translate option. Additionally, the "Select Language" drop-down feature is displayed exclusively in English, which means an LEP individual would have to be able to read English in order to identify that this feature offers translated languages. This is also the case for the "civil rights and complaints" link. How are LEP folx provided meaningful access to language services if they must navigate English-only language in order to identify where these services exist? Placing the "View in other languages" option at the top of the home page, in languages represented in the project area, would provide more meaningful LEP access. On the Title VI page, multiple languages are provided in the top right corner to guide LEP folx to information about the Title VI complaint process. How do LEP folx locate complaint information, in-language, on the home page?
		Title VI Equity Analysis			This appears to be exclusively a EJ analysis and not a Title VI analysis, It does not include all Title VI protected classes or analyze them individually. The analysis aggregates minority populations and includes low-income populations. EJ addresses distribution of high and adverse impacts on minority and low-income populations. EJ analytical standards also recommend aggregating minority populations. Title VI ensures nondiscrimination in programs and activities on the basis of race, color, and national origin (all races, all colors, all national origins) and does not consider low-income. Title VI analytical standards recommend each population be analyzed individually. The Minority Population Distribution maps look at the density of the aggregated minority population but does not evaluate if there is a specific community (race, color, national origin) present that may be disparately impacted.

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
4-1	4.1	General Outreach, last paragraph			Indicates "translation assistance" was available during online hearings. Was this oral interpretation or written translation services? If it was translation (written) how was this accommodated in the virtual space? Were there break-out rooms offering translated captioning?
4-2	4.2	Targeted Outreach, 1st bullet			Were in-language lunch groups provided oral-interpretation services or written translation services? May want to make a distinction between what type of services were provided.
4-2	4.2	Targeted Outreach, 2nd bullet			Were translation (written) or interpretation (oral) services provided for open houses?
G1-69	4.2.1.1	TTR			No information was provided regarding increases in freight traffic. If this is captured in the passenger car equivalents, please document that in the text.
		TTR			No discussion of heavy vehicle traffic increases and impacts.
G1-44	3.7				I recommend using fatal and serious crash rates rather than collision rates. Regardless of the pandemic, K and A crashes have increased while total reported crashes have decreased. This assessment should assess what risks are being elevated due to the increases in traffic, both in aggregate and by type.
G1-44	3.7				The traffic safety changes experienced in 2020-2022 are realistic and should not be excluded. Exposure is accounted for by normalizing by VMT and EV. Traffic behavior has changed since 2018 and should be accounted for in decision-making.
		Ecosystems			Essential Fish Habitat should be capitalized throughout.
		Ecosystems			2nd paragraph where study area extent defined, the 300’ extent for pollutants isn’t really consistent with conclusions in second paragraph of 3.10-13 where downstream adverse effects are acknowledged.
3.10-13		Ecosystems			For the discussion on 6PPD-quinone where coho pre-spawn mortality is mentioned, consider expanding to include more recent science on mortality to other salmonids and trout including steelhead, Chinook salmon and rainbow trout (scientific sources provided).
3.11-17		Water Resources			Pg. 3.11-17: States that enhanced treatment for all post-project GIS will be provided. Does this include existing and replaced PGIS?
		Water Resources			Table 3.11-10 shows either a net reduction or no increase in PGIS for the Preferred Alternative but later in the section (3.11.2.2) it states that OMF S. would add PGIS and non-PGIS.

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
	3.11.3	Water Resources			The Potential Mitigation (3.11.3) section states that no temporary or long-term adverse impacts on water resources are expected after treatment BMPs are constructed, however in the Ecosystems section, adverse effects downstream are acknowledged. I think it is valid to state that no further mitigation is likely to be required and explain that some adverse effects may occur due to the very low concentrations of some pollutants that are still deemed toxic to some fish species and the fact that even “effective” treatment won’t prevent some discharges from the BMPs that may be above those thresholds.
ES-v		Fact Sheet			There are two separate approval actions for FHWA and they should be called out separately on this list. There is an NEPA Record of Decision, Federal Highway Administration and the Air Space Lease for Use of Interstate Right of Way, Federal Highway Administration.
ES-v		Fact Sheet			FHWA wants to confirm there are no anticipated design approvals or modifications to Interstate 5 with this project, which would require FHWA approval.
3.6.3.1		Environmental Justice			The last paragraph in 3.6.3.1 indicates that EJ populations would accrue benefits through “the addition of new jobs to build the project.” Given the way contractors are selected, there is no way to definitively say the jobs will be given to people in the vicinity of the project. Even with more lenient local hiring rules now, there is no guarantee and we would be more comfortable if this statement was left out—or include a caveat to the statement to explain that it is not a guarantee. Even though it should be obvious given the context, there should be an explaination that the benefits in the last paragraph of this section are all temporary benefits that would occur during construction. If there would be any kind of increased staffing in the area because of the maintenance facility, that could be added as a more permanent benefit related to the economic factors mentioned in this paragraph.
		Environmental Justice			Please include the following (adding FTA if you deem appropriate): "An Executive Order (E.O.) 14096—Revitalizing Our Nation’s Commitment to Environmental Justice for All has been recently enacted (April 21, 2023). The new E.O. 14096 on environmental justice does not rescind EO 12898, which FHWA is implementing through the current DOT and FHWA EJ Orders (DOT 5610.2C and FHWA 6640.23A) until further guidance is provided regarding the implementation of the new E.O. on environmental justice."
	Ch 2				It is difficult from any figure to see where the alternatives would intersect the interstate ROW and cross the access line. Does there need to be a figure with that?
31	3.9.1				It was not stated in the noise analysis specifically but it may be helpful to the reader and existing residents that the reason why there are so few noise impacts from the new mainline extension and test track to the north is because properties will be acquired for the facility, thus there will be some distance between sensitive receptors and the track. This is not exactly clear as there is no map in the technical report that includes model receptor locations.

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
37	3.9.2.2	Table 3.9-2 and 3.9-3			It is confusing to the reader that existing noise levels in both tables (specifically S 324th Street to Burning Tree Blvd) do not match. Checking this against tables G2.6-10 and G2.6-11 it looks like the difference is between NB and SB locations. Consider adding the track side column to Table 3.9-2 and 3.9-3.
44	3.9.3.1	First paragraph			"Sound Transit would replace noise walls and berms that would be removed as part of the Preferred And South 344th Street alternatives." State that this would specifically occur on I-5.
	Ch 2				It is difficult from any figure to see where the alternatives would intersect the interstate ROW and cross the access line. Does there need to be a figure with that?
31	3.9.1	Noise			It was not stated in the noise analysis specifically but it may be helpful to the reader and existing residents that the reason why there are so few noise impacts from the new mainline extension and test track to the north is because properties will be acquired for the facility, thus there will be some distance between sensitive receptors and the track. This is not exactly clear as there is no map in the technical report that includes model receptor locations.
37	3.9.2.2	Noise/ Table 3.9-2 and 3.9-3			It is confusing to the reader that existing noise levels in both tables (specifically S 324th Street to Burning Tree Blvd) do not match. Checking this against tables G2.6-10 and G2.6-11 it looks like the difference is between NB and SB locations. Consider adding the track side column to Table 3.9-2 and 3.9-3.
44	3.9.3.1	(Noise) First paragraph			"Sound Transit would replace noise walls and berms that would be removed as part of the Preferred And South 344th Street alternatives." State that this would specifically occur on I-5.
3.3 Acquisitions, Displacements, and Relocations					
3.3	General	General			Missing discussion that relocation resources are available to all people being relocated without discrimination in compliance with Sound Transit's Limited English Proficiency Plan.
3.3-1	3.3	Title			Displacement and relocation really mean the same thing. Displaced person is defined as any person who moves from the real property or moves his or her personal property from the real property. Relocation is provided to displaced persons. This section should really be titled Property Acquisitions and Displacements.
3.3-1	3.3	Entire Section	Includes Notes section under tables		This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..
3.3-5	3.3.3	Title			I wouldn't refer to this section as "Relocation Opportunities". The section is really talking about property availability for displacements so I would suggest using that title.
3.3-5	3.3.3	1st paragraph			Suggest changing "relocation opportunities" to "available properties".

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
3.3-6	3.3.3	Table 3.3-3	Notes (2)		Since CoStar does not collect data on availability for potential replacement sites for religious facilities, what other data collection did you explore, e.g. real estate broker in the local market?
3.3-6	3.3.3	3.3.3.1			This section states that finding properties that have specific needs may be more difficult to find. Missing a discussion of the actions proposed to remedy insufficient replacement sites.
3.3-6	3.3.3	3.3.3.2 - Title			Title of section is "Single-Family Residential" and according the Table 3.3-1 under notes residential displacements include individual apartment/condo units and mobile homes. Based on this "Multi-Family should be added to the title.
3.3-6	3.3.3	3.3.3.2			Suggest changing the sentence from saying displaced residents may have to find a location in a different neighborhood to "a similar neighborhood". A comp from either the same neighborhood or similar neighborhood considered in the same market must be provided to the displaced person before the agency can require them to relocate. Also, mobile home displacements can be challenging as inventory is at an all time low. This section is missing a discussion of the actions proposed to remedy insufficient replacement sites, including housing of last resort.
3.3-6	3.3.3	3.3.3.3			The first sentence is contridictory as prior sections stated that finding properties with unique characteristics, such has a religious facility, could be more challenging. Also, in the case of the Church on 25 acres, it can be difficult to relocate due to its size. Missing a discussion of the actions proposed to remedy insufficient replacement sites.
3.3-7	3.3.4	1st paragraph			Suggest changing "relocation opportunities" to "available properties".
3.3-7	3.3.4	2nd paragraph			Not sure if Sound Transit's procedures allow for the use of a waiver valuation but, if they are going to use a waiver valuation for the TCEs or any other right that fits the criteria then they will want to add waiver valuation discussion to this section.
3.3-7	3.3.4	3rd paragraph			2nd sentence needs to be changed as it states in addition to compensating owners which can provide the appearance that the additional compensation is only for owners. Since this sentence deals with relocation expenses it should be revised to state other forms of compensation for displacements could include...... Would also suggest changing "support services" to "advisory services"
3.3-7	3.3.4	4th paragraph			Typically the property owner will approach the agency to request a hardship acquisition and that has a defined process. An agency can also acquire early when they have the legal right to do so. You might revise to state Sound Transit, with FTA's approval is considering early acquisition of the four parcels associated with the church parcel, and it could potentially be acquired as a hardship acquisition if the church makes the request and provides the necessary documentation.

FHWA Comments on OMF-South Draft EIS October 2023					
Page	**Section**	**Location**	**Table Row**	**Table Column**	**Comment**
3.3-8	3.3.4	1st paragraph			This statement is incorrect and should be revised to include all displacements. I would suggest removing "Businesses and tenants" to "Displaced persons" since all (business, farm, NPO, PPO, and residential) are included as defined.
3.3-9	3.3.5	1st paragraph			Advisory services are applicable to more than just property owners. Sentence should be revised - suggest just removing "to property owners".
3.4 Land Use					
3.4.1	3.4	Entire Section			This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..
3.5 Economics					
3.5-1	3.5	Entire Section			This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..
3.5-7	3.5.2.2	Last paragraph			Suggest changing "subsitute" to "suitable" to be consistent with the other areas you reference suitable for business sites.
3.6 Social Resources, Community Facilities, and Neighborhoods					
3.6-8	3.6	Entire Section			This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..
3.6-8	3.6	Preferred Alternative - 2nd paragraph			Suggest referring reader to the Acquisition and Displacements section for discussion on the difficulties associated with relocating a church.

Environmental Science & Technology LETTERS

pubs.acs.org/journal/estlcu

Letter

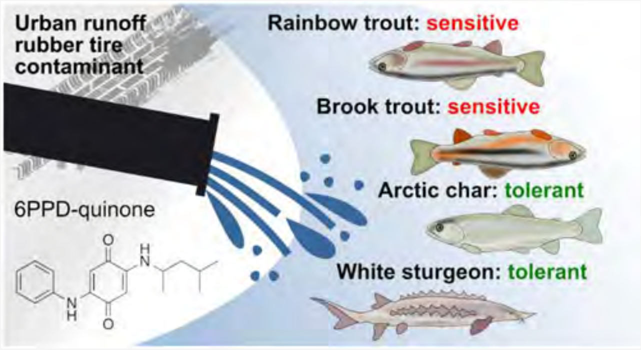
Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance

Markus Brinkmann, David Montgomery, Summer Selinger, Justin G. P. Miller, Eric Stock, Alper James Alcaraz, Jonathan K. Challis, Lynn Weber, David Janz, Markus Hecker,* and Steve Wiseman

Cite This: https://doi.org/10.1021/acs.estlett.2c00050

Read Online

ACCESS | Metrics & More | Article Recommendations | Supporting Information



ABSTRACT: *N*-(1,3-Dimethylbutyl)-*N*′-phenyl-*p*-phenylenediamine-quinone (6PPD-quinone), a transformation product of the rubber tire antioxidant 6PPD, has recently been identified as the chemical responsible for urban runoff mortality syndrome in coho salmon, with a median lethal concentration (LC_{50}) of <0.1 μg/L. Subsequent studies have failed to confirm comparable sensitivity in other fish species. Here, we investigated the acute toxicity of 6PPD-quinone to rainbow trout, brook trout, Arctic char, and white sturgeon. Fish were exposed under static renewal conditions, and exposure concentrations were verified analytically. Mortalities in brook trout occurred between 1.2 and 20 h, while mortalities began after 7 h and spanned 60 h in rainbow trout. The LC_{50}s in brook trout (24 h) and rainbow trout (72 h) were 0.59 and 1.00 μg/L, respectively. Both species showed characteristic symptoms (increased ventilation, gasping, spiraling, and loss of equilibrium) shortly before death. No mortalities were observed after exposure of either char or sturgeon for 96 h at measured concentrations as high as 14.2 μg/L. This is the first study to demonstrate the acute toxicity of 6PPD-quinone to other fishes of commercial, cultural, and ecological importance at environmentally relevant concentrations and provides urgently needed information for environmental risk assessments of this contaminant of emerging concern.

■ INTRODUCTION

Stormwater runoff from urban landscapes has long been a cause for environmental concern due to its chemical complexity, toxicity to aquatic organisms, and temporal and spatial dynamics.[1] In addition to road salt, organic contaminants from vehicle emissions and leakage, and toxic metals from brake pad abrasion,[2] tire wear particles (TWPs) have recently become the focus of scientific and public interest.[3] Earlier research into the causes of fish kills following rainfall events along the west coast of the United States, termed coho salmon (*Oncorhynchus kisutch*) urban runoff mortality syndrome (URMS), suggested that rubber tire-derived chemicals might be responsible for this effect because they co-occurred with these mortality events.[4] In a landmark study, Tian et al.[5] applied a combination of fractionation, chemical analysis, and biological testing to pinpoint the causative chemical. The authors found that *N*-(1,3-dimethylbutyl)-*N*′-phenyl-*p*-phenylenediamine-quinone (6PPD-quinone) was generated through the environmental oxidation of the common rubber tire antidegradant 6PPD and can cause lethality in coho salmon at a median lethal concentration (LC_{50}) of <0.8 μg/L. Using a commercial standard, a revised LC_{50} in coho salmon of <0.10 μg/L was reported in a follow-up study.[6] Tian et al.[5,6] and subsequent studies have demonstrated the widespread occurrence of 6PPD-quinone in stormwater runoff and surface waters at concentrations of ≤19 μg/L,[7,8] indicating that 6PPD-quinone exposure poses an immediate risk to coho salmon populations. However, it was unknown whether exposure to this pollutant would also affect other aquatic species.

Two follow-up studies have determined the acute toxicity of 6PPD-quinone to a variety of species, including fish (zebrafish, *Danio rerio*; Japanese medaka, *Oryzias latipes*) and invertebrates (*Daphnia magna* and *Hyalella azteca*).[9,10] All tested species were significantly less sensitive than coho salmon: exposure to 6PPD-quinone did not cause lethality in any of the four species studied by Hiki et al.[10] up to concentrations as high as the maximum water solubility, which the authors estimated to range between 34 and 54 μg/L. Varshney et al.[9] observed an LC_{50} of 309 μg/L for zebrafish larvae when ethanol was used as the solvent vehicle. Because of the

Received: January 19, 2022
Revised: February 11, 2022
Accepted: February 14, 2022

ACS Publications © XXXX American Chemical Society

alarmingly high sensitivity of coho salmon to 6PPD-quinone, environmental risk assessors urgently require data on the acute toxicity of 6PPD-quinone across a greater diversity of fish species, with an emphasis on additional salmonid species.

This study investigated the acute toxicity of 6PPD-quinone across four species of commercial, cultural, and ecological importance to North America: rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), Arctic char (*Salvelinus alpinus*), and white sturgeon (*Acipenser transmontanus*). Additionally, rainbow trout are an important model fish species used in chemical risk assessment across many jurisdictions.[11,12] This research provides important information for the environmental risk assessment of urban runoff and has the potential to inform regulatory controls of the use of 6PPD in rubber tires.

■ MATERIALS AND METHODS

Chemicals and Reagents. Native and mass-labeled (d_5) 6PPD-quinone were purchased from Toronto Research Chemicals (Toronto, ON). Stock solutions for exposure of fish to 6PPD-quinone were prepared using dimethyl sulfoxide (DMSO) to achieve a final solvent concentration of 0.01% (v/v) during exposures. Analytical standard solutions of native and mass-labeled 6PPD-quinone were prepared in HPLC-grade methanol.

Fish Source and Culture. Brook trout were from Allison Creek Trout Hatchery (Coleman, AB), were ∼1 year old, were 17.1 ± 1.1 cm in length, and weighed 52.8 ± 7.6 g. Fish were housed in the Aquatic Research Facility (ARF) at the University of Lethbridge and acclimated in 150 L inert glass-fiber Krescel tanks (four fish per tank, 30% daily water renewal) for 2 weeks prior to exposures. Fish were fed a commercial salmonid feed at a daily rate of 1% of body weight during acclimation. Studies were approved by the University of Lethbridge Animal Welfare Committee (Protocol 2111).

Rainbow trout (from Lyndon Hatcheries, New Dundee, ON), Arctic char (from Miracle Springs Inc., North Vancouver, BC), and white sturgeon (wild fish spawned at the Nechako White Sturgeon Conservation Centre, Vanderhoof, BC) were from in-house cultures raised from embryos in the Aquatic Toxicology Research Facility (ATRF) at the University of Saskatchewan. Fish were cultured under flow-through conditions in facility water until they reached the juvenile stage (rainbow trout, ∼2 years, 19.6 ± 1.9 cm, 97.5 ± 28.9 g; Arctic char, ∼3 years, 13.8 ± 1.7 cm, 28.3 ± 9.8 g; white sturgeon, ∼4.5 years, 42.4 ± 4.5 cm, 462.3 ± 159.3 g) and fed with a commercial fish feed at a daily rate of 1% of body weight during acclimation. Even though fish were somewhat larger than recommended according to various guidelines for acute toxicity tests, all fish were sub-adult and the larger size was selected due to availability considerations and to provide sufficient tissues for downstream analyses. Experiments were approved by the University of Saskatchewan Animal Care Committee (Protocol 20070049). A Species at Risk Act (SARA) permit for culture of and experimentation with white sturgeon was obtained from the Department of Fisheries and Oceans Canada (Permit 20-PPAC-00026).

Exposure Experiments. Pilot studies were conducted for each species to establish upper concentration bounds for acute lethality studies. For brook trout, fish were fasted for 24 h, moved to aerated 45 L rectangular glass tanks (two fish per tank) at 10 °C, and exposed for 24 h to nominal concentrations of 0, 0.02, 0.2, 2, or 20 μg/L 6PPD-quinone under static conditions (10 fish total). For the other species, two fish per species were each exposed under static conditions in individual tanks at either 6 or 20 μg/L (two fish total per species). Brook trout and rainbow trout became moribund at 2 and 6 μg/L, respectively, within 4 h of the onset of exposure. Arctic char and white sturgeon did not show any response to concentrations as high as 20 μg/L within 96 h.

Accordingly, in the main experiment, brook trout and rainbow trout were exposed to nominal concentrations of 6PPD-quinone ranging from 0.1 to 6 μg/L (see Table S1 for details). Tanks were cleaned with a series of detergents, disinfectants, and/or ethanol, carefully rinsed, and left to dry before experiments. Due to their lower sensitivity, Arctic char and white sturgeon were exposed to only one nominal concentration (20 μg/L) that could be achieved using the limited amount of chemical available and that was nearing water solubility, while still being environmentally relevant.[5,7,8] Exposures of brook trout were performed in 150 L inert glass-fiber Krescel tanks at 10 ± 1 °C for 24 h (two replicate tanks with four fish each; two controls at five concentrations, 56 fish total). A shorter exposure period was chosen for brook trout due to a much faster onset of symptoms compared to rainbow trout. Test solutions were continuously aerated, recirculated, and temperature controlled. Rainbow trout, white sturgeon, and Arctic char were exposed in 700 L glass-fiber Min-o-Cool tanks containing 500, 500, and 300 L of test solution, respectively, at 12 ± 1 °C for 96 h under static renewal conditions. Water was exchanged at 40−60% (white sturgeon) or 75% (rainbow trout and Arctic char) daily (two replicate tanks and one extra control replicate with five fish each for rainbow trout, 65 fish total; two replicate tanks with five fish each for Arctic char, 20 fish total; three replicate tanks with two fish each for white sturgeon, 12 fish total). Control tanks were dosed with the DMSO solvent vehicle at the same level as all other tanks [0.01% (v/v)]. Average (±SD) water quality parameters were as follows for brook trout: temperature, 10.3 ± 0.7 °C; pH, 6.74 ± 0.13; DO, 99.8 ± 11.5%; ammonia, 0.13 ± 0.11 mg/L; hardness, 131 ± 2.33 mg/L. Average (±SD) water quality parameters were as follows for other species: temperature, 12.8 ± 0.8 °C; pH, 8.35 ± 0.45; DO, 92.8 ± 13.2%; ammonia, 0.14 ± 0.15 mg/L; hardness, 132 ± 6.80 mg/L. Water samples were collected for analytical confirmation of concentrations of 6PPD-quinone ∼1 h after the initial dosing of tanks, which occurred after acclimation of fish for 48−96 h. For rainbow trout, Arctic char, and white sturgeon, a water sample was also taken every 24 h prior to water changes or after most fish in a tank became moribund. Samples were immediately spiked at 50 μg/L with 6PPD-quinone-d_5 and stored at −20 °C until they were analyzed. Fish were observed during most of the exposure duration, immediately removed once they became moribund, and humanely euthanized using >250 mg/L buffered MS-222. Characteristic signs of 6PPD-quinone exposure leading to brook trout and rainbow trout becoming moribund (increased ventilation rate, gasping on the water surface, permanent loss of equilibrium, and spiraling motion) were observed during regular tank inspections and noted and would have resulted in death within 0.5 h if fish were not euthanized.

Biological Sampling. The fork length (millimeters) and weight (grams) of each fish were determined after euthanasia. Blood samples were obtained from the caudal vein using heparinized syringes, and blood glucose concentrations determined using hand-held meters (brook trout, OneTouch

https://doi.org/10.1021/acs.estlett.2c00050

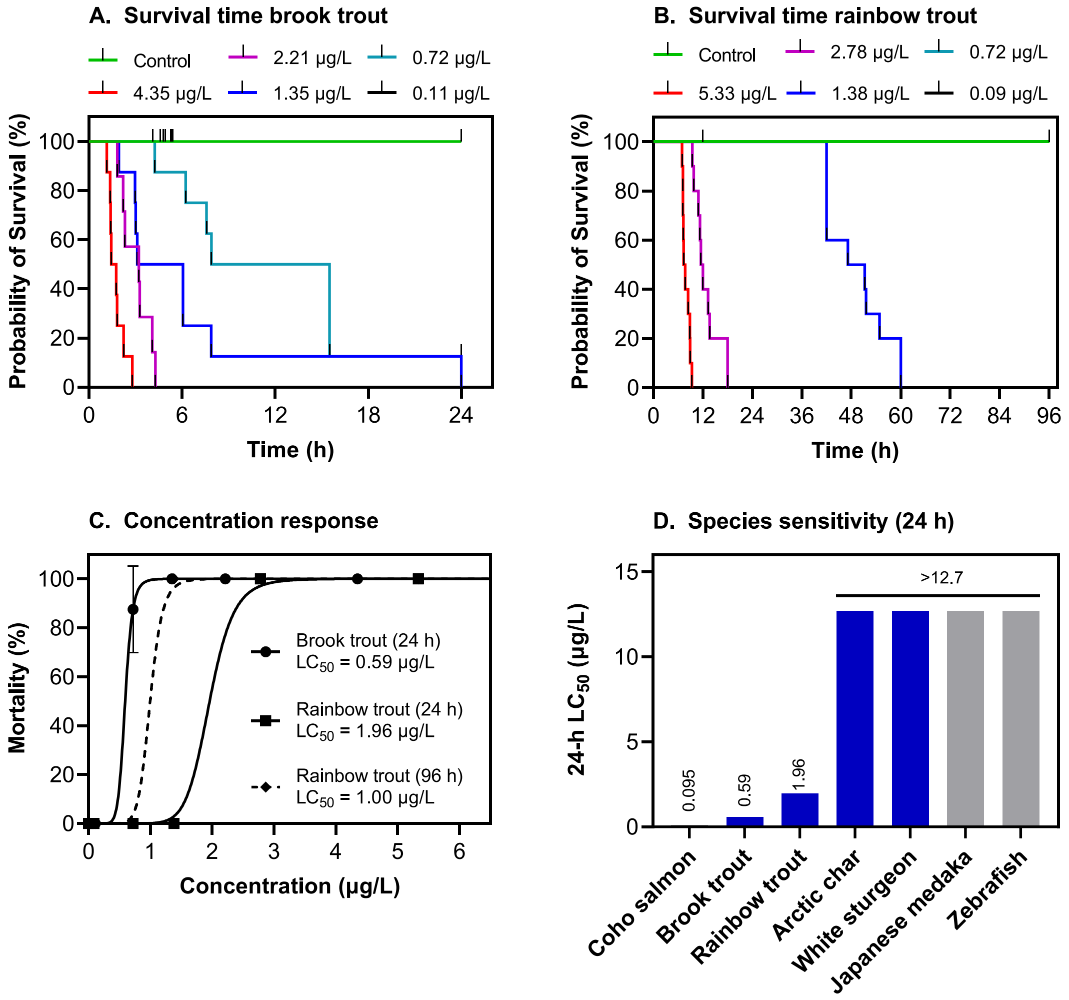


Figure 1. Relationships among exposure time, exposure concentration, and survival in (A) brook trout and (B) rainbow trout over exposure durations of 24 and 96 h, respectively. Median lethal concentrations at 24 and 96 h of exposure were interpolated for both species using (C) two-parameter logistic regression and (D) compared with those of other previously studied species. All concentrations are based on measured concentrations. Blue bars in panel D are from this study, while values for coho salmon, Japanese medaka, and zebrafish have been previously published.[6,9,10]

Ultra 2 m, LifeScan, Malvern, PA; all other species, Contour Next meter, Ascensia, Basel, Switzerland). The percent hematocrit was determined in brook trout using a StatSpin CritSpin microhematocrit centrifuge (StatSpin, Norwood, MA).

Analytical Chemistry. Instrumental verification of exposure concentrations of 6PPD-quinone followed the method outlined by Challis et al.[7] with modifications. Briefly, samples were analyzed on a Vanquish UHPLC instrument coupled with a Q-Exactive HF Quadrupole-Orbitrap hybrid mass spectrometer (Thermo-Fisher). An isotope dilution strategy using 6PPD-quinone-d_5 was applied for quantification. Average measured exposure concentrations were calculated and used for subsequent data analysis instead of nominal exposure concentrations. A detailed description of the analytical methods is provided in the Supporting Information.

Data Analysis and Statistics. The percent mortality for each concentration and replicate was calculated at 24 h for brook trout and at 24 and 96 h for rainbow trout to account for differences in time to death between both species. LC_{50}s were interpolated for each time point using logistic regression of the percent mortality versus average measured exposure concentrations. Blood glucose measurements were analyzed for normality and heteroscedasticity using Kolmogorov−Smirnov's test and Levene's test, respectively. Because the data sets violated the assumptions for one-way analysis of variance (ANOVA), a nonparametric Kruskal−Wallis's test with Dunn's post hoc test was performed. A p value of ≤ 0.05 was considered indicative of statistically significant differences. All plots were created and statistically analyzed using Prism 9 (GraphPad, La Jolla, CA).

■ RESULTS AND DISCUSSION

Analytical Verification of Exposure Concentrations. Average concentrations of 6PPD-quinone measured over the exposure periods deviated <16% from nominal values across all species with the exception of the low-treatment groups for brook trout and rainbow trout (Table S1). There was an average loss of 14% (1.7% and 32% in the high- and low-treatment groups, respectively) of the test chemical over the 24 h window between water changes, suggesting exposure levels were stable throughout the experiments. Losses were slightly greater at the higher exposure concentrations used for Arctic char and white sturgeon. Hiki et al.[10] reported a 17−73% decrease in 6PPD-quinone concentrations over 48 h between water changes for zebrafish and medaka, confirming the

https://doi.org/10.1021/acs.estlett.2c00050
Environ. Sci. Technol. Lett. XXXX, XXX, XXX−XXX

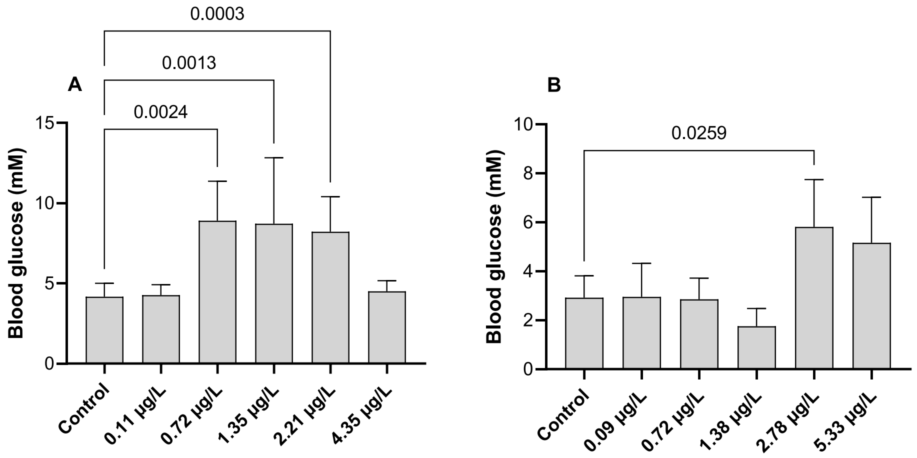


Figure 2. Blood glucose concentrations in (A) brook trout and (B) rainbow trout in moribund animals and those that survived until termination of the experiment following exposure to graded nominal concentrations of 6PPD-quinone. Bars depict the mean, and error bars the standard deviation of 4−15 fish per treatment and species, rather than tank replicates. Because control fish taken down at different sampling times did not differ significantly, individuals were pooled in a single control group for this analysis. Concentrations are based on measured exposure concentrations. Numbers above the brackets indicate the *p* value of statistical comparisons of blood glucose concentrations in 6PPD-quinone-exposed fish with those of the control group (Kruskal−Wallis ANOVA on ranks with Dunn's post hoc test).

relative stability of this chemical under static renewal conditions.

Acute Toxicity of 6PPD-quinone in Fish. Exposure to 6PPD-quinone resulted in significant acute effects in two of the four tested species, which varied as a function of chemical concentration, exposure time, and species (Figure 1). Brook trout were most sensitive with 100% of mortalities in the high-treatment group occurring within 3 h of exposure and a 24 h LC_{50} of 0.59 μg/L [95% confidence interval (CI) of 0.48−0.63 μg/L], which is similar to previous observations in coho salmon.[5] A slightly greater LC_{50} of 1.00 μg/L (95% CI of 0.95−1.05 μg/L) was recorded for rainbow trout after 72−96 h (1.96 μg/L after 24 h, 95% CI of 1.86−2.06 μg/L), while no mortalities were observed for either Arctic char or white sturgeon at measured concentrations as high as 14.2 and 12.7 μg/L after 96 h. Interestingly, in rainbow trout, the first signs of morbidity did not manifest until 7 h after commencing exposures and maximum mortalities occurred at 60 h, which was significantly longer than the times for brook trout and coho salmon.[5] The LC_{50} values reported here for brook trout (0.59 μg/L) and rainbow trout (1.00 μg/L) were ∼6-10-fold greater than that of coho salmon (0.10 μg/L) and are well within ranges of environmental concentrations of 6PPD-quinone previously reported in Canadian and U.S. surface waters after stormwater runoff events.[5−8] While no mortality of endangered white sturgeon or Arctic char was observed after exposure to 6PPD-quinone, potential subchronic or chronic impacts have not been fully studied and cannot be excluded at this time.

These results support earlier reports that identified marked differences in the sensitivity of fishes to exposure with 6PPD-quinone and TWP leachates.[3,5,10] Previous studies have hypothesized that sensitivity to 6PPD-quinone may be unique to salmonids.[9] These authors, who assessed the acute toxicity of this chemical to Japanese medaka and zebrafish, did not observe any significant mortalities up to the limit of the water solubility of 6PPD-quinone, which was estimated to range between 34 and 54 μg/L. While this is in accordance with the lack of effects reported in white sturgeon in this study, our results for Arctic char as well as those reported for TWP leachates by McIntyre et al.[3,5] for chum salmon (*Oncorhynchus keta*) clearly demonstrate the tolerance of these two salmonid species. Thus, we can conclude that sensitivity to acute exposure with 6PPD-quinone is highly variable among fishes in general, and salmonids specifically, even among species from the same genus such as brook trout and Arctic char representing the genus *Salvelinus*, and rainbow trout, chum salmon, and coho salmon representing the genus *Oncorhynchus*.

In cases in which mortalities occurred, both brook trout and rainbow trout exhibited behaviors consistent with those observed in coho salmon,[3,5] including hovering close to the water surface, accelerated opercular movements, gasping, and spiraling motion. This is in accordance with the hypothesis by McIntyre et al.[3] and Varshney et al.[9] that these types of behavior are suggestive of 6PPD-quinone causing cardiorespiratory distress. A significant increase in blood glucose concentrations observed at 0.72−2.21 μg/L in brook trout and 2.78 μg/L in rainbow trout (Figure 2) indicates that 6PPD-quinone impacted energy metabolism, although the underlying mechanisms for this increase are currently unclear. Additionally, hematocrit of brook trout exposed to 0.72−4.35 μg/L 6PPD-quinone significantly increased from an average of 42% in the control group to 68% at 4.35 μg/L (Figure S4). This agrees with observations by Blair et al.,[13] who found even more pronounced increases in hematocrit in coho salmon following exposure to urban runoff. The authors also provided evidence of the disruption of the blood−brain barrier in exposed fish, which might be one of the reasons for the observed increases in hematocrit. However, it is currently unclear if this is the key event ultimately responsible for causing death or if other processes are involved.

Environmental Implications and Risk Assessment. Salmonids are of significant ecological, commercial, and recreational importance in many countries around the world, and this study highlights that the acute toxicity of 6PPD-quinone previously reported for coho salmon[3,5] is also of significant concern for other key receptors, including rainbow trout and brook trout. While there have only been a limited number of studies that characterized the presence of 6PPD-

https://doi.org/10.1021/acs.estlett.2c00050

quinone in surface waters and urban runoff,[7,8] available reports clearly highlight that commonly found concentrations of this emerging contaminant exceed toxicity thresholds reported here and by Tian et al.[5] Hence, 6PPD-quinone appears to pose a significant and widespread ecological risk to these species, and potentially other salmonids, especially downstream of urban areas and in smaller water bodies receiving roadway runoff.[5,7,8] However, other ecologically relevant genera and families of fishes have not been studied to date, which represents an important uncertainty at this point.

The observed differences in the temporal dynamics of time to death among the three species for which acute effects of 6PPD-quinone have been observed to date are interesting. While in coho salmon[5] and brook trout morbidities at the greatest concentrations were observed as early as 1−2 h after initiation of exposure, in rainbow trout the first mortalities did not occur until ∼7 h at comparable concentrations. As exposure conditions were comparable among experiments in terms of temperature (10−13 °C), pH (6.7−8.3), and DO (>90% saturation), it is unlikely that these parameters would have been a driving factor. Despite the similar LC_{50} values observed for all three species, these differences may have significant implications for ecological risk assessment of urban runoff events. The shorter time to death for coho salmon and brook trout may increase their risk of mortality prior to dilution of stormwater in receiving water bodies over time after rain events.

Future Research Needs. For more comprehensive future risk assessments of 6PPD-quinone in aquatic ecosystems, it is imperative to study its acute and sublethal effects in a broad range of fish species. More research into the potential respiratory or cardiovascular mechanisms of action is needed to conclusively and comprehensively elucidate the specific mechanism by which 6PPD-quinone triggers URMS in select salmonids and possibly other fishes. Most importantly, drivers of species differences in sensitivity need to be studied; i.e., why are some salmonids more sensitive than others? Several native salmonid fish species (e.g., cutthroat trout, *Oncorhynchus clarkii*; bull trout, *Salvelinus confluentus*)[14−16] are at risk of extinction in parts of their native range, and the contribution of 6PPD-quinone to their stock status needs to be urgently investigated.

■ ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available free of charge at https://pubs.acs.org/doi/10.1021/acs.estlett.2c00050.

Additional details of the chemical analytical methods (Text S1) and results (Table S1 and Figures S1 and S2) and results of hematocrit measurements in brook trout (Figure S3) (PDF)

Video of characteristic symptoms of brook trout exposed to 6PPD-quinone, here loss of equilibrium and spiraling (MOV)

Video of characteristic symptoms of rainbow trout exposed to 6PPD-quinone, here gasping (MOV)

■ AUTHOR INFORMATION

Corresponding Author

Markus Hecker − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada; School of Environment and Sustainability (SENS), University of Saskatchewan, Saskatoon S7N 5CN, Canada;* Email: markus.hecker@usask.ca

Authors

Markus Brinkmann − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada; School of Environment and Sustainability (SENS), University of Saskatchewan, Saskatoon S7N 5CN, Canada; Global Institute for Water Security (GIWS), University of Saskatchewan, Saskatoon S7N 3H5, Canada;* orcid.org/0000-0002-4985-263X

David Montgomery − *Toxicology Centre and Toxicology Graduate Program, University of Saskatchewan, Saskatoon S7N 5B3, Canada*

Summer Selinger − *Toxicology Centre and Toxicology Graduate Program, University of Saskatchewan, Saskatoon S7N 5B3, Canada*

Justin G. P. Miller − *Department of Biological Sciences, University of Lethbridge, Lethbridge T1K 3M4, Canada*

Eric Stock − *Department of Biological Sciences, University of Lethbridge, Lethbridge T1K 3M4, Canada*

Alper James Alcaraz − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada;* orcid.org/0000-0002-3213-6805

Jonathan K. Challis − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada;* orcid.org/0000-0003-3514-0647

Lynn Weber − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada; Department of Veterinary Biomedical Sciences, Western College of Veterinary Medicine University of Saskatchewan, Saskatoon S7N 5B4, Canada*

David Janz − *Toxicology Centre, University of Saskatchewan, Saskatoon S7N 5B3, Canada; Department of Veterinary Biomedical Sciences, Western College of Veterinary Medicine University of Saskatchewan, Saskatoon S7N 5B4, Canada*

Steve Wiseman − *Department of Biological Sciences, University of Lethbridge, Lethbridge T1K 3M4, Canada; Water Institute for Sustainable Environments, University of Lethbridge, Lethbridge T1K 3M4, Canada;* orcid.org/0000-0002-8215-2272

Complete contact information is available at: https://pubs.acs.org/10.1021/acs.estlett.2c00050

Notes

The authors declare no competing financial interest.

■ ACKNOWLEDGMENTS

This project was supported partially by a financial contribution from Fisheries and Oceans Canada. Additional funding was provided to M.B., L.W., D.J., M.H., and S.W. through the Discovery Grants program of the Natural Sciences and Engineering Research Council of Canada (NSERC). Instrumentation used for chemical analyses within this research was obtained with funding from Western Economic Diversification Canada (WED) and the Canadian Foundation for Innovation (CFI). J.K.C. was supported through the Banting Postdoctoral Fellowship program of NSERC. M.B. is currently a faculty member of the Global Water Futures (GWF) program, which received funds from the Canada First Research Excellence Funds (CFREF). S.W. and M.H. were supported by the Canada Research Chairs Program. The authors acknowledge the animal care support of Zoë Henrikson and Dale Jefferson (ATRF) and Holly Shepherd and Mamun Shamsuddin (ARF).

Analytical support was provided by Shakya Kurukulasuriya, Jenna Cantin, and Xiaowen Ji.

■ REFERENCES

(1) Masoner, J. R.; Kolpin, D. W.; Cozzarelli, I. M.; Barber, L. B.; Burden, D. S.; Foreman, W. T.; Forshay, K. J.; Furlong, E. T.; Groves, J. F.; Hladik, M. L.; Hopton, M. E.; Jaeschke, J. B.; Keefe, H.; Krabbenhoft, D. P.; Lowrance, R.; Romanok, K. M.; Rus, D. L.; Selbig, W. R.; Williams, B. H.; Bradley, P. M. Urban Stormwater: An Overlooked Pathway of Extensive Mixed Contaminants to Surface and Groundwaters in the United States. *Environ. Sci. Technol.* **2019**, *53*, 10070−10081.

(2) Zgheib, S.; Moilleron, R.; Chebbo, G. Priority Pollutants in Urban Stormwater: Part 1 - Case of Separate Storm Sewers. *Water Res.* **2012**, *46* (20), 6683−6692.

(3) McIntyre, J. K.; Prat, J.; Cameron, J.; Wetzel, J.; Mudrock, E.; Peter, K. T.; Tian, Z.; Mackenzie, C.; Lundin, J.; Stark, J. D.; King, K.; Davis, J. W.; Kolodziej, E. P.; Scholz, N. L. Treading Water: Tire Wear Particle Leachate Recreates an Urban Runoff Mortality Syndrome in Coho but Not Chum Salmon. *Environ. Sci. Technol.* **2021**, *55* (17), 11767−11774.

(4) Peter, K. T.; Tian, Z.; Wu, C.; Lin, P.; White, S.; Du, B.; McIntyre, J. K.; Scholz, N. L.; Kolodziej, E. P. Using High-Resolution Mass Spectrometry to Identify Organic Contaminants Linked to Urban Stormwater Mortality Syndrome in Coho Salmon. *Environ. Sci. Technol.* **2018**, *52* (18), 10317−10327.

(5) Tian, Z.; Zhao, H.; Peter, K. T.; Gonzalez, M.; Wetzel, J.; Wu, C.; Hu, X.; Prat, J.; Mudrock, E.; Hettinger, R.; Cortina, A. E.; Biswas, R. G.; Kock, F. V. C.; Soong, R.; Jenne, A.; Du, B.; Hou, F.; He, H.; Lundeen, R.; Gilbreath, A.; Sutton, R.; Scholz, N.; Davis, J.; Dodd, M. C.; Simpson, A.; McIntyre, J. K.; Kolodziej, E. P. A Ubiquitous Tire Rubber−Derived Chemical Induces Acute Mortality in Coho Salmon. *Science* **2021**, *371* (6525), 185−189.

(6) Tian, Z.; Gonzalez, M.; Rideout, C. A.; Zhao, H. N.; Hu, X.; Wetzel, J.; Mudrock, E.; James, C. A.; McIntyre, J. K.; Kolodziej, E. P. 6PPD-Quinone: Revised Toxicity Assessment and Quantification with a Commercial Standard. *Environ. Sci. Technol. Lett.* **2022**, *9*, 140.

(7) Challis, J. K.; Popick, H.; Prajapati, S.; Harder, P.; Giesy, J. P.; McPhedran, K.; Brinkmann, M. Occurrences of Tire Rubber-Derived Contaminants in Cold-Climate Urban Runoff. *Environmental Science & Technology Letters* **2021**, *8* (11), 961−967.

(8) Johannessen, C.; Helm, P.; Lashuk, B.; Yargeau, V.; Metcalfe, C. D. The Tire Wear Compounds 6PPD-Quinone and 1,3-Diphenylguanidine in an Urban Watershed. *Arch. Environ. Contam. Toxicol.* **2022**, *82*, 171.

(9) Varshney, S.; Gora, A. H.; Siriyappagouder, P.; Kiron, V.; Olsvik, P. A. Toxicological effects of 6PPD and 6PPD quinone in zebrafish larvae. *Journal of Hazardous Materials* **2022**, *424*, 127623.

(10) Hiki, K.; Asahina, K.; Kato, K.; Yamagishi, T.; Omagari, R.; Iwasaki, Y.; Watanabe, H.; Yamamoto, H. Acute Toxicity of a Tire Rubber-Derived Chemical, 6PPD Quinone, to Freshwater Fish and Crustacean Species. *Environmental Science & Technology Letters* **2021**, *8* (9), 779−784.

(11) Biological test method: acute lethality test using rainbow trout. Report EPS 1/RM/9; Environmental Protection Series; Method Development and Applications Section, Environmental Technology Centre, Environment Canada, 1990.

(12) OECD Guidelines for the Testing of Chemicals, Section 2: Effects on Biological Systems. Test No. 203: Fish, Acute Toxicity Test. Organisation for Economic Cooperation and Development (OECD): Paris, 2019.

(13) Blair, S. I.; Barlow, C. H.; McIntyre, J. K. Acute cerebrovascular effects in juvenile coho salmon exposed to roadway runoff. *Canadian Journal of Fisheries and Aquatic Sciences* **2021**, *78* (2), 103−109.

(14) Katz, J.; Moyle, P. B.; Quinones, R. M.; Israel, J.; Purdy, S. Impending extinction of salmon, steelhead, and trout (Salmonidae) in California. *Environmental Biology of Fishes* **2013**, *96* (10), 1169−1186.

(15) Rodtka, M.; Post, J. R.; Johnston, F. D. Status of the Bull Trout (Salvelinus confluentus) in Alberta: Update 2009. Alberta Sustainable Resource Development: Strathmore, AB, 2009.

(16) Allen, B.; Anderson, M.; Mee, J.; Coombs, M.; Rogers, S. Role of genetic background in the introgressive hybridization of rainbow trout (Oncorhynchus mykiss) with Westslope cutthroat trout (O. clarkii lewisi). *Conservation Genetics* **2016**, *17* (3), 521−531.

Environmental Science & Technology LETTERS

pubs.acs.org/journal/estlcu

Letter

Urban Roadway Runoff Is Lethal to Juvenile Coho, Steelhead, and Chinook Salmonids, But Not Congeneric Sockeye

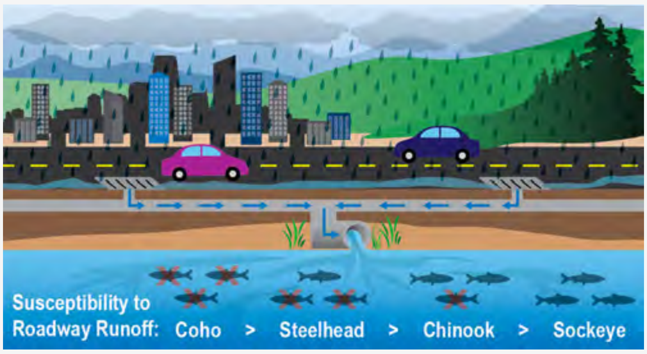
B. F. French, D. H. Baldwin, J. Cameron, J. Prat, K. King, J. W. Davis, J. K. McIntyre, and N. L. Scholz*

Cite This: *Environ. Sci. Technol. Lett.* 2022, 9, 733–738

Read Online

ACCESS | Metrics & More | Article Recommendations | Supporting Information

Downloaded via 152.119.227.166 on August 2, 2023 at 15:50:48 (UTC).
See https://pubs.acs.org/sharingguidelines for options on how to legitimately share published articles.


Susceptibility to
Roadway Runoff: Coho > Steelhead > Chinook > Sockeye

ABSTRACT: We compared the sensitivity of closely related Pacific salmon and steelhead (*Oncorhynchus* spp.) to untreated urban stormwater runoff across three storm events. Juvenile coho, sockeye, steelhead, and Chinook were exposed for 24 h to untreated urban runoff and then transferred to clean water for 48 h. As anticipated from previous studies, coho were highly susceptible to runoff toxicity, with cumulative mortality rates ranging from 92%−100% across the three storms. By contrast, juvenile sockeye were unaffected (100% survival), and cumulative mortality rates were intermediate for steelhead (4%−42%) and Chinook (0%−13%). Furthermore, coho died rapidly following the onset of stormwater exposure (generally <4 h), whereas mortality in Chinook and steelhead was delayed by 1−2 days. Similar to previous findings for coho, steelhead and Chinook did not recover when transferred to clean water. Lastly, significant mortality occurred in coho even when roadway runoff was diluted by 95% in clean water. Our findings extend the urban runoff mortality syndrome in salmonids and point to a near-term need for sublethal studies in steelhead and Chinook to more precisely understand stormwater risks to threatened species recovery efforts in the western United States.

KEYWORDS: *urbanization, stormwater, endangered species, Oncorhynchus, microplastics, 6PPD-quinone, urban runoff mortality syndrome, tire wear particles*

INTRODUCTION

Recent advances in analytical methods have made it increasingly possible to fractionate urban stormwater runoff into individual and identifiable toxic components. These efforts have yielded several chemicals of emerging concern (CECs) that are derived primarily from vehicle tires and therefore ubiquitous in roadway runoff.[1,2] Many are essentially unknown to ecotoxicology despite an apparent prevalence in the environment[3,4] and rapid mobilization in stormwater runoff.[5−7] One such CEC is *N*-(1,3-dimethylbutyl)-*N*′-phenyl-*p*-phenylenediamine (6PPD), an antiozonant added during the manufacture of tires to help prevent tread degradation. Ozone abiotically converts 6PPD into 6PPD-quinone, as well as other transformation products.[8]

For the past two decades, researchers in the Pacific Northwest of the United States (U.S.) have been studying a severe urban runoff mortality syndrome in coho salmon (*Oncorhynchus kisutch*). This forensic investigation eventually led to the discovery of 6PPD-quinone (6PPD-q) as the primary causal agent in the urban runoff mortality phenomenon.[4] Recurring, stormwater-driven dieoffs pose a significant threat to the near-term and long-term conservation of wild coho populations,[9] several of which are currently managed under the U.S. Endangered Species Act (ESA). The conservation implications for ESA-listed salmon are considerable, given high rates of premature death (up to 90% or more) among adult coho returning to spawn in urban watersheds, as documented in field surveys across multiple years in Puget Sound and elsewhere.[10,11]

At present, uncertainty around the extent to which roadway runoff toxicants, including 6PPD-q and other tire antioxidant/antiozonant transformation products, impact aquatic taxa beyond coho is spurring a global effort in ecotoxicology.[3,12,20] Although environmental health data are limited, there appears to be variation in vulnerability to roadway runoff even among closely related species of Pacific salmon belonging to the genus *Oncorhynchus*. This is evident from recent studies, wherein adult coho and chum (*O. keta*) were exposed to urban runoff or tire leachate, with high mortality observed in coho but not chum.[13,14] These differences in survival were consistent with observations from field surveys that previously documented

Received: July 8, 2022
Revised: July 28, 2022
Accepted: July 28, 2022
Published: August 24, 2022

© 2022 The Authors. Published by American Chemical Society

https://doi.org/10.1021/acs.estlett.2c00467

high rates of premature spawner mortality in coho but not chum in restored urban catchments.[10] However, the vulnerability of other Pacific salmonids to urban roadway runoff, including sockeye (*O. nerka*), Chinook (*O. tshawytscha*), and steelhead (ocean-going rainbow trout; *O. mykiss*), has not been determined. In the context of the ESA, this represents a major information gap, particularly for stream-type Chinook and steelhead that spend proportionately more time in freshwater habitats as juveniles, where they are more likely to be exposed to runoff from the transportation grid. Moreover, relative to coho, ESA-listed Chinook and steelhead populations encompass a much wider range of river basins in the western U.S., particularly in California (see www.fisheries.noaa.gov/species-directory/threatened-endangered for current ESA range designations).

It was recently shown that juvenile coho, in addition to spawning adults, are highly susceptible to the mortality syndrome.[15] Salmonids other than coho, including *O. mykiss*, also appear vulnerable.[12] In the present study, we extended these earlier observations by coexposing juvenile coho, sockeye, Chinook, and steelhead to runoff collected during multiple rain events. We focused on small subyearlings (coho, sockeye, Chinook) as well as larger age 1+ juveniles (coho, steelhead), and used coho as a positive control for the baseline toxicity of untreated stormwater (i.e., as confirmation of the mortality syndrome). Our study had three primary objectives: (1) determine whether ESA-listed species other than coho are vulnerable to acutely lethal stormwater toxicity, (2) evaluate the time course for mortality across species and whether affected fish recover in clean water, and (3) assess the role of dilution as a factor influencing survival, using juvenile coho as an indicator species.

■ MATERIALS AND METHODS

Urban Roadway Runoff Collection and Transport. Urban stormwater was collected from downspouts draining a short section of elevated urban arterial (west-bound onramp to State Route 520 from Montlake Boulevard in Seattle, Washington). Runoff from six storms was collected at different times of the year in 2018 (August 26, October 25, and December 17) and 2019 (March 12, March 25, and April 4). During each storm event, runoff was filtered through a fiberglass window screen to remove coarse debris and collected in 900 L or 1325 L stainless steel collection totes (Custom Metalcraft Inc., Springfield MO) for subsequent transport at ambient temperature to the Washington State University Research and Extension Center in Puyallup (WSU-P). Juvenile salmonid exposures were initiated within 24 h of each storm event. Note that 6PPD-q levels in runoff from this location have been previously measured across nine storms in 2017−2019,[4,19] including the October and December collection events used here in 2018; all storms contained 6PPD-q at concentrations expected to be lethal to juvenile coho (Table S3).

Juvenile Salmon and Steelhead. Juvenile coho, sockeye, and Chinook salmon as well as an ocean-migrating stock of *O. mykiss* (hereafter referred to as steelhead) were obtained from local hatcheries, held in a recirculating freshwater system at WSU-P on a 12:12 h dark:light cycle, and fed daily with commercial fish food (BioVita, Bio-Oregon). Fish rearing water consisted of municipal water treated with reverse osmosis and adjusted to pH 7.6 and a conductivity of 1500 μS/cm, then passed through a bead filter, UV reactor, bioreactor, and chiller. Sockeye prefer cooler waters (8 °C optimum), and thus exposure temperatures were maintained at 5.0−10.3 °C for the cross-species vulnerability experiments involving sockeye and the three other salmonids. For the dilution experiments (coho only), temperatures ranged from 10.0 to 12.1 °C. Fish sizes and water quality measurements for all experiments are described in the Supporting Information (Tables S3 and S4); experimental protocols were approved by Washington State University's Institutional Animal Care and Use Committee.

Stormwater Exposures to Assess Species-Specific Sensitivity. For the multispecies comparisons, replicate groups of juvenile salmonids were exposed to undiluted roadway runoff (100% stormwater) for 24 h following each of the three 2019 storm events and then transferred to clean (rearing) water for an additional 48 h (Table S1). Coho served as positive controls for the urban mortality syndrome in side-by-side exposures using subyearlings (coho, sockeye, and Chinook) and larger age 1+ salmonids (coho and steelhead). We selected an ocean-migrating stock of *O. mykiss* to differentiate the steelhead life history from domesticated, freshwater-resident strains of rainbow trout.

Static exposures were carried out in 35 L glass aquaria containing either 30 L of clean water or 100% stormwater. For the smaller fish (subyearling coho, Chinook, and sockeye), 9−10 fish were placed in each of the three replicate exposure tanks. For the larger (age 1+) coho and steelhead, $n = 6$ fish were placed in each of four replicate exposure tanks. A few fish escaped into the surrounding water bath and were excluded (Table S1).

Exposure tanks were supplied with air stones for oxygenation (>10 mg/L) and placed in flow-through water baths with chillers to maintain temperatures. Across all three storms, mortality was monitored throughout exposure periods at regular intervals (2, 4, 8, and 24 h). Final reported mortality counts included moribund fish that did not react to gentle prodding and were removed and euthanized with MS-222 (400 mg/L) followed by severing the spinal cord.

All fish surviving the 24 h exposure were transferred to larger (57 L) tanks containing clean water for a 48 h depuration. For the smaller fish (subyearling coho, Chinook, and sockeye), individuals were removed from the three replicate exposure tanks and grouped into a single depuration tank with a maximum number of 30 fish per tank. For the larger age 1+ coho and steelhead, fish from individual exposure tanks were divided evenly into two depuration tanks ($n = 12$ maximum per tank, to adjust for larger fish). Moribund and dead fish were monitored and removed midway through depuration (48 h) and at the end of depuration (72 h).

Stormwater Exposures to Assess the Influence of Dilution on the Mortality Syndrome. To evaluate dilution, juvenile coho were exposed to a graded stormwater concentration series for 24 h following three storms in 2018 (Table S2). Juvenile coho (age 1+; Table S4) were placed in static exposure chambers as described above. Glass aquaria (35 L) were filled with either 30 L of clean water or urban stormwater diluted to 25%, 11.2%, 5%, 2.2%, or 1% with clean water. For the August and December storms, individual fish ($n = 8$, adjusted for size) were placed in each of three replicate tanks per concentration. For the October storm, a mechanical failure (chiller) necessitated a shift in experimental design, whereby $n = 10$ fish were exposed in each of the two replicate tanks per dilution. Mortality was enumerated as described above.

Statistical Analyses. Statistical analyses were developed using R (https://www.r-project.org/) and RStudio (https://www.rstudio.com). Mortality was calculated in proportion to the total number of individuals across all tanks within a given treatment (e.g., exposure, species, time, and/or dilution; see data in Tables S1 and S2). For each observed proportion, the 95% confidence interval was calculated using the BinomCI function from the DescTools R package with the "modified Wilson" method to account for proportions near 0 and 1 (presented as percentages in Figure 1). Differences among treatments were determined by comparing confidence intervals around the observed proportions.

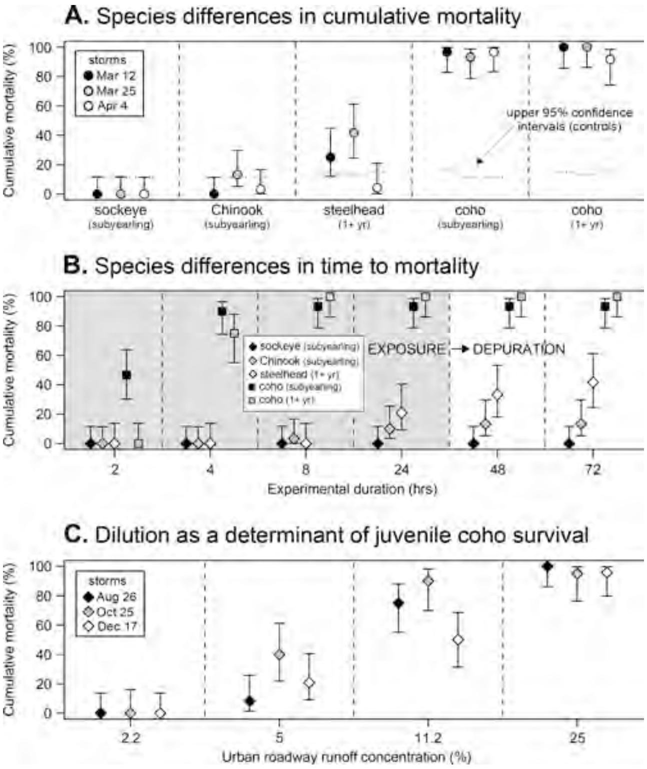


Figure 1. Cumulative mortality (% and 95% confidence interval) of juvenile Pacific salmonids exposed to urban roadway runoff. (A) Species differences across three storms following 24 h exposure and 48 h depuration. Upper 95% confidence intervals of controls are shown as dotted lines. (B) Species differences in mortality over time for a single storm (March 25) after 24 h exposure (gray shaded area) and 48 h depuration (unshaded area). (C) Mortality in coho (1+ yr) exposed for 24 h to different dilutions of roadway runoff over three storms. No mortality was observed in controls. (A−C) Data from all control and exposed fish are shown in Tables S1 and S2. Fish age is noted as subyearlings or 1+ yrs.

■ RESULTS AND DISCUSSION

Varying Mortality in Response to Untreated Stormwater Across Salmonid Species. Juvenile sockeye, Chinook, and steelhead, as well as two size classes of juvenile coho (positive controls), were exposed to untreated roadway runoff from three separate storm events (Figure 1A). As anticipated from earlier studies,[4,15,16] subyearling and larger (age 1+) coho were highly susceptible to toxic runoff, as evidenced by >90% cumulative mortality (Figure 1A; rightmost panels) across all three 2019 storms. Conversely, all juvenile sockeye survived 24 h exposures to runoff, irrespective of the storm, similar to previous observations of 100% survival for chum.[13,14] The response of juvenile Chinook was less consistent, with only modest mortality in response to the second (March 25) storm. Steelhead were intermediate between sockeye (no deaths) and coho (almost no survivors), with proportionately higher mortality for the first and second storms (Figure 1A).

Species-Specific Timelines for the Mortality Syndrome. Among Pacific salmonids, the stormwater mortality phenomenon has primarily been studied in coho, where the progression of the syndrome—from asymptomatic fish to visible distress (disorientation, loss of equilibrium) to death—occurs over a span of a few hours in fish exposed to 100% stormwater. In accord with earlier published results,[15] juvenile coho began dying soon during exposure (2−4 h), with near-maximal cumulative mortality within 8 h (Figure 1B; stormwater exposure window in shaded panels at left). Relative to coho (positive controls), the progressions of symptoms in Chinook and steelhead were qualitatively the same (surface swimming and gaping, loss of equilibrium) albeit with a delayed onset and a longer window for mortality thereafter, with fish generally dying toward the end of the 24 h exposure or after subsequent transfer to clean water. Hence, similar to coho,[15] the distress syndrome in Chinook and steelhead appears irreversible.

Influence of Dilution on Coho Survival. Our sourcing of stormwater from an urban arterial with high traffic volume (relatively concentrated runoff) is well suited for studies of green infrastructure effectiveness[16,17] but is less representative of exposure conditions in salmon habitats where stormwater is diluted by receiving waters. To evaluate the influence of dilution on survival, juvenile coho were exposed to runoff from three separate storm events for 24 h, at concentrations ranging from 1% to 25%. Mixtures containing 5% or more stormwater were generally lethal to juvenile coho (Figure 1C). Note that the upper end of the exposure range (25% runoff diluted in clean water) was chosen based on maximal coho lethality in pilot experiments; untreated surface runoff is likely to represent more than 25% of receiving surface water volumes in many urban watersheds.

Implications. In the U.S. Pacific Northwest, the urban runoff mortality phenomenon has been studied intensively for the past two decades, with a primary focus on adult coho returning from the ocean to spawn in urbanized Puget Sound watersheds.[10,18] Wild coho populations are unlikely to withstand the high rates of dying spawners previously and consistently documented in urban stream reach surveys.[9] The mortality syndrome was subsequently extended to juvenile coho,[15] which enabled relatively high-throughput testing of stormwater fractions and set the stage for the eventual discovery of 6PPD-q as the causative agent.[4] Because the parent compound (6PPD) and other chemicals similar in structure and function are ubiquitous in motor vehicle tires worldwide, there has been an expanding effort to identify other fish species at risk from exposure to untreated roadway runoff. Our current findings extend the urban runoff mortality phenomenon to steelhead and Chinook but with phenotypic nuances in severity (less) and time course (longer) relative to coho. Nevertheless, the characteristics of the syndrome in coho exposed to roadway runoff (e.g., the present study; Chow et al.[15]) or 6PPD-q alone (e.g., Tian et al.[4]) are the same, implying a common underlying mechanism. The discussion that follows therefore hypothesizes that the coho, steelhead, and Chinook toxicity observed here was caused by 6PPD-q across the different stormwater collections, an assumption further supported by recent findings for *O. mykiss.*[12] For context, coho are exceptionally sensitive to 6PPD-q toxicity, with lethality (LC50) in response to exposure concentrations less than 0.1 parts per billion.[19] In the present study, 6PPD-q levels were likely to have exceeded this acute lethality threshold for coho across all storms by an order of magnitude. This is supported by published 6PPD-q measurements in runoff from the same source (SR520 elevated bridge) across nine separate rain events in 2017−2019,[4,19] including the October and December stormwaters collected for the dilution experiments in Figure 1C (Table S3).

Our current findings are the first demonstration of urban runoff-driven mortality in Chinook, and our sockeye results reinforce what are apparently stark differences in vulnerability across closely related salmonids. For example, whereas coho (*O. kisutch*) are highly sensitive,[19] several field and laboratory studies have shown that congeneric chum salmon (*O. keta*) are not.[10,13] Similar to chum, zebrafish (*Danio rerio*) and medaka (*Oryzias latipes*) appear relatively insensitive to 6PPD-q,[20,21] along with Arctic char (*Salvelinus alpinus*) and white sturgeon (*Acipenser transmontanus*).[12] Conversely, Brinkmann et al.[12] recently showed that brook trout (*Salvelinus fontinalis*), like coho, are also highly sensitive to the acutely lethal toxicity of 6PPD-q. Intriguingly, in the same study, the time to death for rainbow trout (*O. mykiss*) was intermediate, with mortality occurring over a more protracted timeline of a few days. On the basis of these initial findings, the Salmonidae appear to sort into roughly three categories of vulnerability to 6PPD-q acute toxicity: high (coho salmon and brook trout), low (chum and sockeye salmon, Arctic char), and intermediate (steelhead/rainbow trout, Chinook salmon).

In the context of threatened species management, the recent *O. mykiss* results are particularly noteworthy. In addition to being a model test organism in aquatic toxicology, rainbow trout are an important aquaculture species for recreational fishing.[22] In the western United States, several distinct population segments (or evolutionarily significant units) of ocean-migrating *O. mykiss* (steelhead) are currently listed for protection under the U.S. Endangered Species Act (ESA). Accordingly, freshwater and estuarine habitats critical for steelhead conservation and recovery have been designated across major metropolitan areas in the coastal and interior regions of California, Oregon, and Washington. The overlap between these recovery domains and the expanding transportation grid, at the watershed and basin scales, is extensive. The ESA requires that federal natural resource managers consider the impacts of federal actions on listed species, and stormwater contaminants (e.g., 6PPD-q) represent a habitat factor that was largely unknown to science when steelhead were listed.

For *O. mykiss*, the initial evidence suggests that life history plasticity (i.e., freshwater residence vs ocean migration) is not a determinant of susceptibility, albeit premised on two important assumptions: (1) Variation in genetics or husbandry/culture practices between the *O. mykiss* stocks used here and those sourced for Brinkmann et al.[12] did not influence observed toxicity, and (2) 6PPD-q was the causative agent for *O. mykiss* deaths here, thus facilitating a direct comparison of mortality across the two studies. Irrespective, more work is needed—particularly experimental designs that consider phenotypic and genetic differences across wild steelhead stocks. The intermediate and delayed nature of the mortality syndrome in steelhead and Chinook (relative to coho) also raises the potential significance of sublethal toxicity. The recent discovery of 6PPD-q should expedite functional studies of neurobehavioral and cardiorespiratory dysregulation, to match the consistently dominant features of the distress phenotype (e.g., surface swimming and gaping, loss of orientation and equilibrium).

Our findings also directly address the potential role of dilution in receiving waters, as a conventional management strategy for reducing toxic impacts to aquatic communities. Recent laboratory study designs[14−17] have used urban runoff from a relatively intensively trafficked arterial, in part as a strategy to establish a clear baseline of toxicity in fish and invertebrates prior to green infrastructure treatments to evaluate pollutant removal and improved organismal health. While this approach was useful for challenging bioinfiltration soil systems,[16,17] exposures to undiluted arterial roadway runoff are not necessarily representative of receiving water quality conditions in large rivers or lakes or in habitats downstream from a site-specific stormwater discharge. Field surveys have consistently demonstrated high rates of coho spawner mortality across all urban watersheds where the phenomenon has been studied closely.[11] Therefore, a protective role for dilution has (to date) seemed unlikely, given these indirect lines of evidence.[10,11] Consistent with this, arterial runoff was acutely lethal to juvenile coho salmon, even when diluted in 95% clean water. Additional factors working against "dilution as the solution" to the urban runoff mortality syndrome include the ubiquitous and diffuse nature of stormwater inputs to salmon habitats (e.g., serial and repeated discharges along migration corridors), ongoing climate change (i.e., reduced receiving water volumes), and the possibility of sublethal toxicity at the lower end of the dilution exposure range examined here. To address these factors, future studies can focus on a few related chemicals (antiozonants and associated transformation products, as opposed to whole urban runoff), using an extensive and established set of tools for studying cardiorespiratory and neurobehavioral toxicity in fish (e.g., Blair et al.[23]). These studies are needed to more precisely define sublethal toxicity thresholds in ESA-listed steelhead and Chinook and to better understand what appear to be striking sensitivity differences across closely related species of salmon, trout, and char.

■ ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available free of charge at https://pubs.acs.org/doi/10.1021/acs.estlett.2c00467.

> Table S1: All data for the species comparison exposure studies. Table S2: All data collected for the exposure studies evaluating dilution effect. Table S3: Storm information and water quality measurements. Table S4: Information related to the fish such as age, size, and hatchery of origin. (XLSX)

■ AUTHOR INFORMATION

Corresponding Author

N. L. Scholz − *Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric*

Administration, Seattle, Washington 98112, United States; orcid.org/0000-0001-6207-0272;
Email: nathaniel.scholz@noaa.gov

Authors

B. F. French − *Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, Washington 98112, United States;* orcid.org/0000-0002-2358-9044

D. H. Baldwin − *Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, Washington 98115, United States*

J. Cameron − *Saltwater Inc, under contract to Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, Washington 98112, United States*

J. Prat − *School of the Environment, Puyallup Research and Extension Center, Washington State University, Puyallup, Washington 98371, United States*

K. King − *Environmental Contaminants Program, United States Fish and Wildlife Service, Lacey, Washington 98503, United States*

J. W. Davis − *Environmental Contaminants Program, United States Fish and Wildlife Service, Lacey, Washington 98503, United States*

J. K. McIntyre − *School of the Environment, Puyallup Research and Extension Center, Washington State University, Puyallup, Washington 98371, United States;* orcid.org/0000-0003-3480-7083

Complete contact information is available at:
https://pubs.acs.org/10.1021/acs.estlett.2c00467

Notes

The authors declare no competing financial interest.

■ ACKNOWLEDGMENTS

This effort was supported by federal funding for Puget Sound recovery (EPA Interagency Agreement DW-014092437301). Washington State University was also supported by the Alice C. Tyler Trust, the Governor of Washington State, McIntire-Stennis Grant #NI19MSCFRXXXG034, accession #1015288 from the USDA National Institute of Food and Agriculture, and Seattle Public Utilities. We thank Emma Mudrock and Jill Wetzel for assistance with animal husbandry and conducting the exposures. Fish were generously provided by the Washington Department of Fish & Wildlife and the Puyallup Tribe. Additional assistance was provided by Chelsea Mitchell, Stephanie Blair, Lane Maguire, Ben Leonard, Michelle Chow, Jana Labenia, and Julann Spromberg. Our thanks to Su Kim for creating the graphic embedded in the abstract. Findings and conclusions herein are those of the authors and do not necessarily represent the views of the sponsoring organizations.

■ REFERENCES

(1) Tian, Z.; Peter, K. T.; Gipe, A. D.; Zhao, H.; Hou, F.; Wark, D. A.; Khangaonkar, T.; Kolodziej, E. P.; James, C. A. Suspect and Nontarget Screening for Contaminants of Emerging Concern in an Urban Estuary. *Environ. Sci. Technol.* **2020**, *54* (2), 889−901.

(2) Du, B.; Lofton, J. M.; Peter, K. T.; Gipe, A. D.; James, C. A.; McIntyre, J. K.; Scholz, N. L.; Baker, J. E.; Kolodziej, E. P. Development of Suspect and Non-target Screening Methods for Detection of Organic Contaminants in Highway Runoff and Fish Tissue with High-resolution Time-of-flight Mass Spectrometry. *Environmental Science: Processes & Impacts* **2017**, *19* (9), 1185−1196.

(3) Peter, K. T.; Lundin, J. I.; Wu, C.; Feist, B. E.; Tian, Z.; Cameron, J. R.; Scholz, N. L.; Kolodziej, E. P. Characterizing the Chemical Profile of Biological Decline in Stormwater-Impacted Urban Watersheds. *Environ. Sci. Technol.* **2022**, *56* (5), 3159−3169.

(4) Tian, Z.; Zhao, H.; Peter, K. T.; Gonzalez, M.; Wetzel, J.; Wu, C.; Hu, X.; Prat, J.; Mudrock, E.; Hettinger, R.; Cortina, A. E.; Biswas, R. G.; Kock, F. V. C.; Soong, R.; Jenne, A.; Du, B.; Hou, F.; He, H.; Lundeen, R.; Gilbreath, A.; Sutton, R.; Scholz, N. L.; Davis, J. W.; Dodd, M. C.; Simpson, A.; McIntyre, J. K.; Kolodziej, E. P. A Ubiquitous Tire Rubber-derived Chemical Induces Acute Mortality in Coho Salmon. *Science* **2021**, *371* (6525), 185−189.

(5) Peter, K. T.; Hou, F.; Tian, Z.; Wu, C.; Goehring, M.; Liu, F.; Kolodziej, E. P. More Than a First Flush: Urban Creek Storm Hydrographs Demonstrate Broad Contaminant Pollutographs. *Environ. Sci. Technol.* **2020**, *54* (10), 6152−6165.

(6) Rauert, C.; Charlton, N.; Okoffo, E. D.; Stanton, R. S.; Agua, A. R.; Pirrung, M. C.; Thomas, K. V. Concentrations of Tire Additive Chemicals and Tire Road Wear Particles in an Australian Urban Tributary. *Environ. Sci. Technol.* **2022**, *56* (4), 2421−2431.

(7) Johannessen, C.; Helm, P.; Lashuk, B.; Yargeau, V.; Metcalfe, C. D. The Tire Wear Compounds 6PPD-Quinone and 1,3-Diphenylguanidine in an Urban Watershed. *Arch. Environ. Contam. Toxicol.* **2022**, *82* (2), 171−179.

(8) Seiwert, B.; Nihemaiti, M.; Troussier, M.; Weyrauch, S.; Reemtsma, T. Abiotic Oxidative Transformation of 6-PPD and 6-PPD Quinone from Tires and Occurrence of their Products in Snow from Urban Roads and in Municipal Wastewater. *Water Res.* **2022**, *212*, 118122.

(9) Spromberg, J. A.; Scholz, N. L. Estimating the Future Decline of Wild Coho Salmon Populations Resulting from Early Spawner Die-offs in Urbanizing Watersheds of the Pacific Northwest, USA. *Integrated Environmental Assessment and Management* **2011**, *7* (4), 648−656.

(10) Scholz, N. L.; Myers, M. S.; McCarthy, S. G.; Labenia, J. S.; McIntyre, J. K.; Ylitalo, G. M.; Rhodes, L. D.; Laetz, C. A.; Stehr, C. M.; French, B. L.; McMillan, B.; Wilson, D.; Reed, L.; Lynch, K. D.; Damm, S.; Davis, J. W.; Collier, T. K. Recurrent Die-Offs of Adult Coho Salmon Returning to Spawn in Puget Sound Lowland Urban Streams. *PLoS One* **2011**, *6* (12), e28013.

(11) Feist, B. E.; Buhle, E. R.; Baldwin, D. H.; Spromberg, J. A.; Damm, S. E.; Davis, J. W.; Scholz, N. L. Roads to Ruin: Conservation Threats to a Sentinel Species across an Urban Gradient. *Ecological Applications* **2017**, *27* (8), 2382−2396.

(12) Brinkmann, M.; Montgomery, D.; Selinger, S.; Miller, J. G. P.; Stock, E.; Alcaraz, A. J.; Challis, J. K.; Weber, L.; Janz, D.; Hecker, M.; Wiseman, S. Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance. *Environmental Science & Technology Letters* **2022**, *9*, 333−338.

(13) McIntyre, J. K.; Prat, J.; Cameron, J.; Wetzel, J.; Mudrock, E.; Peter, K. T.; Tian, Z.; Mackenzie, C.; Lundin, J.; Stark, J. D.; King, K.; Davis, J. W.; Kolodziej, E. P.; Scholz, N. L. Treading Water: Tire Wear Particle Leachate Recreates an Urban Runoff Mortality Syndrome in Coho but Not Chum Salmon. *Environ. Sci. Technol.* **2021**, *55* (17), 11767−11774.

(14) McIntyre, J. K.; Lundin, J. I.; Cameron, J. R.; Chow, M. I.; Davis, J. W.; Incardona, J. P.; Scholz, N. L. Interspecies Variation in the Susceptibility of Adult Pacific Salmon to Toxic Urban Stormwater Runoff. *Environ. Pollut.* **2018**, *238*, 196−203.

(15) Chow, M. I.; Lundin, J. I.; Mitchell, C. J.; Davis, J. W.; Young, G.; Scholz, N. L.; McIntyre, J. K. An Urban Stormwater Runoff Mortality Syndrome in Juvenile Coho Salmon. *Aquatic Toxicology* **2019**, *214*, 105231.

(16) McIntyre, J. K.; Davis, J. W.; Hinman, C.; Macneale, K. H.; Anulacion, B. F.; Scholz, N. L.; Stark, J. D. Soil Bioretention Protects Juvenile Salmon and their Prey from the Toxic Impacts of Urban Stormwater Runoff. *Chemosphere* **2015**, *132*, 213−219.

(17) Spromberg, J. A.; Baldwin, D. H.; Damm, S. E.; McIntyre, J. K.; Huff, M.; Sloan, C. A.; Anulacion, B. F.; Davis, J. W.; Scholz, N. L. Coho Salmon Spawner Mortality in Western US Urban Watersheds: Bioinfiltration Prevents Lethal Storm Water Impacts. *Journal of Applied Ecology* **2016**, *53* (2), 398−407.

(18) McCarthy, S. G.; Incardona, J.; Scholz, N. Coastal Storms, Toxic Runoff, and the Sustainable Conservation of Fish and Fiisheries. *American Fisheries Society Symposium* **2008**, *64*, 7−27.

(19) Tian, Z.; Gonzalez, M.; Rideout, C. A.; Zhao, H. N.; Hu, X.; Wetzel, J.; Mudrock, E.; James, C. A.; McIntyre, J. K.; Kolodziej, E. P. 6PPD-Quinone: Revised Toxicity Assessment and Quantification with a Commercial Standard. *Environmental Science & Technology Letters* **2022**, *9* (2), 140−146.

(20) Hiki, K.; Asahina, K.; Kato, K.; Yamagishi, T.; Omagari, R.; Iwasaki, Y.; Watanabe, H.; Yamamoto, H. Acute Toxicity of a Tire Rubber-Derived Chemical, 6PPD Quinone, to Freshwater Fish and Crustacean Species. *Environmental Science & Technology Letters* **2021**, *8* (9), 779−784.

(21) Varshney, S.; Gora, A. H.; Siriyappagouder, P.; Kiron, V.; Olsvik, P. A. Toxicological Effects of 6PPD and 6PPD Quinone in Zebrafish Larvae. *Journal of Hazardous Materials* **2022**, *424*, 127623.

(22) Barnes, M. E.; Whelan, G. E. Visitor Policies and Practices at Public Trout and Salmon Hatcheries in North America. *Fisheries* **2004**, *29* (10), 16−21.

(23) Blair, S. I.; Barlow, C. H.; McIntyre, J. K. Acute Cerebrovascular Effects in Juvenile Coho Salmon Exposed to Roadway Runoff. *Canadian Journal of Fisheries and Aquatic Sciences* **2021**, *78* (2), 103−109.

Recommended by ACS

Bifenthrin, a Ubiquitous Contaminant, Impairs the Development and Behavior of the Threatened Longfin Smelt during Early Life Stages

Florian Mauduit, Richard E. Connon, *et al.*

JUNE 23, 2023
ENVIRONMENTAL SCIENCE & TECHNOLOGY
READ

Bioretention Cells Provide a 10-Fold Reduction in 6PPD-Quinone Mass Loadings to Receiving Waters: Evidence from a Field Experiment and Modeling

Timothy F. M. Rodgers, Rachel C. Scholes, *et al.*

JUNE 16, 2023
ENVIRONMENTAL SCIENCE & TECHNOLOGY LETTERS
READ

Establishing an *In Vitro* Model to Assess the Toxicity of 6PPD-Quinone and Other Tire Wear Transformation Products

Justin B. Greer, John D. Hansen, *et al.*

MAY 02, 2023
ENVIRONMENTAL SCIENCE & TECHNOLOGY LETTERS
READ

Cross-Species Evaluation of Bioaccumulation Thresholds for Air-Breathing Animals

Leslie J. Saunders and Frank Wania

JULY 14, 2023
ENVIRONMENTAL SCIENCE & TECHNOLOGY
READ

Get More Suggestions >

https://doi.org/10.1021/acs.estlett.2c00467
Environ. Sci. Technol. Lett. 2022, 9, 733−738

FHWA (Communication ID 539007)		
Comment ID	Comment Text	Response
1	Are project updates via listserv provided in languages other than English? Is there an option for individuals to request updates in languages other than English? If so, which languages?	Email updates on the OMF South project are provided in English. At the bottom of every email are translated links to a translation services webpage where readers can request information in their language. Sound Transit fully translates notification mailers and online open houses into Spanish, Korean, and Russian (the three most common languages spoken in the study area after English). In addition, Sound Transit provided a fully translated guide to the Draft EIS that provided a similar level of information to the online open houses. These are intended to be physical handouts shared at public meetings and targeted community briefings.
2	How are language access services provided during open house and drop-in sessions? Are multi-lingual staff present?	As described in Appendix B, Public Involvement and Agency Coordination, of the Final EIS, interpreters for sign language, Spanish, Korean, and Russian were available at the in-person public meeting and hearing on October 24, 2023. For smaller public events, such as drop-ins or presentations to specific community groups, Sound Transit will arrange interpretation upon request. Staff can also access a language line for on-demand interpretation services, if needed, or follow up with someone requesting more information with the support of an interpreter.
3	Were language services provided for virtual public hearings? If so, how were they provided? (Break-out sessions in multiple languages, etc.?)Was a sign language interpreter present?	The virtual public hearings included live-captioning, sign-language interpretation, and simultaneous interpretation in Spanish, Korean, and Russian. The virtual hearings were hosted on Zoom, with on-screen and spoken instructions informing people how to tune into the appropriate audio channel on the Zoom Interpretation feature at the bottom of their screen. Information clarifying this has been added to Appendix B, Public Involvement and Agency Coordination.
4	Simple typo creates significant difference: Title VI (6), instead of Title IV (4)	The correction has been made in Appendix B of the Final EIS.
5	The project web page provides a Google translate feature at the bottom right hand corner of the home page where it blends with the rest of the page. It isn't highlighted or easily identified by bold color or font. This means LEP individuals must scan the entire, English-only, page before locating the translate option. Additionally, the "Select Language" drop-down feature is displayed exclusively in English, which means an LEP individual would have to be able to read English in order to identify that this feature offers translated languages. This is also the case for the "civil rights and complaints" link. How are LEP folx provided meaningful access to language services if they must navigate English-only language in order to identify where these services exist? Placing the "View in other languages" option at the top of	Thank you for your comment. This input has been shared with the Sound Transit web team for inclusion in future updates to the website.

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
	the home page, in languages represented in the project area, would provide more meaningful LEP access. On the Title VI page, multiple languages are provided in the top right corner to guide LEP folx to information about the Title VI complaint process. How do LEP folx locate complaint information, in-language, on the home page?	
6	This appears to be exclusively a EJ analysis and not a Title VI analysis, It does not include all Title VI protected classes or analyze them individually. The analysis aggregates minority populations and includes low-income populations. EJ addresses distribution of high and adverse impacts on minority and low-income populations. EJ analytical standards also recommend aggregating minority populations. Title VI ensures nondiscrimination in programs and activities on the basis of race, color, and national origin (all races, all colors, all national origins) and does not consider low-income. Title VI analytical standards recommend each population be analyzed individually. The Minority Population Distribution maps look at the density of the aggregated minority population but does not evaluate if there is a specific community (race, color, national origin) present that may be disparately impacted.	Sound Transit published the Title VI Facility Equity Analysis in 2021, separate from the 2021 SEPA Draft EIS. It was prepared in compliance with Title VI of the Civil Rights Act (42 U.S. Code 200d), FTA Circular 4702.1B, and Sound Transit Resolution No. R2022-19. The report is available to the public on Sound Transit's web page: https://www.soundtransit.org/sites/default/files/documents/operations-and-maintenance-facility-south-title-iv-facility-equity-analysis-report-2021110.pdf. The Board considered the findings of the Facility Equity Analysis in its selection of the Preferred Alternative in December 2021. Sound Transit will be publishing an amendment to the report in mid-2024 that will consider project revisions since the original analysis. The amendment will be available to the Board and the public prior to the action to select the project to be built.
7	Indicates "translation assistance" was available during online hearings. Was this oral interpretation or written translation services? If it was translation (written) how was this accommodated in the virtual space? Were there break-out rooms offering translated captioning?	The OMF South Title VI Facility Equity Analysis was published separately from the Draft EIS in November 2021. The virtual public hearings included live-captioning, sign language interpretation, and simultaneous interpretation in Spanish, Korean, and Russian. The virtual hearings were hosted on Zoom, with on-screen and spoken instructions informing people how to tune into the appropriate audio channel on the Zoom Interpretation feature at the bottom of their screen.
8	Were in-language lunch groups provided oral-interpretation services or written translation services? May want to make a distinction between what type of services were provided.	Oral interpretation was provided at the in-language meal events.
9	Were translation (written) or interpretation (oral) services provided for open houses?	American Sign Language and oral interpretation were provided at in-person and virtual public hearings for 2021 Draft EIS and the 2023 Draft EIS. Translated materials (handouts and website information) were provided for all open houses. Other interpretation services have been advertised and provided upon request for open houses.
10	No information was provided regarding increases in freight traffic. If this is captured in the passenger car equivalents, please document that in the text.	The amount of freight traffic to and from the OMF site is anticipated to be minimal, particularly during the AM and PM peak hours, because deliveries would occur during off-peak hours. Therefore, freight traffic was not factored into the analysis. Section 4.2.1.1 of Appendix G1, Transportation Technical

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
		Report, to the Final EIS has been updated to clarify this.
11	No discussion of heavy vehicle traffic increases and impacts.	The amount of freight traffic to and from the OMF site is anticipated to be minimal, particularly during the AM and PM peak hours, because deliveries would occur during off-peak hours. Therefore, freight traffic was not factored into the analysis. Section 4.2.1.1 of Appendix G1, Transportation Technical Report, to the Final EIS has been updated to clarify this.
12	I recommend using fatal and serious crash rates rather than collision rates. Regardless of the pandemic, K and A crashes have increased while total reported crashes have decreased. This assessment should assess what risks are being elevated due to the increases in traffic, both in aggregate and by type.	The City of Federal Way Transportation Impact Analysis guidelines requires total collision crash rates and only provide thresholds for high-collision locations based on total collisions. Therefore, total collision-crash rates were provided for all locations. There were also only two serious injury crashes in the entire study area and no fatal crashes, so K/A (fatal or disabling) crash rates will almost all be zero. Section 3.7.1 of Appendix G1, Transportation Technical Report, has been updated to reflect this. Additionally, while there are volume increases expected in the future, these are not because of the project. Because the project alternatives are not expected to result in impacts to traffic safety, it is not a differentiator among the alternatives.
13	The traffic safety changes experienced in 2020-2022 are realistic and should not be excluded. Exposure is accounted for by normalizing by VMT and EV. Traffic behavior has changed since 2018 and should be accounted for in decision-making.	The Final EIS relies on data from 2016 to 2018 because it provides a more conservative (higher) collision rate than data from 2020 and 2021, which reflect lower traffic volumes during the years of the COVID pandemic. Because the project alternatives are not expected to result in impacts to traffic safety, the collision data is not a differentiator among the alternatives.
14	Essential Fish Habitat should be capitalized throughout.	This revision has been made throughout the Final EIS.
15	2nd paragraph where study area extent defined, the 300' extent for pollutants isn't really consistent with conclusions in second paragraph of 3.10-13 where downstream adverse effects are acknowledged.	The description of the study area in Section 3.10, Ecosystem Resources, has been revised to explain that downstream impacts were also considered.
16	For the discussion on 6PPD-quinone where coho pre-spawn mortality is mentioned, consider expanding to include more recent science on mortality to other salmonids and trout including steelhead, Chinook salmon and rainbow trout (scientific sources provided).	The provided references have been summarized in Section 3.10, Ecosystems, and added to the reference section in Appendix A, Support Information, of the Final EIS.
17	Pg. 3.11-17: States that enhanced treatment for all post-project GIS will be provided. Does this include existing and replaced PGIS?	Yes, the project would provide treatment for existing and new pollutant-generating impervious surfaces that are part of the project, as required by local regulations.

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
18	Table 3.11-10 shows either a net reduction or no increase in PGIS for the Preferred Alternative but later in the section (3.11.2.2) it states that OMF S. would add PGIS and non-PGIS.	The PGIS calculations were updated for the Final EIS. The updated numbers show an increase of 1.2 acres for the Preferred Alternative with the 40 mph Alignment. Please see Table 3.11-3 in the Final EIS with the updated analysis.
19	The Potential Mitigation (3.11.3) section states that no temporary or long-term adverse impacts on water resources are expected after treatment BMPs are constructed, however in the Ecosystems section, adverse effects downstream are acknowledged. I think it is valid to state that no further mitigation is likely to be required and explain that some adverse effects may occur due to the very low concentrations of some pollutants that are still deemed toxic to some fish species and the fact that even "effective" treatment won't prevent some discharges from the BMPs that may be above those thresholds.	The proposed stormwater management uses Ecology-approved BMPs that meet standards for all known, available, and reasonable methods of prevention, control, and treatment (abbreviated as AKART). Section 3.11, Water Resources, in the Final EIS was updated to note that it is possible that discharges from sites with approved stormwater management may release pollutants at low thresholds or low flows at durations that can still harm sensitive aquatic species for a period of time, due to the limitations of AKART. Nevertheless, these BMPs are expected to prevent long-term, adverse impacts to surface water and groundwater quality, and no additional mitigation is recommended.
20	There are two separate approval actions for FHWA and they should be called out separately on this list. There is an NEPA Record of Decision, Federal Highway Administration and the Air Space Lease for Use of Interstate Right of Way, Federal Highway Administration.	The suggested revision to the Fact Sheet has been made in the Final EIS.
21	FHWA wants to confirm there are no anticipated design approvals or modifications to Interstate 5 with this project, which would require FHWA approval.	The current design does not include modifications to I-5 that would require FWHA approval. If final design includes modifications, Sound Transit would apply for the necessary approvals.
22	The last paragraph in 3.6.3.1 indicates that EJ populations would accrue benefits through "the addition of new jobs to build the project." Given the way contractors are selected, there is no way to definitively say the jobs will be given to people in the vicinity of the project. Even with more lenient local hiring rules now, there is no guarantee and we would be more comfortable if this statement was left out—or include a caveat to the statement to explain that it is not a guarantee. Even though it should be obvious given the context, there should be an explanation that the benefits in the last paragraph of this section are all temporary benefits that would occur during construction. If there would be any kind of increased staffing in the area because of the maintenance facility, that could be added as a more permanent benefit related to the economic factors mentioned in this paragraph.	Section 3.6.3.1, Project Impacts and Benefits (to Environmental Justice, Social Resources, Community Facilities, and Neighborhoods), states that the benefits of job creation would be to all populations, including EJ populations. It does not include a statement that jobs would be given to the people in the vicinity of the project. Job creation would be both permanent for operations of the facility, which would employ approximately 610 people, as well as for temporary for construction. The text in Section 3.6.3.1 of the Final EIS has been revised to clarify this.
23	Please include the following (adding FTA if you deem appropriate): "An Executive Order (E.O.) 14096—Revitalizing Our Nation's Commitment to Environmental Justice for All has been recently enacted (April 21, 2023). The new E.O. 14096 on environmental justice does not rescind EO 12898, which FHWA is implementing through the current DOT and FHWA EJ Orders (DOT 5610.2C	Appendix E, Environmental Justice Assessment, of the Final EIS has been revised to acknowledge that EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, does not rescind EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which FTA is implementing through

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
	and FHWA 6640.23A) until further guidance is provided regarding the implementation of the new E.O. on environmental justice."	DOT Order 5610.2C until further guidance is provided regarding the implementation of EO 14096 on environmental justice.
24	It is difficult from any figure to see where the alternatives would intersect the interstate ROW and cross the access line. Does there need to be a figure with that?	The figure in Chapter 2 is intended to be a high-level representation of the project. Please see Appendix C, Conceptual Design Drawings and Engineering Information, which includes the WSDOT Compatibility Line and the I-5 right-of-way.
25	It was not stated in the noise analysis specifically but it may be helpful to the reader and existing residents that the reason why there are so few noise impacts from the new mainline extension and test track to the north is because properties will be acquired for the facility, thus there will be some distance between sensitive receptors and the track. This is not exactly clear as there is no map in the technical report that includes model receptor locations.	As discussed in Section 3.9, Noise and Vibration, the project noise level was determined based on project parameters, such as the speed of the trains, headways and hours of operation, and the distance to sensitive receptors from the tracks. Because several properties would be acquired for the project, and those would be the properties closest to the tracks, the distance between the receptors and tracks is greater than it would be otherwise. The projected noise level was then compared to the existing noise levels to determine whether there would be impacts. Section 3.9.2, Environmental Impacts, in the Final EIS has been updated for clarification. Appendix G2, Noise and Vibration Technical Report, includes figures that show noise impact locations and proposed mitigation associated with the 55 mph Design Option.
26	It is confusing to the reader that existing noise levels in both tables (specifically S 324th Street to Burning Tree Blvd) do not match. Checking this against tables G2.6-10 and G2.6-11 it looks like the difference is between NB and SB locations. Consider adding the track side column to Table 3.9-2 and 3.9-3.	Tables 3.9-2 and 3.9-3 of the Final EIS have been revised to add a column specifying the track side and the distance to the track.
27	"Sound Transit would replace noise walls and berms that would be removed as part of the Preferred And South 344th Street alternatives." State that this would specifically occur on I-5.	The suggested revision has been made to the Final EIS and to note that Sound Transit would conduct additional noise analysis, as needed, in coordination with WSDOT and Federal Way during final design.
28	It is difficult from any figure to see where the alternatives would intersect the interstate ROW and cross the access line. Does there need to be a figure with that?	The figure in Chapter 2 is intended to be a high-level representation of the project. Please see Appendix C, Conceptual Design Drawings and Engineering Information, which includes the WSDOT Compatibility Line and I-5 right-of-way.
29	Missing discussion that relocation resources are available to all people being relocated without discrimination in compliance with Sound Transit's Limited English Proficiency Plan.	Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary has been revised in the Final EIS to include reference to Sound Transit's Language Assistance Plan.
30	Displacement and relocation really mean the same thing. Displaced person is defined as any person who moves from the real property or moves his or her personal property from the real property. Relocation is provided to displaced persons. This section should really be titled Property Acquisitions and Displacements.	For the purposes of the OMF South EIS analysis, displacements are referring to businesses and residents that would be moved as a result of the project, and relocations are referring to opportunities for businesses, residents, and other property owners to relocate within the same general area. The heading title in the Final EIS has not been changed.

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
31	This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..	The level of detail for the potentially affected parcels analysis is standard for Sound Transit projects. Providing this level of affected parcel information is appropriate because it provides adequate notification to potentially affected property owners and discloses the range of effects among project alternatives.
32	I wouldn't refer to this section as "Relocation Opportunities". The section is really talking about property availability for displacements so I would suggest using that title.	Please see response to Comment ID 30.
33	Since CoStar does not collect data on availability for potential replacement sites for religious facilities, what other data collection did you explore, e.g. real estate broker in the local market?	In addition to CoStar, Sound Transit used King County Assessor data and consulted web-based real estate companies for appropriately sized vacant land. Note that most of the potentially affected churches are in commercial or industrial buildings, which are common in the area.
34	This section states that finding properties that have specific needs may be more difficult to find. Missing a discussion of the actions proposed to remedy insufficient replacement sites.	As stated in Section 3.3, Acquisitions, Displacements, and Relocations, of the Final EIS, Sound Transit would follow the procedures outlined in its Property Acquisition and Relocation handbook. Qualified relocation agents are assigned to work with displaced persons throughout the process of locating replacement property and making the transition to the new location. The goal of the relocation agent is to assist the displaced person in locating a replacement site and successfully completing their move.
35	Title of section is "Single-Family Residential" and according the Table 3.3-1 under notes residential displacements include individual apartment/condo units and mobile homes. Based on this "Multi-Family should be added to the title.	The title of Section 3.3.3.2 has been changed to "Residential" in the Final EIS.
36	Suggest changing the sentence from saying displaced residents may have to find a location in a different neighborhood to "a similar neighborhood". A comp from either the same neighborhood or similar neighborhood considered in the same market must be provided to the displaced person before the agency can require them to relocate. Also, mobile home displacements can be challenging as inventory is at an all time low. This section is missing a discussion of the actions proposed to remedy insufficient replacement sites, including housing of last resort.	A different neighborhood was used because, while a comparable sale (comp) in a similar neighborhood would be provided, the resident may elect to move to a different neighborhood. Section 3.3.3.2 has been revised to describe different relocation options available for displaced Belmor residents.

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
37	The first sentence is contradictory as prior sections stated that finding properties with unique characteristics, such has a religious facility, could be more challenging. Also, in the case of the Church on 25 acres, it can be difficult to relocate due to its size. Missing a discussion of the actions proposed to remedy insufficient replacement sites.	Section 3.3.3.3, Religious Facilities, states that there would generally be adequate space available in the study area because the facilities that would be displaced are in commercial or industrial buildings. It also acknowledges an exception to this is Christian Faith Center, which would be more challenging to relocate because of its size. Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, summarizes the compensation and services Sound Transit provides. As part of its advisory services to those that are displaced, Sound Transit provides continuing and ongoing information related to available replacement sites as they arise.
38	Suggest changing “relocation opportunities” to “available properties”.	“Relocation opportunities” is the standard terminology Sound Transit uses in its EISs.
39	Not sure if Sound Transit’s procedures allow for the use of a waiver valuation but, if they are going to use a waiver valuation for the TCEs or any other right that fits the criteria then they will want to add waiver valuation discussion to this section.	Use of waiver valuation are typically determined during final design; therefore, they are not identified in the EIS.
40	2nd sentence needs to be changed as it states in addition to compensating owners which can provide the appearance that the additional compensation is only for owners. Since this sentence deals with relocation expenses it should be revised to state other forms of compensation for displacements could include…... Would also suggest changing “support services” to “advisory services”	The Final EIS has been revised to clarify the text per this comment.
41	Typically the property owner will approach the agency to request a hardship acquisition and that has a defined process. An agency can also acquire early when they have the legal right to do so. You might revise to state Sound Transit, with FTA’s approval is considering early acquisition of the four parcels associated with the church parcel, and it could potentially be acquired as a hardship acquisition if the church makes the request and provides the necessary documentation.	The text in Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, states that hardship can be used when the property owner can document, based on health, safety, or financial reasons, that remaining in the property poses an undue hardship compared to others. FTA required this documentation to support their approval referenced in the text. The text in this section has been updated in the Final EIS to reflect the Sound Transit Board action to advance the early acquisition of the Christian Faith Center parcels.
42	This statement is incorrect and should be revised to include all displacements. I would suggest removing “Businesses and tenants” to “Displaced persons” since all (business, farm, NPO, PPO, and residential) are included as defined.	The Final EIS has been revised as suggested.
43	Advisory services are applicable to more than just property owners. Sentence should be revised – suggest just removing “to property owners”.	Section 3.3.5, Potential Mitigation Measures (Acquisitions, Displacements, and Relocations), has been updated in the Final EIS to reflect this suggestion.

FHWA (Communication ID 539007)		
Comment ID	**Comment Text**	**Response**
44	This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..	The level of detail for the potentially affected parcels analysis is standard for Sound Transit projects. Providing this level of affected parcel information is appropriate because it provides adequate notification to potentially affected property owners and discloses the range of effects among project alternatives.
45	This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..	Please see response to Comment ID 44.
46	Suggest changing "substitute" to "suitable" to be consistent with the other areas you reference suitable for business sites.	The text of the Final EIS has been revised.
47	This is really an FTA call however, if this were a WSDOT project, according to WSDOT's ROW manual, environmental reports at this level should not include parcel specific information such as names and possible addresses of potential displacements. This information, if collected, should be kept in a separate project file. The statements should be more general. Instead of calling out Belmor Mobile Home Park, just say mobile home park, GarageTown to storage units, etc..	Please see response to Comment ID 44.
48	Suggest referring reader to the Acquisition and Displacements section for discussion on the difficulties associated with relocating a church.	The text of the Final EIS has been revised.

November 6th, 2023

Sound Transit, OMF South Project
c/o Erin Green, South Corridor Environmental Manager
401 S Jackson St., Seattle, WA 98104

RE: Operations & Maintenance Facility South, Draft EIS review

The Washington State Department of Transportation (WSDOT) is pleased to provide comments on the Draft Environmental Impact Statement (DEIS) for the Operations and Maintenance South (OMF South) Project.

Some key priorities from the attached Excel comment sheet are listed below:

1. Take inventory of WSDOT owned and managed facilities (i.e., noise walls, utilities, ITS) so we can work together to create avoidance and/or minimization and mitigation plans.
    a. Please also note the comments focused on maintenance access and plans. We anticipate these will be resolved through an Operations and Maintenance agreement.
2. The South 344th Street alternative shows impacts to a WSDOT BMP. Please coordinate with WSDOT to define any potential impacts and mitigation measures.
3. The WSDOT Triangle Project is mentioned multiple times. Please be aware that this project was recently shelved. Refer to the project website for more information.
4. Fish passage barriers are noted throughout the document. We recommend adding WDFW ID numbers and ownership when feasible to help differentiate between locations.
    a. Additionally, please utilize this link to access WSDOT's current 2030 fish passage delivery plan.
5. The 2019 Memorandum Of Understanding between Sound Transit and the Department of Ecology explains a difference between projects constructed by 2024 and projects constructed between 2030-2041. How will this apply to OMF South if complete by 2029?

Please contact Jessica Giblin, WSDOT Regional Transit Coordination Division (RTCD) environmental liaison, with any questions regarding this letter or the attached comment sheet.

WSDOT appreciates the opportunity to review and looks forward to continuing our collaboration with Sound Transit.

Sincerely,

Cordelia Crockett

Cordy Crockett WSDOT RTCD Director
crockec@wsdot.wa.gov

cc: Jessica Giblin, WSDOT RTCD Environmental Liaison GiblinJ@WSDOT.WA.GOV

Sound Transit's Operations & Maintenance Facility South Project - Comments from WSDOT's Review of the Draft EIS

Comments Due 11/6/23. Contact Jessica Giblin with questions (giblinj@wsdot.wa.gov)

#	DEIS Chapter	Page	Comment	Reviewer
1	3.11	3.11-8	If the project sites include any WSDOT-managed stormwater facilities, please identify the WSDOT stormwater facilities by creating a summary table if necessary.	K. Shin
2	3.11	3.11-17	Please verify if the WSDOT Highway Runoff Manual should be included to consider LID Design.	K. Shin
3	3.10.1.1	3.10-1	The statement "Based on the anticipated high level of interest from Tribes…biologists conducted formal delineations of the OHWM of tributaries to Hylebos Creek" could be corrected. OHWM delineations are done because of state and federal regulatory requirements, not because of a project's public profile. Is this trying to say delineations were done outside of the study area? If so, suggest clarifying and explain the reasoning.	E. Pizzichemi
4	3.10.1.1	Figure 3.10	How are mature forest and native mature forest classified? Ex: Based on dbh of trees? Please help clarify by defining how these are measured.	E. Pizzichemi
5	3.10.1.1	3.10-5	Consider adding "… biologists evaluated the accessibility of the streams in the study area *to salmonids* …" or something similar for clarity.	A. Atkinson
6	3.10.1.3	3.10-8	Similar to comment 3, wetland delineations are not done to alleviate concern, they are done to satisfy federal and state regulatory requirements. The sentence about doing formal delineations because of co-manager concern is not necessary.	E. Pizzichemi
7	3.10.1.3	3.10-8	"The Corps is expected to issue a new rule that will revise the definitions of waters of the US in fall 2023." - Will this paragraph be updated based on this change?	A. Atkinson
8	3.10.2.3	3.10-30	Regarding the classification of impact types - Typically, temporary impacts would need to be less than a year. Saying that forested/woody vegetated wetlands would recover in decades doesn't seem to fit the definition of temporary or long-term temporary.	E. Pizzichemi
9	3.10.3	3.10-32	Please work with the Puyallup Tribe if you're considering mitigation in the Hylebos watershed as the PTOI appreciate large-scale restoration.	E. Pizzichemi
10	3.10.3	3.10-33	Recommend re-checking availability at the Upper Clear Creek mitigation bank again. It may not have space by the time this project gets to permitting. I know the Rule prefer ILF and Banks.	E. Pizzichemi
11	3.8		AQ, GHG Emissions: Include social cost of carbon per the CEQ's 2023 NEPA GHG.	L. Taylor
12	3.2	3.2-22	S 344th Street access appears to be through WSDOT's BMP. How will WSDOT's facility be impacted and then mitigated for? The capacity/function of the WSDOT pond at S.344th St. needs to be maintained. (also in Executive Summary page ES-11).	K. Hall, C. Winningham
13	2	2-8	Because vulnerable communities have been historically impacted by transportation-related projects, recommend providing a concise explanation about how you will "identify potential impacts to neighborhood/community cohesion." The report currently makes some generalizations, but it would be helpful to have more information.	D. Karolczyk
14	2	2-8	Recommend that the report explain how vulnerable communities (e.g., community of color, retirees, Limited English proficient persons), and low-income residing in South 344th Street Preferred Alternative would be impacted. This would give reassurance that protected groups under Title VI of the Civil Rights of 1964 are protected. For example, will this project adhere to the Right-of Way Uniform Act Relocation Assistance? How would this project carry out the relocation assistance advisory program to satisfy FHWA's requirements of Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.)?	D. Karolczyk
15	3.1-3.6	3.6.11	Hazardous chemical exposure has been linked to many diseases (cancer, respiratory and heart diseases, among others). The Midway Landfill site is located in the middle of a residential area. If this alternative is chosen, how will the surrounding residents be protected during the cleaning of the site? Additionally, is there any information available to tell the reader what Midway's impact has been on the nearby residents and also the environment?	D. Karolczyk

#	DEIS Chapter	Page	Comment	Reviewer
16	2.5	2.32	In the cost comparison section, it might be worth mentioning that there is a test track in two alternatives, but not in the Midway Landfill option.	C. Crockett, D. Haight
17	Executive Summary	v	The table lists Temporary Construction Easement (SR 99, I-5). Since there probably won't be a lease on SR 99 for the OMF-S project, SR 99 can be removed from the parenthesis. Also, it is called a Temporary Construction Airspace Lease (TCAL) in this situation.	C. Crockett
18	3.15	85	No WSDOT utilities are listed here. Please check this area to confirm there are no stormwater facilities and/or ITS systems that belong to WSDOT.	C. Crockett
19			What would be the impacts to light rail service of building the midway option?	C. Crockett
20	3.7.2.4	21	5th bullet - Luminaires (light (lumen) in the air) is spelled incorrectly. Luminaries refers to people.	C. Winningham
21	Overall		Should state that WSDOT is a willing property seller for the at-grade portions and also a willing leaser for aerial sections, based on a successfully approved Compatibility Report.	D. Haight
22	Overall		If the OMF-S project is adding the work at S 324th then that area should be covered in the environmental document.	D. Haight
23	4.4.8	4-12	This does not discuss if there will be impacts to existing WSDOT noise walls. If so, Sound Transit must mitigate to the satisfaction of the City and replace removed WSDOT noise walls as necessary.	D. Haight
24	Executive Summary	ES-23	Acquisitions, Land Use, and Economics – “However, if the Midway Landfill Alternative were selected to be built, the residential displacements from mainline would still occur as a result of TDLE, subject to environmental review. Therefore, these displacements *could* ultimately occur regardless of which OMF S alternative is selected.” Should this ‘could’ be changed to ‘would’?	J. Giblin
25	Executive Summary	ES-26	Cumulative Impacts – “In addition, the COFW CCA Project and WSDOT Triangle Project are proposed adjacent to the Preferred and S 344th St alternatives. Both projects are in the early design phase, and neither have guaranteed (*construction)* funding.” Suggest adding in construction.	J. Giblin
26	Executive Summary	ES-29	Preferred and South 344th St Alternatives – “If the Board were to select *the* either the Preferred Alternative or South 344th St Alternative…” Suggest removing extra ‘the’.	J. Giblin
27	Throughout		The document states that OMF S will likely open in 2032. The public website ‘timeline and milestones’ page still states 2029. Suggest aligning. https://www.soundtransit.org/system-expansion/operations-maintenance-facility-south/timeline-milestones	J. Giblin
28	1	1-3	Infill stations are mentioned under 'central corridor'. What is an infill station? Consider defining.	J. Giblin
29	1 and 2 purpose and need		Midway Landfill Alternative: Mentions that public comments showed a heavy desire for this alternative. However, it seems that the landfill alternative doesn’t meet the purpose/need of the project. Was this communicated to the public that desired the Midway alternative? Can it be clarified in this document/will it be clarified in a future document why the Midway alternative is not an appropriate fit? This document explains that the Midway alternative has no impacts to homes, businesses, and low impacts to ecological resources, where the other alternatives have higher impacts to each of those resources. It would be helpful to include an explanation behind the reasoning for not going with the Midway Alternative.	J. Giblin, D. Haight
30	3.10	figures 3.10-1 and others	Wetlands and streams are shown in detail, so we suggest showing fish passage barriers with their WDFW IDs.	J. Giblin
31	3.10	3.10-16	Paragraph about a barrier but no number to define it. Could also state the owner.	J. Giblin
32	3.10	3.10-5	Mentions Federal Way City code stream type – suggest a table to show the code and the different corresponding categories.	J. Giblin
33	3.10	Table 3.10-1	Show buffers and consider adding which code is being followed (COFW, Kent, or state?).	J. Giblin

#	DEIS Chapter	Page	Comment	Reviewer
34	3.10	3.10-5	Mentions WSDOT developing plans to correct barriers. The Triangle Project (which was going to include these barriers) is now shelved, so this could be rephrased.	J. Giblin
35	3.10	3.10-9	Notes that the WSDOT 509 project previously delineated a wetland, but no source is provided. Should this report be cited?	J. Giblin
36	3.10	3.10.2.1	No build alternative – "FWLE will temporarily impact a wetland buffer within the Midway Landfill Alternative area." Isn't FWLE almost complete? Should this read 'FWLE temporarily *impacted* …"	J. Giblin
37	3.10	3.10-11	Mentions CWA Section 404 permit but does not specify regulatory agency that issues permit.	J. Giblin
38	3.10	3.10-130	"Under any of the build alternatives, runoff from impervious surfaces, including PGIS would be detained and treated in accordance with local, state, and federal requirements." Consider referencing the ST/Ecology 2019 MOU and any updates available since: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2019/Motion%20M2019-111.pdf	J. Giblin
39	3.11	3.11-9; 2.11.2.2	Long-term impacts – notes the 2019 MOU that calls out projects completed between 2030-2041. However, the MOU also says that projects completed by 2024 don't apply. It does call out TDLE as a project that will have to follow the MOU. OMF S was originally a part of TDLE, but it's not clear now where OMF S lies now in relation to this MOU. Could you explain where OMF S falls in relation to this MOU?	J. Giblin
40	3.11	3.11-1	BMP should be defined at first use.	J. Giblin
41	3.11	3.11-19	Preferred alternative – "…serves as an in-line stormwater detention facility." Suggested adding ownership here. Will you coordinate with the State or City if it's owned by another entity than ST?	J. Giblin
42	3.14	3.14-8	Public services, preferred alternative – "if the facility is relocated, some students would likely have to travel farther to school. If the school discontinues operations, the approximately 312 students would either need to enroll in another private school or enter the public school system." However, no mitigation is noted for this impact. Could you explain why nothing is needed here?	J. Giblin
43	4	Table 4.3-1	States that ST FWLE project will be completed in 2024. I believe this changed to 2026.	J. Giblin
44	4	Table 4.3-1	COFW CCA Project. Could add this has no construction funding. Could add more detail than TBD if desired to WSDOT Triangle Project (website says 'project suspended, no date for resumption scheduled').	J. Giblin
45	4	4-7	"In conjunction with this project, WSDOT is proposing to make fish passage improvements that would remove a portion of parking spaces in the FW/S 320th St Park & Ride. This would could start as early as 2024." Suggest defining which project (COFW CCA, ST OMF S, WSDOT Triangle) and adding WDFW ID numbers to help clarify. Also, the current schedule of these WSDOT barrier corrections can be verified using the 2030 plan here: https://wsdot.wa.gov/sites/default/files/2023-08/Env-FishPassage-KingSnohomishIsland-table.pdf.	J. Giblin

WSDOT (Communication ID 539078)

Comment ID	Comment Text	Response
1	Take inventory of WSDOT owned and managed facilities (i.e., noise walls, utilities, ITS) so we can work together to create avoidance and/or minimization and mitigation plans. a. Please also note the comments focused on maintenance access and plans. We anticipate these will be resolved through an Operations and Maintenance agreement.	After the Sound Transit Board selects the project to be built, Sound Transit staff will create a complete inventory of all WSDOT-managed facilities that could be potentially affected by the project to inform the development of an Operations and Maintenance agreement between the two agencies.
2	The South 344th Street alternative shows impacts to a WSDOT BMP. Please coordinate with WSDOT to define any potential impacts and mitigation measures.	Staff from Sound Transit and the consultant design team have had a series of meetings with WSDOT to discuss potential impacts to WSDOT's stormwater detention pond located near the southeast corner of the South 344th Street Alternative. If this alternative is selected as the project to be built, this coordination will continue.
3	The WSDOT Triangle Project is mentioned multiple times. Please be aware that this project was recently shelved. Refer to the project website for more information.	The Final EIS has been revised to reflect this comment.
4	Fish passage barriers are noted throughout the document. We recommend adding WDFW ID numbers and ownership when feasible to help differentiate between locations. a. Additionally, please utilize this link to access WSDOT's current 2030 fish passage delivery plan.	Thank you for the link to WSDOT's 2030 fish passage delivery plan. WDFW ID numbers and have been added to Figures 3.10-1 through 3.10-3.
5	The 2019 Memorandum Of Understanding between Sound Transit and the Department of Ecology explains a difference between projects constructed by 2024 and projects constructed between 2030-2041. How will this apply to OMF South if complete by 2029?	The footnote has been revised to correct the OMF South completion date to 2032.
6	If the project sites include any WSDOT-managed stormwater facilities, please identify the WSDOT stormwater facilities by creating a summary table if necessary.	Sound Transit will identify specific WSDOT stormwater facilities that could be affected during final design and coordinate with WSDOT as needed.
7	Please verify if the WSDOT Highway Runoff Manual should be included to consider LID Design.	Because OMF South is not a WSDOT facility, Sound Transit would not be required to follow WSDOT's Highway Runoff Manual, which provides guidance to direct the planning and design of stormwater management facilities for existing and new Washington State highways, rest areas, park-and-ride lots, ferry terminals, and highway maintenance facilities throughout the state. The Highway Runoff Manual establishes minimum requirements and provides uniform technical guidance in a similar manner to Sound Transit design standards and Ecology requirements.
8	The statement "Based on the anticipated high level of interest from Tribes…biologists conducted formal delineations of the OHWM of tributaries to Hylebos Creek" could be corrected. OHWM delineations are done because of state and federal regulatory requirements, not because of a project's public profile. Is this trying to say delineations were done outside of the study area? If so, suggest clarifying and explain the reasoning.	Formal surveyed delineations are not typically completed until after the NEPA/SEPA environmental review process has been completed, an alternative selected, and permit applications are being prepared. Sound Transit chose to survey ecosystem resources earlier in the process to both aid in design (thereby avoiding and/or minimizing impacts) and to inform the discussion with Tribes,

WSDOT (Communication ID 539078)		
Comment ID	**Comment Text**	**Response**
		resource agencies, and the public. The text of the Final EIS has been revised to clarify this.
9	How are mature forest and native mature forest classified? Ex: Based on dbh of trees? Please help clarify by defining how these are measured.	Appendix G2, Ecosystem Resources Technical Report, explains the difference between the forest vegetation types, which are non-native forest, mature native forest, and other native forest, following the WDFW vegetation classification system. Non-native forests are typically plantings of horticultural species as part of residential or commercial development. Mature native forest stands are generally over 80 years old, with trees exceeding 21 inches in diameter at breast height, on average (WDFW 2008). These forests are dominated by Douglas-fir, western redcedar, western hemlock, and black cottonwood and provide structurally complex habitat with more biological diversity and higher habitat value. The other native forest land cover type represents forests dominated by native tree species but lacking the defining features of mature forest.
10	Consider adding "… biologists evaluated the accessibility of the streams in the study area *to salmonids*…" or something similar for clarity.	This sentence in the Final EIS has been revised for clarity.
11	Similar to comment 3, wetland delineations are not done to alleviate concern, they are done to satisfy federal and state regulatory requirements. The sentence about doing formal delineations because of co-manager concern is not necessary.	See response to Comment ID 8.
12	"The Corps is expected to issue a new rule that will revise the definitions of waters of the US in fall 2023." – Will this paragraph be updated based on this change?	Effective September 8, 2023, EPA and the U.S. Army Corps of Engineers published their amendments to the Revised Definition of Waters of the United States. The Final EIS includes this update.
13	Regarding the classification of impact types – Typically, temporary impacts would need to be less than a year. Saying that forested/woody vegetated wetlands would recover in decades doesn't seem to fit the definition of temporary or long-term temporary.	Temporary impacts to forested wetlands that result in loss of trees are considered long-term temporary impacts because they can be restored over time. During permit review, resource agencies and Tribes may require specific mitigation to offset this loss.
14	Please work with the Puyallup Tribe if you're considering mitigation in the Hylebos watershed as the PTOI appreciate large-scale restoration.	Appendix B, Public Involvement and Agency Coordination, includes discussion of Sound Transit's outreach to the Puyallup Tribe of Indians and the Muckleshoot Indian Tribe regarding potential impacts to ecosystem resources.
15	Recommend re-checking availability at the Upper Clear Creek mitigation bank again. It may not have space by the time this project gets to permitting. I know the Rule prefer ILF and Banks.	The referenced statement in the Draft EIS was noting the existence of wetland mitigation banks and in-lieu fee programs that could be available for projects within the OMF South study area. Sound Transit would assess availability during the mitigation design and permitting process.
16	AQ, GHG Emissions: Include social cost of carbon per the CEQ's 2023 NEPA GHG.	The social cost of GHG emissions has been calculated for the Final EIS and is included in Section 3.8, Air Quality and Greenhouse Gas Emissions.
17	S 344th Street access appears to be through WSDOT's BMP. How will WSDOT's facility be impacted and then mitigated for? The capacity/function of the WSDOT pond	The main employee access for the South 344th Street Alternative is just west of the S 344th Street/18th Place S intersection. It would not impact WSDOT's stormwater pond near S 344th Street and I-5.

WSDOT (Communication ID 539078)		
Comment ID	**Comment Text**	**Response**
	at S.344th St. needs to be maintained. (also in Executive Summary page ES-11).	
18	Because vulnerable communities have been historically impacted by transportation-related projects, recommend providing a concise explanation about how you will "identify potential impacts to neighborhood/community cohesion." The report currently makes some generalizations, but it would be helpful to have more information.	This comment was made on Table 2.2-3, Evaluation Criteria, Measures, and Methods. The table describes the criteria used in the evaluation of the original 20 potential OMF South sites. The referenced OMF South Alternatives Evaluation Technical Memorandum describes the high-level assessment this criterion and others received to rank the original list of possible alternative sites. Sites that would alter major features and functions important to neighborhood/community cohesion or affect areas where low-income or minority populations are prevalent were assigned the number 1. A ranking of 2 meant that the site would alter some features and functions; 3 indicated that no features and functions would be affected. Once the sites were narrowed to the three analyzed in the Draft EIS during the SEPA scoping process, Sound Transit and FTA conducted a thorough assessment of impacts, which can be found in Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods. Additional information can be found in Appendix E, Environmental Justice Assessment.
19	Recommend that the report explain how vulnerable communities (e.g., community of color, retirees, Limited English proficient persons), and low-income residing in South 344th Street Preferred Alternative would be impacted. This would give reassurance that protected groups under Title VI of the Civil Rights of 1964 are protected. For example, will this project adhere to the Right-of Way Uniform Act Relocation Assistance? How would this project carry out the relocation assistance advisory program to satisfy FHWA's requirements of Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.)?	Please see response to Comment ID 18. Sound Transit published a Title VI Facility Equity Analysis independent of the EIS in November 2021. Prior to the Sound Transit Board action to select the project to be built, Sound Transit plans to publish an addendum to the Title VI Facility Equity analysis to reflect project changes since the 2021 analysis.
20	Hazardous chemical exposure has been linked to many diseases (cancer, respiratory and heart diseases, among others). The Midway Landfill site is located in the middle of a residential area. If this alternative is chosen, how will the surrounding residents be protected during the cleaning of the site? Additionally, is there any information available to tell the reader what Midway's impact has been on the nearby residents and also the environment?	Section 3.13, Hazardous Materials, includes information on the Midway Landfill, its Superfund status, the cleanup activities, and the ongoing monitoring actions. Potential impacts and proposed mitigation associated with removing materials from the landfill are also discussed.
21	In the cost comparison section, it might be worth mentioning that there is a test track in two alternatives, but not in the Midway Landfill option.	A footnote has been added to Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives, of the Final EIS to reflect this comment.
22	The table lists Temporary Construction Easement (SR 99, I-5). Since there probably won't be a lease on SR 99 for the OMF-S project, SR 99 can be removed from the parenthesis. Also, it is called a Temporary Construction Airspace Lease (TCAL) in this situation.	If the Midway Landfill Alternative is selected as the project to be built, this approval may be necessary for SR 99. The Fact Sheet for the Final EIS has been revised to state the correct title of the approval.

WSDOT (Communication ID 539078)		
Comment ID	**Comment Text**	**Response**
23	No WSDOT utilities are listed here. Please check this area to confirm there are no stormwater facilities and/or ITS systems that belong to WSDOT.	The analysis considers WSDOT stormwater facilities in Section 3.11, Water Resources. As WSDOT is not typically considered a utility provider, its facilities were not considered in Section 3.15, Utilities, Energy and Electromagnetic Fields, which addresses consumer-oriented utilities.
24	What would be the impacts to light rail service of building the midway option?	FWLE will be operational at the time of OMF South construction. If the Midway Landfill Alternative is selected as the project to be built, there would be some disruption of service in order to connect the lead tracks of the OMF to the mainline. Section 3.2.2.3, Construction Impacts (to Transportation), and Section 4.3.3.5 in Appendix G1, Transportation Technical Report, of the Final EIS have been revised to clarify this.
25	5th bullet -Luminaires (light (lumen) in the air) is spelled incorrectly. Luminaries refers to people.	The Final EIS has been revised to reflect this comment.
26	Should state that WSDOT is a willing property seller for the at-grade portions and also a willing leaser for aerial sections, based on a successfully approved Compatibility Report.	The Final EIS acknowledges WSDOT's role as a potential property seller and leaser. Sound Transit appreciates WSDOT's cooperation on this project and looks forward to continuing to coordinate through project design and construction.
27	If the OMF-S project is adding the work at S 324th then that area should be covered in the environmental document.	The project study area used for analysis in the Draft EIS covers the entire geographic area potentially affected by the proposed OMF South. The City of Federal Way is preparing separate environmental documentation for the City Center Access project at S 324th Street.
28	This does not discuss if there will be impacts to existing WSDOT noise walls. If so, Sound Transit must mitigate to the satisfaction of the City and replace removed WSDOT noise walls as necessary.	Potential impacts to noise walls are discussed in Final EIS Section 3.9, Noise and Vibration, under Section 3.9.2.2, Long-Term Impacts, Preferred Alternative.
29	Acquisitions, Land Use, and Economics – "However, if the Midway Landfill Alternative were selected to be built, the residential displacements from mainline would still occur as a result of TDLE, subject to environmental review. Therefore, these displacements could ultimately occur regardless of which OMF S alternative is selected." Should this 'could' be changed to 'would'?	The use of "could" in this case is correct, as an OMF South alternative has not yet been selected for construction and TDLE has not completed its environmental review and includes consideration of a No-Build Alternative.
30	Cumulative Impacts – "In addition, the COFW CCA Project and WSDOT Triangle Project are proposed adjacent to the Preferred and S 344th St alternatives. Both projects are in the early design phase, and neither have guaranteed (construction) funding." Suggest adding in construction.	The Final EIS has been revised to reflect this comment.
31	Preferred and South 344th St Alternatives – "If the Board were to select the either the Preferred Alternative or South 344th St Alternative…" Suggest removing extra 'the'.	The Final EIS has been revised to reflect this comment.
32	The document states that OMF S will likely open in 2032. The public website 'timeline and milestones' page still states 2029. Suggest aligning. https://www.soundtransit.org/system-expansion/operations-maintenance-facility-south/timeline-milestones	The project website has been updated to reflect a forecasted in-service date of 2032. Consistent with the EIS, it also states that Sound Transit is pursuing measures to advance the opening earlier. Additionally, if the Midway Landfill Alternative is selected to be built the

WSDOT (Communication ID 539078)		
Comment ID	**Comment Text**	**Response**
		opening date would be between 2035 and 2037, depending on the subsurface construction design option.
33	Infill stations are mentioned under 'central corridor'. What is an infill station? Consider defining.	An infill station is a new station built on an existing light rail line. This definition has been added to the Final EIS.
34	Midway Landfill Alternative: Mentions that public comments showed a heavy desire for this alternative. However, it seems that the landfill alternative doesn't meet the purpose/need of the project. Was this communicated to the public that desired the Midway alternative? Can it be clarified in this document/will it be clarified in a future document why the Midway alternative is not an appropriate fit? This document explains that the Midway alternative has no impacts to homes, businesses, and low impacts to ecological resources, where the other alternatives have higher impacts to each of those resources. It would be helpful to include an explanation behind the reasoning for not going with the Midway Alternative.	The 2021 Draft EIS and 2023 NEPA Draft/SEPA Supplemental Draft EIS and related community engagement materials identify the tradeoffs of the alternatives studied in the EIS. This includes identifying the schedule, cost, and transit impacts of the Midway Landfill Alternative. The Sound Transit Board identified the South 336th Street Alternative as the Preferred Alternative in 2021. The Preferred Alternative represents a preference based on information currently available. After the Final EIS is published, the Board will consider the Draft EIS public comments, Final EIS analysis, and other factors prior to the selection of the project to be built.
35	Wetlands and streams are shown in detail, so we suggest showing fish passage barriers with their WDFW IDs.	The Final EIS has been revised to include the WDFW fish passage barrier ID numbers.
36	Paragraph about a barrier but no number to define it. Could also state the owner.	The Final EIS has been revised to add the WDFW ID number (933224) and ownership (City of Federal Way) for the culvert described.
37	Mentions Federal Way City code stream type – suggest a table to show the code and the different corresponding categories.	Since all of the streams described in the Final EIS are considered Type F for potential fish habitat, a new table has not been added. The city of Federal Way has adopted Washington Department of Natural Resources' water typing system in its entirety. The Final EIS has been updated to refer to the appropriate city code section for stream typing for the reader's reference.
38	Show buffers and consider adding which code is being followed (COFW, Kent, or state?).	Potential long-term impacts to stream buffers are included in Table 3.10-1, and potential construction-related stream buffer impacts are listed in Table 3.10-5. As the Midway Landfill Alternative has no stream impacts, all potential impacts identified in the Final EIS are in Federal Way.
39	Mentions WSDOT developing plans to correct barriers. The Triangle Project (which was going to include these barriers) is now shelved, so this could be rephrased.	The text of the Final EIS in Section 3.10, Ecosystem Resources, has been revised to reflect this comment.
40	Notes that the WSDOT 509 project previously delineated a wetland, but no source is provided. Should this report be cited?	Wetland WL148.67L is a small, depressional wetland located in the WSDOT right-of-way of southbound I-5. It was delineated in April 2019 by Anchor QEA as a component of the SR 509 Completion Stage 1B Project (Anchor 2019). The reference has been added to the Final EIS.
41	No build alternative – "FWLE will temporarily impact a wetland buffer within the Midway Landfill Alternative area." Isn't FWLE almost complete? Should this read 'FWLE temporarily impacted…"	The comment is correct, and the Final EIS has been revised.

WSDOT (Communication ID 539078)		
Comment ID	**Comment Text**	**Response**
42	Mentions CWA Section 404 permit but does not specify regulatory agency that issues permit.	The Anticipated or Potential Licenses, Permits, and Approvals in the Fact Sheet identifies the U.S. Army Corps of Engineers as the issuing agency of the CWA Section 404 approval.
43	"Under any of the build alternatives, runoff from impervious surfaces, including PGIS would be detained and treated in accordance with local, state, and federal requirements." Consider referencing the ST/Ecology 2019 MOU and any updates available since: https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2019/Motion%20M2019-111.pdf	Section 3.11, Water Resources, includes a footnote summarizing the memorandum of understanding (MOU) between Ecology and Sound Transit.
44	Long-term impacts – notes the 2019 MOU that calls out projects completed between 2030-2041. However, the MOU also says that projects completed by 2024 don't apply. It does call out TDLE as a project that will have to follow the MOU. OMF S was originally a part of TDLE, but it's not clear now where OMF S lies now in relation to this MOU. Could you explain where OMF S falls in relation to this MOU?	Sound Transit is considering OMF South as a project covered by the MOU.
45	BMP should be defined at first use.	The first use of BMP in the document is in Section 3.2, Transportation, where it is defined.
46	Preferred alternative – "…serves as an in-line stormwater detention facility." Suggested adding ownership here. Will you coordinate with the State or City if it's owned by another entity than ST?	The facility is owned by Federal Way and has been the subject of ongoing coordination between the city and Sound Transit.
47	Public services, preferred alternative – "if the facility is relocated, some students would likely have to travel farther to school. If the school discontinues operations, the approximately 312 students would either need to enroll in another private school or enter the public school system." However, no mitigation is noted for this impact. Could you explain why nothing is needed here?	As a business, the Pacific Christian Academy would be eligible for relocation assistance if the Preferred Alternative is selected as the project to be built. Based on recent coordination with Pacific Christian Academy, it is anticipated that the school would relocate. If that is not possible, there are several other private Christian schools in south King County, including Evergreen Christian in Federal Way and Seattle Christian in SeaTac.
48	States that ST FWLE project will be completed in 2024. I believe this changed to 2026.	The completion date for FWLE has been updated to 2026 in the Final EIS.
49	COFW CCA Project. Could add this has no construction funding. Could add more detail than TBD if desired to WSDOT Triangle Project (website says 'project suspended, no date for resumption scheduled').	The suggested revisions have been made to Table 4.3-1 of the Final EIS.
50	"In conjunction with this project, WSDOT is proposing to make fish passage improvements that would remove a portion of parking spaces in the FW/S 320th St Park & Ride. This would could start as early as 2024." Suggest defining which project (COFW CCA, ST OMF S, WSDOT Triangle) and adding WDFW ID numbers to help clarify. Also, the current schedule of these WSDOT barrier corrections can be verified using the 2030 plan here: https://wsdot.wa.gov/sites/default/files/2023-08/Env-FishPassage-KingSnohomishIsland-table.pdf.	Information regarding culvert ID numbers and ownership related to Federal Way's City Center Access Project has been added to Table 4.4-1 of the Ecosystem Resources section of Chapter 4, Cumulative Effects Analysis, of the Final EIS.

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

November 6, 2023

By Email

Susan Fletcher
Federal Transit Administration
915 Second Avenue, Suite 3192
Seattle, WA 98174-1002

Perry Weinberg
Sound Transit
401 S Jackson Street
Seattle, WA 98104
OMFSouthDEIS@soundtransit.org

RE: Sound Transit Operations and Maintenance Facility – South NEPA/SEPA Supplemental DEIS City of Federal Way Technical Review Comments

Dear Ms. Fletcher and Mr. Weinberg,

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Operations and Maintenance Facility South (OMF South). As you are aware, two of three sites that Sound Transit is considering are within the City of Federal Way. We have appreciated the collaborative nature of the relationship Sound Transit staff looks to have with the City.

The City has taken an official position on the OMF South in the previous SEPA DEIS and in a previously provided letter signed by the Mayor and full City Council dated April 6, 2021, and technical comment letter dated April 19, 2021. Both letters and supplemental comments are attached with this letter and are still valid and incorporated by reference.

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Alternatives Considered

Page 2-16

- How can environmental impacts from TDLE be considered part of the "no-build" alternative if TDLE does not have an approved environmental document?

Transportation Impacts

The Following Comments are related to the main EIS document and pertain to transportation impacts.

Page 3.2-8

- 20th Avenue S is listed incorrectly as 20th Avenue E. Please address.

Page 3.2-12

- Historical collision date was collected between January 2016 to December 2018. This should be updated with more current data.
- Intersections with a collision rate above 1.0 per MEV will need to be discussed in greater detail as to potential contributing factors.
- Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.

Page 3.2-13

- It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.
- Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the signal timings?

Page 3.2-14

- Routes 177 and 577 would still be faster than light rail for several years, so there will be opposition to discontinuing those routes.

Page 3.2-16

- A more comprehensive trip generation section needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips).

- Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns alone. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.

Page 3.2-17

- It cannot be definitely stated that no new safety issues would be introduced and no existing safety issues would be exacerbated. Particularly given the elimination of north-south connectivity for non-motorized traffic in the South 344th Street Alternative.

- The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.

Page 3.2-18

- The description of the new 18th Avenue S intersection is not consistent with the provided site plan. The description and if applicable, the associated analysis, should be updated.

- Parking study needs to be updated from the FWLE EIS to be consistent with ability to remove stalls without replacement.
  Does this include stalls removed for S324th culvert and roadway grade construction?

Page 3.2-19 – Table 3.2-6

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

- Intersection 10 (SR 99/Driveway) is no longer proposed as part of the preferred alternative.

- Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-6. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.

Page 3.2-20 – Table 3.2-7

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

- 55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.

- Intersection 10 (SR 99/Driveway) is no longer proposed as part of the preferred alternative.

- Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-7. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.

Page 3.2-21 and page 3.2-25 - Figure 3.2-7 and Figure 3.2-8

- This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.

Page 3.2-22

- The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.

Page 3.2-23 and page 3.2-24 - Table 3.2-8 and Table 3.2-9

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

- If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.

Page 3.2-26

- This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved ped and cyclists along SR 99.

Page 3.2-32 – Table 3.2-13

- S 330th St is inappropriate for a haul route, as it is narrow, has a small traffic circle at 20th Ave S, and traverse's residential areas with some areas of high parking utilization.

Page 3.2-13

- In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.
- Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.

Page 3.2-35

- S 330th St is not an acceptable haul route.

Page 3.2-42

- Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network for both Federal Way alternatives.

The following comments are related to Appendix C

Page 1

- Additional support information is needed related to access for the proposed driveways for the midway landfill alternative. Support information for the proposed driveway widths and geometry is needed. Channelization and median improvements are needed on Pacific Hwy to support the new accesses.

Page 11

- The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.

Page 12

- The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.
- Location of track over/across S 322nd St may impact driver visibility of existing traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.
- Location of track over/across 23rd Ave S may impact driver visibility of traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.

Page 15

- Set gate further from 24th Ave S so that access ST maintenance vehicles can pull completely out of the roadway when opening the gate.
- Clarity is needed for a section of asphalt shown on the plans along 24th Avenue S near S 333rd St.

Page 16

- A proposed column is shown within the intersection of Winged Foot Way and Burning Tree Blvd. A revised location shall be provided.

Page 17 and Page 19

- Adjustment to the location of the proposed sidewalk, curb, and landscape strip for 24th Ave S is required.

Page 22

- Adjustment is needed for the access to the WSDOT stormwater facility at 21st Ave S and S 344th St. Update design to represent the intended roadway curve. Revise the access to driveway standards.

Page 25

- A 10-foot clear zone is required from roadway edge to face of proposed retaining walls.

Page 27

- On-street parking is shown along the proposed 18th Place S. On-street parking is allowed provided that it is outside the prescriptive sight triangle of the intersection and does not result in impacts to adjacent critical areas.

- S 341st Place is incorrectly shown as S 340th St. Please correct.

Page 34

- The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.

Page 37

- More evaluation is needed for access needs for existing properties adjacent to the proposed S 344th St Site alternative.

- Additional sidewalk connectivity is needed for a portion of the removed S 341st Place.

The following comments are related to Appendix G1

Overall Comments:

The analysis provided does not adequately analyze the preferred and 344th Street alternatives as not all new driveways/intersections are included and/or incorrect driveways are included. Additionally, v/c must be recorded for all intersections including those along State Routes as the City of Federal Way controls these intersections.

There is insufficient information provided related to the existing land uses removed and traffic rerouted as a result of vacated streets. Supplemental trip generation analysis and volume figures should be provided to illustrate how these conditions impact the future volumes.

Without this information it is not possible to validate the future volumes provided.
Additional attachments must be provided including detailed trip generation information for the OMF South site and existing land uses; traffic counts; and Synchro worksheets.

An updated parking analysis for the WSDOT 320th/23rd Ave park and ride needs to be completed to support removal of parking spaces consistent with the FWLE EIS that assumed use of this park and ride for LINK/Regional Transit riders.

Page G1-i

- The summary states that impacts may occur if the delay in an LOS F condition is worsened by more than 10 seconds. Please clarify the basis for this standard as it is not specified in Attachment A. Additionally, the City of Federal Way standards should be referenced here since they are based on v/c rather than LOS/delay.

Page G1-3 – Figure G1.1-2

- The extension of 18th Place S is described as intersection S 336th Street as the fourth (NB) leg of the 18th Ave S/S 336th St intersection, but the conceptual site plan does not depict it in this way due to the creek. It is assumed that a four-leg intersection is not feasible here and therefore the description/analysis should be revised accordingly.

Page G1-20

- In section 3.2.3 Traffic Volumes, please clarify what "as applicable" means for the adjusted 2022 traffic volumes. For instance, was volume balancing between intersections a key factor?

Page G1-21 – Figure G1.3-7

- During the AM peak hour, existing volumes at intersections 6 and 9 have decreased as compared to the 2021 DEIS resulting in greater volume imbalances between intersections in some cases. Please explain the change from the 2021 DEIS to the 2023 ADEIS.

Page G1-29, G1-31, G1-58, and G1-60 – Table G1.3-9, Table G1.3-11, Table G1.4-1, and Table G1.4-3

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

Page G1-44

- Under section 3.7 Safety, while it is acceptable to use collision data from 2016 to 2018 because collision data during the pandemic was atypical, many studies have found that collision rates were higher during the pandemic. Therefore, it may not be accurate to say that 2016 to 2018 collision data is more conservative.

Page G1-55

- Intersections with a collision rate above 1.0 per MEV will need to be discussed in greater detail as to potential contributing factors.

  Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.

Page G1-54

- Under section 4.1.1.2 Traffic Volumes, it is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.

Page G1-55

- In the 2042 PM analysis there is a mention of a decrease in delay due to signal optimization. Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the signal timings? Additionally, you cannot look at one SR-99 intersection in a vacuum as the entire corridor is coordinated.

Page G1-68

- Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.

Page G1-69

- A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips).

Page G1-70

- Under section 4.2.1.5 Parking, please specify the approximate number of parking spaces this represents for each alternative.

Page G1-71

- Under section 4.2.1.6 Safety, this section should address the intersections with a collision rate over 1.0 collisions per MEV and discuss how the project may impact these locations. Additionally, if north-south non-motorized facilities would not be feasible as part of the 344th Street Alternative, safety would not improve for non-motorized users and could in fact worsen. Please elaborate.

Page G1-72

- The City of Federal Way's street vacation process should be referenced for both City of Federal Way alternatives as it relates to the currently proposed roadway network and potential ongoing coordination.

- In section 4.2.2.1 regarding the extension of 18th Place S there is a section indicating that it would convert the existing S 336th St/18th Avenue S intersection into a four-legged intersection. This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.

- Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in section 4.2.2.2 Traffic Volumes.

Page G1-73 – Figure G1.4-7

- In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-7).

- This figure should indicate new roadway extensions that are part of the preferred alternative.

- This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.

  Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures.

Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.

Page G1-74 – Figure G1.4-8

- This figure should indicate new roadway extensions that are part of the preferred alternative.

- This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.

  Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures.

  It is also not clear how the rerouted vehicles from roadway closures are accounted for. For example, the no-build conditions show 85 vehicles exiting 20th Avenue S during the PM peak hour. However, there are only 15 additional right turns at intersection 1 and no additional left turns beyond project trips. While volumes for intersection 11 are not shown, based on the future volumes at intersection 1, it does not appear that additional trips are routed to intersection 11. If these trips would no longer exist due to land uses being removed, it is not clear from this analysis as no trip generation fore existing land uses to be removed is provided. A figure showing how existing traffic was removed and rerouted should be included.

  Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.

Page G1-75 – Table G1.4-10

- Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

- Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.

Page G1-76 and G1-78 – Figure G1.4-9 and Figure G1.4-10

- This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be shown on the figure.

Page G1-77 – Table G1.4-11

- 55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.

- Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.

- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

- Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.

Page G1-79

- In section 4.2.2.6 Nonmotorized Facilities, it should be more clearly defined where and what bicycle and pedestrian improvements are proposed as part of the preferred alternative.

- In section 4.2.2.8 Safety, the safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV.

Page G1-80

- In section 4.2.3.2 Traffic Volumes, information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.

Page G1-81 – Figure G1.4-11

- In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-11).

Page G1-82 – Figure G1.4-12

- Intersection 10 is mislabeled for both AM and PM peak hours.
- If Intersection 1 is only providing access to the Christian Faith Church under build conditions, and little to no project trips are projected it is unlikely that this intersection would observe as much traffic as it does today. This analysis does not sufficiently account for (or sufficiently document) traffic that would be rerouted from 20th Avenue S due to the closure. As such, this analysis may not adequately consider additional impacts along SR 99 or 16th Street as a result. More broadly, a figure showing how existing traffic was removed and rerouted should be included.

Page G1-83 and G1-85 – Table G1.4-12 and Table G1.4-13

- If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.
- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.

Page G1-84 – Figure G1.4-13

- If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-13).

Page G1-86 – Figure G1.4-14

- If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-14).

Page G1-87

- In section 4.2.3.6 Nonmotorized Facilities, if the alternative eliminates the greenway between S 336th Street and S 344th Street this would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved pedestrians and cyclists along SR 99.

Page G1-88

- In section 4.2.3.8 Safety, the safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV. Additionally, this section should address non-motorized safety impacts associated with eliminating a north-south non-motorized connection.

Page G1-99

- In section 4.3.11 Estimation of Construction Truck Traffic, in addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.

Page G1-104

- In section 4.3.1.6 Impacts to Nonmotorized Facilities, please clarify how long north-south connectivity would be impacted as pedestrians and cyclists would shift to SR 99 under this scenario.

Page G1-105

- In Section 4.3.1.7 Impacts to Parking, please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.

Page G1-122

- In section 4.7 Long Term Mitigation Measures, consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.

Social Resources, Community Facilities, and Neighborhoods

Page 3.6-8

- Belmor is a manufactured home community, zoned multifamily residential.

- Clarification is needed on the expected displaced residences. Provide methodology for calculating impacted residents and provide addresses.

- What analysis went in to this conclusion? Airtime Aviation, Inc. is located in a custom-designed building for the use. The impact to this business and others like it is inadequately evaluated.

Page 3.6-11

- In the environmental justice summary; country of origin and immigration status should also be considered.

Economic and Fiscal Impacts

Page 3.5-1

- Clarification is required if the entire dataset in Section 3.5 "Economics" was calculated using King County level datasets or specific South King County Data Sets. South King County is defined as: Renton, Tukwila, SeaTac, Burien, Des Moines, Normandy Park, Kent, Auburn, and Federal Way.
- Using King County macro level data is not representative of the economic landscape of South King County as it relates to wages, demographics, type & size of industry, etc.

Land Use Impacts

There appear to be unaccounted for impacts from the preferred and S 344th St Alternatives related to affected parking, impacted businesses, and number of employees displaced. These need to be addressed.

The use of the OMF site is inconsistent with the City's urbanizing vision. Address the lack of planning for a smaller footprint for the facility or planning for mixed use by either placing parking in structures thereby allowing for other use of a portion of the property or the use by others of air rights above any of the planned facilities. The possibility of such a project could offset the economic impact of prohibiting the development of 60 acres of strategically located commercial land to its highest and best use.

Specific comments include:

Page ES-11 Figure ES-4

- Apparent unaccounted for impact from the Preferred Alternative to the parking/loading in the northeast corner of the Spectrum Business Park. The EIS should determine if the required parking for the uses at the Spectrum Business Park will be impacted, reduced, or result in any non-conformance.

Page ES-19

- How was this calculated? What are the exact businesses that are being displaced? Is there a spreadsheet of this information? According to Washington State Department of

Revenue there are significantly more 6 active business licenses that will be impacted. This misrepresentation also applies to the South 344th Street Alternative.

- Provide methodology for how the number of employees impacted was calculated. These numbers do not accurately reflect the true number of active businesses that may be impacted and the actual number of impacted employees are likely underrepresented.

The following comments are related to Appendix C

Page 23

- Activation Zone parking spaces are not shown on this map, but shown in others. Plans should be consistent.
- This is the only time in the entire DEIS that the Activation Zone is mentioned, but does not include square footage, uses, benefits, impacts, etc. Additional information for the activation zone is required.
- Any impacts to existing uses shall be addressed including parking stall or loading zone displacement. The OMFS site shall not create any nonconformities.
- Maps should be consistent and the impacts to adjacent uses must be measured. It appears Spectrum Business Park parking is being displaced here. Provide more information on how these impacts will be mitigated and the creation of any nonconformities will be avoided.

Page 27

- The activation zone should serve multi-modal travelers, including those arriving via vehicle. There must be parking available for the activation zone.

The Following comments are related to Appendix H2

Page H2-2

- The reference information for the Federal Way Revised Code and Federal Way Comprehensive Plan are inaccurate and should be updated to reflect the current standards.

Page H2-3

- The preferred and South 344th St alternatives reference some smaller areas within the City Center Core land use designation. This is inaccurate and needs to be updated.

Page H2-4

- The section concerning the Tacoma Dome Link Extension is outdated and needs revision. Not mentioned here is the South Station Subarea Plan and the Countywide Growth Center Candidate Designation which should be included.

Page H2-5 – Table H2-1

- Please provide basis for calculation of 17 acres in the CC-C zone due to OMF impacts.

- For the section concerning City of Federal Way Zone (RM-2400 and RM-3600: Multi-Family), it is not accurate to consider only a portion of the site as zoned multi-family. The preferred alternative is a majority zoned multi-family residential. Additionally, it is not appropriate to consider the OMF use as a Government Facility. Light rail or commuter rail transit facility require a Process IV review in the CC-C & CE zones.

Page H2-6 – Table H2-1

- For the BC: Community Business and CE: Commercial Enterprise zones, the permitting use for the OMFS would be Public Transportation Facilities, per FWRC 19.240.135. Considering the OMF a “Government facility” is not accurate.

Page H2-12 – Table H2-5

- Under Policy LUP 9, the statement that the OMFS site supports light rail operation which would support mixed use development is misleading and inaccurate. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not support mixed-use development any more than the OMF site being located at Midway Landfill does.

Page H2-13 – Table H2-5

- Under Topic 2.7 Land Use Designations (Single Family). For Policy LUP14, the mitigation steps should not only be used to support aesthetic compatibility between uses, and should extend to include additional impacts like noise/sound, light, vibration, etc.

- Under Topic 2.7 Land Use Designations (Multi-Family). It is inaccurate to state that this project helps broaden transit options for multi-family households in the Federal Way area. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not help broaden transit options for MF in the Federal Way area.

Page H2-15 – Table H2-5

- The response provided for consistency with comprehensive Plan Policy LU40 is inappropriate. The policy is about the range of retail and supportive uses.

Visual and Aesthetic Resources

Page 3.7-7

- The i5 and Pac Hwy corridor in Federal Way consists of significant asphalt surfacing, removing trees within this area will have an increasingly negative impact on the City's urban heat index and citywide tree canopy coverage. Impacts to the urban heat index and the citywide tree canopy coverage should be evaluated between alternatives. Tree planting to meet the average Citywide canopy (35%) should be a target for this facility, if located in Federal Way.

Page 3.7-11 – Figure 3.7-6

- The image shows redirected power lines. Confirm if this was intentional? Will they be redirected?

Page 3.7-16 – Figure 3.7-12

- The photo for the existing condition and simulation of proposed conditions appear to be the same. Confirm that no visual change is expected.

Page 3.7-17 – Figure 3.7-14

- A cell tower appears to be removed in the simulation of proposed conditions. Confirm this removal and provide mitigation method for tower if removal is expected.

Noise and Vibration

Page 3.9-7

- Confirm the methodology and noise sources used in the noise analysis. Were the maintenance activity and testing of horns noise generators included in the projections?
- The evaluation of noise impacts shall measure and account for any increase in ambient Interstate 5 noise resulting from tree removal and sound barrier as part of the track construction for both the preferred and S 344th alternatives.

Ecosystems and Resources

Page 3.10-26

- Language indicates that 'frontage improvements along S 336th Street to meet city standards may necessitate the installation of a replacement structure where West Fork Hylebos Tributary is crossed by the road.' This should be changed to 'must replace the culvert.'

Page 3.11-12

- Any impacts to wetlands related to the extension of 18th Place S shall be eliminated or demonstrated to the City that impacts have been minimized and mitigated.

- Language indicates that 'frontage improvements along S 336th Street to meet city standards may necessitate the installation of a replacement structure where West Fork Hylebos Tributary is crossed by the road.' This should be changed to 'must replace the culvert.'

Page 3.11-19

- Any impacts to wetlands related to the extension of 18th Place S shall be eliminated or demonstrated to the City that impacts have been minimized and mitigated.

Cumulative Effects

Page 4-3

- There is a large tree canopy with mature trees that will be heavily impacted by the proposed 18th Place S extension as part of the preferred alternative. Currently as proposed neither OMFS sites in Federal Way will meet Tree retention requirements. Please address.

Page 4-8

- Within section 4.1 under transportation, the City Center Access Project for Federal Way is described as unfunded. This is incorrect, the construction phase is currently unfunded however the design and right of way is funded. Please adjust.

Please reach out to either of us or Kent Smith if you have any questions regarding the comments in this letter.

Sincerely,

EJ Walsh, P.E.
Public Works Director

Keith Niven, AICP, CEcD
Community Development Director

cc: Jim Ferrell, Mayor
Federal Way City Council
Kent Smith, Sound Transit Liaison

Attachment: Supplemental Appendix A1 comments
OMF South Draft Environmental Impact Statement – FW Mayor and City Council Comments
OMF South FW Technical Review Letter final
Supplemental Appendix G1 comments
Sound Transit OMF Site Opportunity Cost Impact Assessment

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Attachment

Supplemental Appendix A1 comments

[This page intentionally left blank]

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Attachment

Supplemental Appendix G1 comments

[This page intentionally left blank]

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Attachment

OMF South Draft Environmental Impact Statement – FW Mayor and City Council Comments

[This page intentionally left blank]

CITY OF
Federal Way
Centered on Opportunity

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

Attachment

Sound Transit OMF Site Opportunity Cost Impact Assessment

[This page intentionally left blank]

City Hall
33325 8th Avenue South
Federal Way, WA 98003-6325
253-835-7000
www.cityoffederalway.com
Jim Ferrell, Mayor

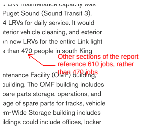
Attachment

OMF South Federal Way Technical Review Letter Final

[This page intentionally left blank]

00-OMFS NEPA SEPA DEIS Executive Summary.aspx.pdf Markup Summary

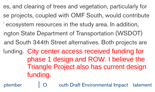
marisfry (1)



Subject: Callout
Page Label: 6
Author: marisfry
Date: 10/23/2023 6:34:48 AM
Status:
Color: 🟥
Layer:
Space:

Other sections of the report reference 610 jobs, rather than 470 jobs

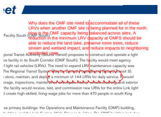
Desiree Winkler (1)



Subject: Text Box
Page Label: 39
Author: Desiree Winkler
Date: 10/20/2023 1:44:08 PM
Status:
Color: 🟥
Layer:
Space:

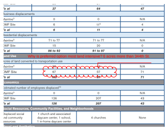
City center access received funding for phase 1 design and ROW. I believe the Triangle Project also has current design funding.

Chaney (4)



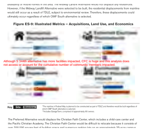
Subject: Cloud+
Page Label: 6
Author: Chaney
Date: 10/31/2023 4:01:11 PM
Status:
Color: 🟥
Layer:
Space:

Why does the OMF site need to accommodate all of these LRVs when another OMF site is being planned for in the north. How is the OMF capacity being balanced across sites. A reduction in the minimum LRV capacity at OMFS should be able to reduce the land take, preserve more trees, reduce stream and wetland impact, and reduce impacts to neighboring residential uses.



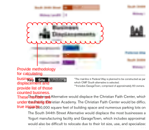
Subject: Cloud+
Page Label: 32
Author: Chaney
Date: 10/31/2023 3:57:08 PM
Status:
Color: 🟥
Layer:
Space:

Why is preferred option most land intensive? 6 acres more than 344th St.



Subject: Text Box
Page Label: 36
Author: Chaney
Date: 10/31/2023 3:54:02 PM
Status:
Color: 🟥
Layer:
Space:

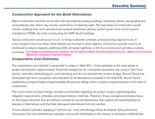
Although S 344th alternative has more facilities impacted, CFC is huge and this analysis does not access or account for the cumulative number of community members impacted.



Subject: Cloud+
Page Label: 36
Author: Chaney
Date: 10/31/2023 3:55:06 PM
Status:
Color: 🟥
Layer:
Space:

Provide methodology for calculating business displacement and provide list of those counted business. These number are under counting the true impacts

C Mullen (1)

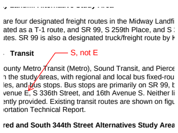


Subject: Text Box
Page Label: 30
Author: C Mullen
Date: 10/16/2023 8:45:42 AM
Status:
Color: 🟥
Layer:
Space:

Any changes to schedule beyond a standard 5 day, 8 hr daytime schedule will require approval by the City. Nighttime work may not be allowed due to proximity to residential properties.

01-OMFS NEPA SEPA Draft Environmental Impact Statement.pdf Markup Summary

Rick Perez (5)


are four designated freight routes in the Midway Landfi
ated as a T-1 route, and SR 99, S 259th Place, and S
utes. SR 99 is also a designated truck/freight route by

Transit

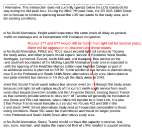
S, not E

ounty Metro Transit (Metro), Sound Transit, and Pierce
n the study areas, with regional and local bus fixed-rou
les, and bus stops. Bus stops are primarily on SR 99, b
venue E, S 336th Street, and 16th Avenue S. Neither li
ently provided. Existing transit routes are shown on figu
portation Technical Report.

red and South 344th Street Alternatives Study Area

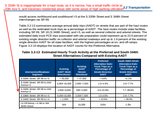
Subject: Callout
Page Label: 107
Author: Rick Perez
Date: 10/27/2023 1:30:49 PM
Status:
Color: 🟥
Layer:
Space:

S, not E



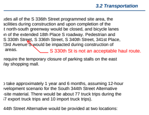
Subject: Callout
Page Label: 113
Author: Rick Perez
Date: 10/27/2023 1:35:42 PM
Status:
Color: 🟥
Layer:
Space:

Routes 177 and 577 would still be faster than light rail for several years, so there will be opposition to discontinuing those routes.



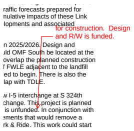
Subject: Callout
Page Label: 131
Author: Rick Perez
Date: 10/27/2023 1:46:24 PM
Status:
Color: 🟥
Layer:
Space:

S 330th St is inappropriate for a haul route, as it is narrow, has a small traffic circle at 20th Ave S, and traverses residential areas with some areas of high parking utilization.



Subject: Callout
Page Label: 134
Author: Rick Perez
Date: 10/27/2023 1:49:48 PM
Status:
Color: 🟥
Layer:
Space:

S 330th St is not an acceptable haul route.


raffic forecasts prepared for
nulative impacts of these Link
lopments and associated

for construction. Design
and R/W is funded.

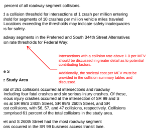
n 2025/2026. Design and
uld OMF South be located at the
overlap the planned construction
f FWLE adjacent to the landfill
led to begin. There is also the
lap with TDLE.

w I-5 interchange at S 324th
change. This project is planned
is unfunded. In conjunction with
ements that would remove a
rk & Ride. This work could start

Subject: Callout
Page Label: 365
Author: Rick Perez
Date: 10/27/2023 2:04:51 PM
Status:
Color: 🟥
Layer:
Space:

for construction. Design and R/W is funded.

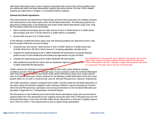
marisfry (26)



Subject: Callout
Page Label: 111
Author: marisfry
Date: 10/25/2023 2:46:41 PM
Status:
Color: 🟥
Layer:
Space:

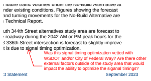
Intersections with a collision rate above 1.0 per MEV should be discussed in greater detail as to potential contributing factors.

Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.



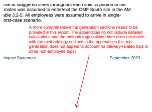
Subject: Callout
Page Label: 112
Author: marisfry
Date: 10/25/2023 2:36:45 PM
Status:
Color: 🟥
Layer:
Space:

It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.



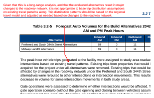
Subject: Callout
Page Label: 112
Author: marisfry
Date: 10/25/2023 2:37:05 PM
Status:
Color: 🟥
Layer:
Space:

Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the siganal timings?



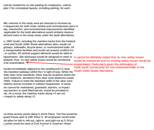
Subject: Callout
Page Label: 114
Author: marisfry
Date: 10/25/2023 2:47:48 PM
Status:
Color: 🟥
Layer:
Space:

A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips)



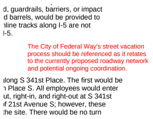
Subject: Callout
Page Label: 115
Author: marisfry
Date: 10/25/2023 2:37:59 PM
Status:
Color: 🟥
Layer:
Space:

Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.



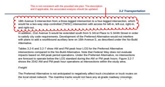
Subject: Callout
Page Label: 116
Author: marisfry
Date: 10/25/2023 2:39:15 PM
Status:
Color: 🟥
Layer:
Space:

It cannot be definitely stated that no new safety issues would be introduced and no existing safety issues would be exacerbated. Particularly given the elimination of north-south connectivity for non-motorized traffic in the South 344th Street Alternative.



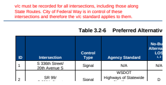
Subject: Text Box
Page Label: 116
Author: marisfry
Date: 10/25/2023 2:48:33 PM
Status:
Color: 🟥
Layer:
Space:

The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.



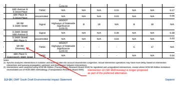
Subject: Cloud+
Page Label: 117
Author: marisfry
Date: 10/25/2023 2:49:22 PM
Status:
Color: 🟥
Layer:
Space:

This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.



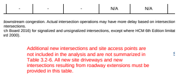
Subject: Text Box
Page Label: 118
Author: marisfry
Date: 10/25/2023 2:39:41 PM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



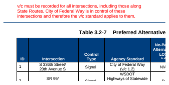
Subject: Callout
Page Label: 118
Author: marisfry
Date: 10/25/2023 2:52:58 PM
Status:
Color: 🟥
Layer:
Space:

Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.



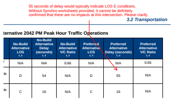
Subject: Text Box
Page Label: 118
Author: marisfry
Date: 10/25/2023 2:53:18 PM
Status:
Color: 🟥
Layer:
Space:

Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-6. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.



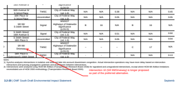
Subject: Text Box
Page Label: 119
Author: marisfry
Date: 10/25/2023 2:39:48 PM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



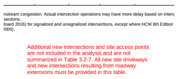
Subject: Callout
Page Label: 119
Author: marisfry
Date: 10/25/2023 2:51:17 PM
Status:
Color: 🟥
Layer:
Space:

55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.



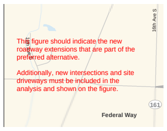
Subject: Callout
Page Label: 119
Author: marisfry
Date: 10/25/2023 2:51:47 PM
Status:
Color: 🟥
Layer:
Space:

Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.



Subject: Text Box
Page Label: 119
Author: marisfry
Date: 10/25/2023 2:52:10 PM
Status:
Color: 🟥
Layer:
Space:

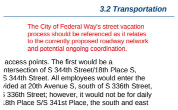
Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-7. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.



Subject: Text Box
Page Label: 120
Author: marisfry
Date: 10/25/2023 2:50:41 PM
Status:
Color: 🟥
Layer:
Space:

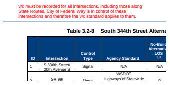
This figure should indicate the new roadway extensions that are part of the preferred alternative.

Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.



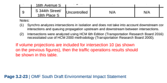
Subject: Text Box
Page Label: 121
Author: marisfry
Date: 10/25/2023 2:54:24 PM
Status:
Color: 🟥
Layer:
Space:

The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.



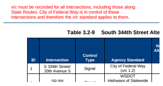
Subject: Text Box
Page Label: 122
Author: marisfry
Date: 10/25/2023 2:40:02 PM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



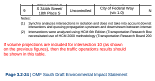
Subject: Text Box
Page Label: 122
Author: marisfry
Date: 10/25/2023 2:54:43 PM
Status:
Color: 🟥
Layer:
Space:

If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.



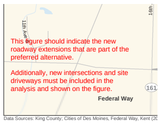
Subject: Text Box
Page Label: 123
Author: marisfry
Date: 10/25/2023 2:40:05 PM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



Subject: Text Box
Page Label: 123
Author: marisfry
Date: 10/25/2023 2:55:42 PM
Status:
Color: 🟥
Layer:
Space:

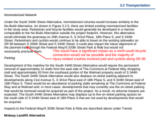
If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.



Subject: Text Box
Page Label: 124
Author: marisfry
Date: 10/25/2023 2:55:26 PM
Status:
Color: 🟥
Layer:
Space:

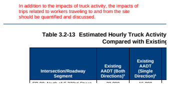
This figure should indicate the new roadway extensions that are part of the preferred alternative.

Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.



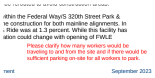
Subject: Callout
Page Label: 125
Author: marisfry
Date: 10/25/2023 2:40:54 PM
Status:
Color: 🟥
Layer:
Space:

This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved ped and cyclists along SR 99



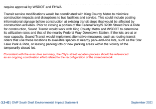
Subject: Text Box
Page Label: 132
Author: marisfry
Date: 10/25/2023 2:56:51 PM
Status:
Color: 🟥
Layer:
Space:

In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.



Subject: Text Box
Page Label: 132
Author: marisfry
Date: 10/25/2023 2:57:35 PM
Status:
Color: 🟥
Layer:
Space:

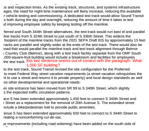
Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.



Subject: Text Box
Page Label: 141
Author: marisfry
Date: 10/25/2023 2:58:05 PM
Status:
Color: 🟥
Layer:
Space:

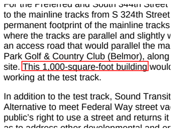
Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.

Desiree Winkler (14)



Subject: Text Box
Page Label: 76
Author: Desiree Winkler
Date: 10/20/2023 4:33:20 PM
Status:
Color: 🟥
Layer:
Space:

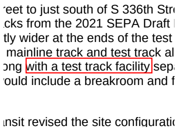
this last sentence seems out of context with the paragraph. What 1,000 SF building?



to the mainline tracks from S 324th Street
permanent footprint of the mainline tracks
where the tracks are parallel and slightly w
an access road that would parallel the ma
Park Golf & Country Club (Belmor), along
site. This 1,000-square-foot building woul
working at the test track.

In addition to the test track, Sound Transit
Alternative to meet Federal Way street va
public's right to use a street and returns it

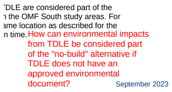
Subject: Rectangle
Page Label: 76
Author: Desiree Winkler
Date: 10/20/2023 4:32:56 PM
Status:
Color: 🟥
Layer:
Space:



reet to just south of S 336th Str
cks from the 2021 SEPA Draft
tly wider at the ends of the test
mainline track and test track al
ong with a test track facility sep
ould include a breakroom and f

nsit revised the site configurati

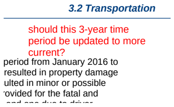
Subject: Rectangle
Page Label: 76
Author: Desiree Winkler
Date: 10/20/2023 4:33:13 PM
Status:
Color: 🟥
Layer:
Space:



DLE are considered part of the
the OMF South study areas. For
ame location as described for the
n time. How can environmental impacts from TDLE be considered part of the "no-build" alternative if TDLE does not have an approved environmental document?
September 2023

Subject: Text Box
Page Label: 77
Author: Desiree Winkler
Date: 10/20/2023 4:39:07 PM
Status:
Color: 🟥
Layer:
Space:

How can environmental impacts from TDLE be considered part of the "no-build" alternative if TDLE does not have an approved environmental document?

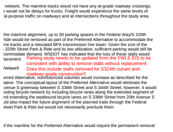


3.2 Transportation

should this 3-year time period be updated to more current?
period from January 2016 to
resulted in property damage
ulted in minor or possible
ovided for the fatal and

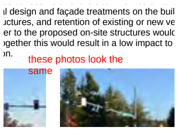
Subject: Text Box
Page Label: 111
Author: Desiree Winkler
Date: 10/23/2023 12:01:25 PM
Status:
Color: 🟥
Layer:
Space:

should this 3-year time period be updated to more current?



Subject: Text Box
Page Label: 117
Author: Desiree Winkler
Date: 10/23/2023 3:04:51 PM
Status:
Color: 🟥
Layer:
Space:

Parking study needs to be updated from the FWLE EIS to be consistent with ability to remove stalls without replacement.
Does this include stalls removed for S324th culvert and roadway grade construction?



Subject: Text Box
Page Label: 209
Author: Desiree Winkler
Date: 10/26/2023 5:40:51 PM
Status:
Color: 🟥
Layer:
Space:

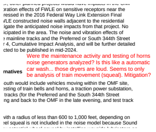
these photos look the same

---

cell tower removed?

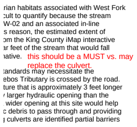
Subject: Text Box
Page Label: 210
Author: Desiree Winkler
Date: 10/26/2023 5:41:42 PM
Status:
Color: 🟥
Layer:
Space:

cell tower removed?



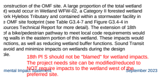
Subject: Text Box
Page Label: 230
Author: Desiree Winkler
Date: 10/26/2023 5:50:55 PM
Status:
Color: 🟥
Layer:
Space:

Were the maintenance activity and testing of horns noise generators analyzed? Is this like a automatic car wash... those dryers are loud. Seems to only be analysis of train movement (squeal). Mitigation?



Subject: Text Box
Page Label: 255
Author: Desiree Winkler
Date: 10/27/2023 10:14:29 AM
Status:
Color: 🟥
Layer:
Space:

this should be a MUST vs. may replace the culvert.

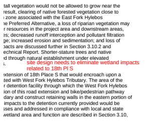


Subject: Text Box
Page Label: 261
Author: Desiree Winkler
Date: 10/27/2023 10:24:43 AM
Status:
Color: 🟥
Layer:
Space:

18th Pl S should not be "blamed" for wetland impacts. The project needs site can be modified/reduced to NOT require impacts to the wetland west of the preferred site.

ds ~~may~~ ne
that road

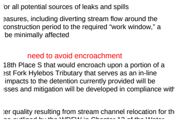
Subject: Line
Page Label: 285
Author: Desiree Winkler
Date: 10/27/2023 10:43:24 AM
Status:
Color: 🟥
Layer:
Space:



tall vegetation would not be allowed to grow near the
result, clearing of native forested vegetation close to
zone associated with the East Fork Hylebos
ne Preferred Alternative, a loss of riparian vegetation may
r resources in the project area and downstream areas,
es; decreased runoff interception and pollutant filtration
ge; increased erosion and sedimentation; and loss of
pacts are discussed further in Section 3.10.2 and
echnical Report. Shorter-stature trees and native
ed through natural establishment under elevated
s.
site design needs to eliminate wetland impacts
related to 18th Pl S
xtension of 18th Place S that would encroach upon a
ted with West Fork Hylebos Tributary. The area of the
r detention facility through which the West Fork Hylebos
ion of this road extension and bike/pedestrian pathway
dary and construct retaining walls in the eastern portion of
impacts to the detention currently provided would be
sses and addressed in compliance with local and state
wetland area and function are described in Section 3.10,

Subject: Text Box
Page Label: 285
Author: Desiree Winkler
Date: 10/27/2023 10:43:56 AM
Status:
Color: 🟥
Layer:
Space:

site design needs to eliminate wetland impacts related to 18th Pl S

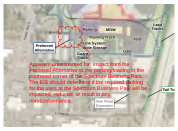


or all potential sources of leaks and spills
easures, including diverting stream flow around the
construction period to the required "work window," a
be minimally affected
need to avoid encroachment
18th Place S that would encroach upon a portion of a
est Fork Hylebos Tributary that serves as an in-line
impacts to the detention currently provided will be
sses and mitigation will be developed in compliance with
ter quality resulting from stream channel relocation for th

Subject: Text Box
Page Label: 292
Author: Desiree Winkler
Date: 10/27/2023 10:49:47 AM
Status:
Color: 🟥
Layer:
Space:

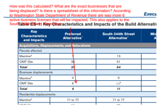
need to avoid encroachment

Chaney (12)



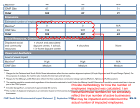
Subject: Cloud+
Page Label: 24
Author: Chaney
Date: 10/31/2023 4:05:12 PM
Status:
Color: 🟥
Layer:
Space:

Apparent unaccounted for impact from the Preferred Alternative to the parking/loading in the northeast corner of the Spectrum Business Park. The EIS should determine if the required parking for the uses at the Spectrum Business Park will be impacted, reduced, or result in any non-conformance.



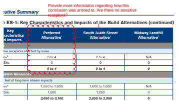
Subject: Callout
Page Label: 32
Author: Chaney
Date: 10/26/2023 3:10:08 PM
Status:
Color: 🟥
Layer:
Space:

How was this calculated? What are the exact businesses that are being displaced? Is there a spreadsheet of this information? According to Washington State Department of Revenue there are way more 6 active business licenses that will be impacted. This also applies to the South 344th Street Alternative



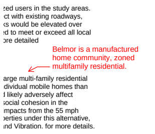
Subject: Cloud+
Page Label: 32
Author: Chaney
Date: 10/31/2023 4:06:20 PM
Status:
Color: 🟥
Layer:
Space:

Provide methodology for how the number of employees impacted was calculated. I am concerned these numbers do not accurately reflect the true number of active businesses that may be impacted and undercount the actual number of impacted employees.



Subject: Cloud+
Page Label: 33
Author: Chaney
Date: 11/2/2023 4:44:06 PM
Status:
Color: 🟥
Layer:
Space:

Provide more information regarding how this conclusion was arrived to. Are there no sensitive receptors?



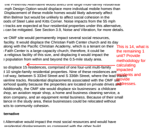
zed users in the study areas.
ct with existing roadways,
ks would be elevated over
ed to meet or exceed all local
ore detailed

Belmor is a manufactured home community, zoned multifamily residential.

arge multi-family residential
dividual mobile homes than
d likely adversely affect
social cohesion in the
impacts from the 55 mph
perties under this alternative,
nd Vibration. for more details.

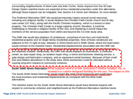
Subject: Callout
Page Label: 189
Author: Chaney
Date: 10/24/2023 8:21:50 AM
Status:
Color: 🟥
Layer:
Space:

Belmor is a manufactured home community, zoned multifamily residential.



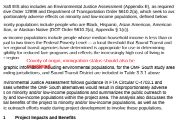
Subject: Callout
Page Label: 189
Author: Chaney
Date: 10/31/2023 4:08:22 PM
Status:
Color: 🟥
Layer:
Space:

This is 14, what is the remaining 1 unit? Provide methodology for calculating impacted residents and provide addresses.



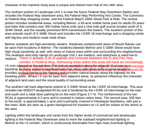
Subject: Cloud+
Page Label: 189
Author: Chaney
Date: 10/31/2023 4:09:20 PM
Status:
Color: 🟥
Layer:
Space:

What analysis went in to this conclusion? Airtime Aviation, Inc. is located in a custom designed building for the use. The impact to this business and others like it is inadequately evaluated.



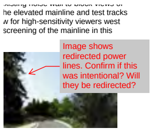
Subject: Text Box
Page Label: 192
Author: Chaney
Date: 10/25/2023 11:00:27 AM
Status:
Color: 🟥
Layer:
Space:

County of origin, immigration status should also be considered.



Subject: Text Box
Page Label: 200
Author: Chaney
Date: 10/31/2023 4:12:04 PM
Status:
Color: 🟥
Layer:
Space:

There is already a lot of asphalt and concrete between the i5 and Pac Hwy corridor in Federal Way, Removing trees within this area will have an increasingly negative impact on the City's urban heat index and citywide tree canopy coverage. Impacts to the urban heat index and the citywide tree canopy coverage should be evaluated between alternatives.

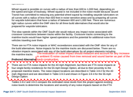


he elevated mainline and test tracks
w for high-sensitivity viewers west
screening of the mainline in this

Image shows redirected power lines. Confirm if this was intentional? Will they be redirected?

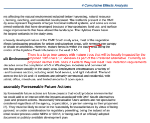
Subject: Callout
Page Label: 204
Author: Chaney
Date: 10/31/2023 4:13:01 PM
Status:
Color: 🟥
Layer:
Space:

Image shows redirected power lines. Confirm if this was intentional? Will they be redirected?



Subject: Cloud+
Page Label: 230
Author: Chaney
Date: 10/31/2023 4:18:13 PM
Status:
Color: 🟥
Layer:
Space:

The evaluation of noise impact should measure and account for any increase in ambient I5 noise caused from tree removal and sound barrier as part of the track construction.

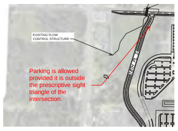


Subject: Callout
Page Label: 360
Author: Chaney
Date: 10/31/2023 4:19:16 PM
Status:
Color: 🟥
Layer:
Space:

There is a large tree canopy with mature trees that will be heavily impacted by the proposed 18th Place S Extension as part of the Preferred alternative. Currently as proposed neither OMF sites in Federal Way will meet Tree Retention requirements.

04-OMFS NEPA SEPA DEIS Appendix C Conceptual Design Drawings and Engineering Information.pdf Markup Summary

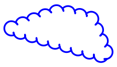
K Smith (1)


EXISTING FLOW CONTROL STRUCTURE
Parking is allowed provided it is outside the prescriptive sight triangle of the intersection.

Subject: Callout
Page Label: 31
Author: K Smith
Date: 11/3/2023 9:53:18 AM
Status:
Color: 🟥
Layer:
Space:

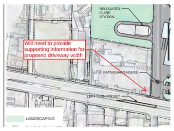
Parking is allowed provided it is outside the prescriptive sight triangle of the intersection.

Chris Cavallo (85)



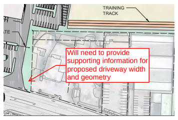
Subject: Cloud
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:06:41 PM
Status:
Color: 🟦
Layer:
Space:

Subject: Cloud
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:06:50 PM
Status:
Color: 🟦
Layer:
Space:


Will need to provide supporting information for proposed driveway width
LANDSCAPING

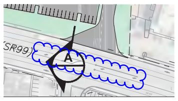
Subject: Text Box
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:07:25 PM
Status:
Color: 🟥
Layer:
Space:

Will need to provide supporting information for proposed driveway width

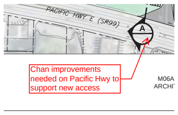

TRAINING TRACK
Will need to provide supporting information for proposed driveway width and geometry

Subject: Text Box
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:07:51 PM
Status:
Color: 🟥
Layer:
Space:

Will need to provide supporting information for proposed driveway width and geometry



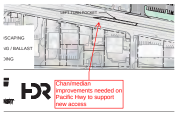
Subject: Cloud
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:08:14 PM
Status:
Color: 🟦
Layer:
Space:



Subject: Text Box
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 4:35:05 PM
Status:
Color: 🟥
Layer:
Space:

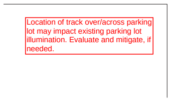
Chan improvements needed on Pacific Hwy to support new access

Subject: Cloud
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:09:10 PM
Status:
Color: 🟦
Layer:
Space:



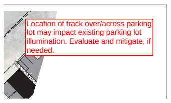
Subject: Text Box
Page Label: 5
Author: Chris Cavallo
Date: 10/23/2023 3:12:10 PM
Status:
Color: 🟥
Layer:
Space:

Chan/median improvements needed on Pacific Hwy to support new access



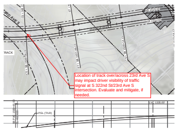
Subject: Text Box
Page Label: 15
Author: Chris Cavallo
Date: 10/20/2023 3:52:31 PM
Status:
Color: 🟥
Layer:
Space:

Location of track over/across parking lot may impact existing parking lot illumination. Evaluate and mitigate, if needed.



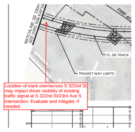
Subject: Text Box
Page Label: 16
Author: Chris Cavallo
Date: 10/23/2023 4:35:26 PM
Status:
Color: 🟥
Layer:
Space:

Location of track over/across parking lot may impact existing parking lot illumination. Evaluate and mitigate, if needed.



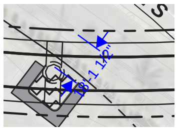
Subject: Text Box
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 3:55:34 PM
Status:
Color: 🟥
Layer:
Space:

Location of track over/across 23rd Ave S may impact driver visibility of traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.



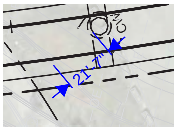
Subject: Text Box
Page Label: 16
Author: Chris Cavallo
Date: 10/23/2023 4:35:34 PM
Status:
Color: 🟥
Layer:
Space:

Location of track over/across S 322nd St may impact driver visibility of existing traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.



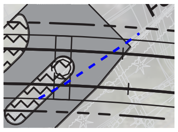
Subject: Length Measurement
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:03:37 PM
Status:
Color: 🟦
Layer:
Space:

18'-1 1/2"

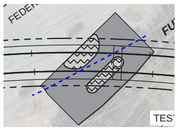


Subject: Length Measurement
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:03:45 PM
Status:
Color: 🟦
Layer:
Space:

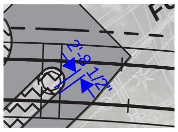
21'-7"



Subject: PolyLine
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:05:04 PM
Status:
Color: 🟦
Layer:
Space:

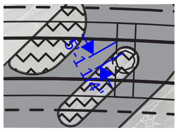


Subject: PolyLine
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:05:04 PM
Status:
Color: 🟦
Layer:
Space:



Subject: Length Measurement
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:03:09 PM
Status:
Color: 🟦
Layer:
Space:

2'-8 1/2"



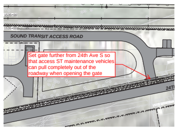
Subject: Length Measurement
Page Label: 16
Author: Chris Cavallo
Date: 10/20/2023 4:03:14 PM
Status:
Color: 🟦
Layer:
Space:

5'-1 1/4"

VD
ST = SB 1521
23'-6 3/4"

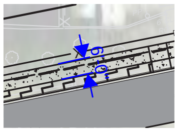
Subject: Length Measurement
Page Label: 17
Author: Chris Cavallo
Date: 10/20/2023 4:09:11 PM
Status:
Color: 🟦
Layer:
Space:

23'-6 3/4"


SOUND TRANSIT ACCESS ROAD
Set gate further from 24th Ave S so that access ST maintenance vehicles can pull completely out of the roadway when opening the gate

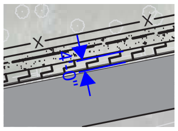
Subject: Text Box
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:13:07 PM
Status:
Color: 🟥
Layer:
Space:

Set gate further from 24th Ave S so that access ST maintenance vehicles can pull completely out of the roadway when opening the gate



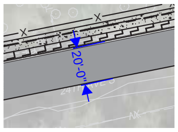
Subject: Length Measurement
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:20:14 PM
Status:
Color: 🟦
Layer:
Space:

6'-0"



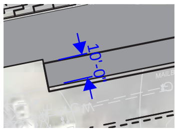
Subject: Length Measurement
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:14:09 PM
Status:
Color: 🟦
Layer:
Space:

4'-0"



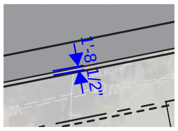
Subject: Length Measurement
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:20:07 PM
Status:
Color: 🟦
Layer:
Space:

20'-0"



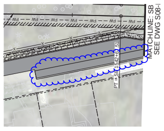
Subject: Length Measurement
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:23:36 PM
Status:
Color: 🟦
Layer:
Space:

10'-0"

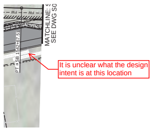


Subject: Length Measurement
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:24:07 PM
Status:
Color: 🟦
Layer:
Space:

1'-8 1/2"

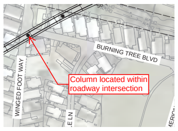

MATCHLINE SB
SEE DWG S08-

Subject: Cloud
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:24:33 PM
Status:
Color: 🟦
Layer:
Space:


It is unclear what the design intent is at this location

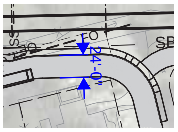
Subject: Text Box
Page Label: 19
Author: Chris Cavallo
Date: 10/20/2023 4:24:57 PM
Status:
Color: 🟥
Layer:
Space:

It is unclear what the design intent is at this location


BURNING TREE BLVD
WINGED FOOT WAY
Column located within roadway intersection

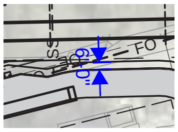
Subject: Text Box
Page Label: 20
Author: Chris Cavallo
Date: 10/20/2023 4:22:19 PM
Status:
Color: 🟥
Layer:
Space:

Column located within roadway intersection



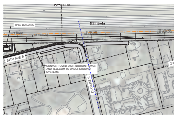
Subject: Length Measurement
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:26:16 PM
Status:
Color: 🟦
Layer:
Space:

24'-0"

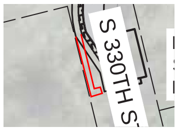


Subject: Length Measurement
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:26:55 PM
Status:
Color: 🟦
Layer:
Space:

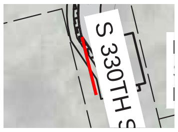
6'-0"



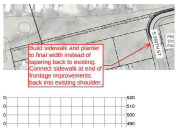
Subject: Line
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:30:05 PM
Status:
Color: 🟦
Layer:
Space:



Subject: PolyLine
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:34:20 PM
Status:
Color: 🟥
Layer:
Space:

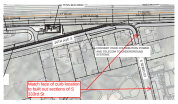


Subject: PolyLine
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:34:07 PM
Status:
Color: 🟥
Layer:
Space:



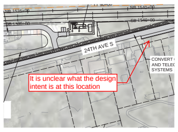
Subject: Text Box
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:35:26 PM
Status:
Color: 🟥
Layer:
Space:

Build sidewalk and planter to final width instead of tapering back to existing. Connect sidewalk at end of frontage improvements back into existing shoulder.



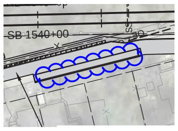
Subject: Text Box
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:31:27 PM
Status:
Color: 🟥
Layer:
Space:

Match face of curb location to built out sections of S 333rd St


24TH AVE S
It is unclear what the design intent is at this location

Subject: Text Box
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:38:55 PM
Status:
Color: 🟥
Layer:
Space:

It is unclear what the design intent is at this location

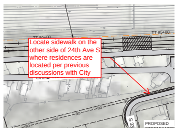


Subject: Cloud
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:38:50 PM
Status:
Color: 🟦
Layer:
Space:

See additional related comments on sheet S08B-KAP105

Subject: Text Box
Page Label: 21
Author: Chris Cavallo
Date: 10/20/2023 4:40:15 PM
Status:
Color: 🟥
Layer:
Space:

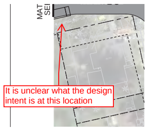
See additional related comments on sheet S08B-KAP105


Locate sidewalk on the other side of 24th Ave S where residences are located per previous discussions with City
PROPOSED

Subject: Text Box
Page Label: 21
Author: Chris Cavallo
Date: 10/23/2023 4:36:54 PM
Status:
Color: 🟥
Layer:
Space:

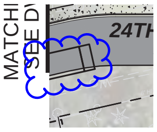
Locate sidewalk on the other side of 24th Ave S where residences are located per previous discussions with City

---

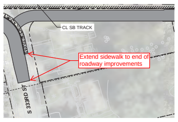

It is unclear what the design intent is at this location

Subject: Text Box
Page Label: 23
Author: Chris Cavallo
Date: 10/20/2023 4:38:08 PM
Status:
Color: 🟥
Layer:
Space:

It is unclear what the design intent is at this location

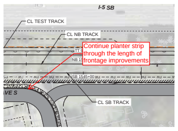

MATCHI
SEE D
24T

Subject: Cloud
Page Label: 23
Author: Chris Cavallo
Date: 10/20/2023 4:38:01 PM
Status:
Color: 🟦
Layer:
Space:


CL SB TRACK
Extend sidewalk to end of roadway improvements

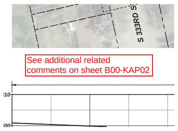
Subject: Text Box
Page Label: 23
Author: Chris Cavallo
Date: 10/20/2023 4:38:23 PM
Status:
Color: 🟥
Layer:
Space:

Extend sidewalk to end of roadway improvements


I-5 SB
CL TEST TRACK
CL NB TRACK
Continue planter strip through the length of frontage improvements
CL SB TRACK

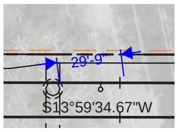
Subject: Text Box
Page Label: 23
Author: Chris Cavallo
Date: 10/20/2023 4:38:16 PM
Status:
Color: 🟥
Layer:
Space:

Continue planter strip through the length of frontage improvements


S 333RD ST
See additional related comments on sheet B00-KAP02

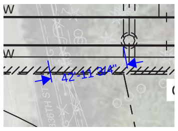
Subject: Text Box
Page Label: 23
Author: Chris Cavallo
Date: 10/20/2023 4:40:45 PM
Status:
Color: 🟥
Layer:
Space:

See additional related comments on sheet B00-KAP02


29'-9"
S13°59'34.67"W

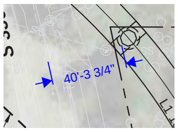
Subject: Length Measurement
Page Label: 24
Author: Chris Cavallo
Date: 10/20/2023 4:44:37 PM
Status:
Color: 🟦
Layer:
Space:

29'-9"



Subject: Length Measurement
Page Label: 24
Author: Chris Cavallo
Date: 10/20/2023 4:44:46 PM
Status:
Color: 🟦
Layer:
Space:

42'-11 3/4"

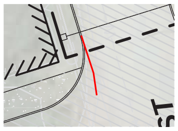


Subject: Length Measurement
Page Label: 24
Author: Chris Cavallo
Date: 10/20/2023 4:46:42 PM
Status:
Color: 🟦
Layer:
Space:

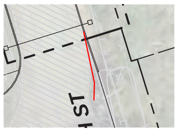
40'-3 3/4"

Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:50:11 PM
Status:
Color: 🟥
Layer:
Space:

Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:50:56 PM
Status:
Color: 🟥
Layer:
Space:



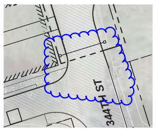
Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:51:05 PM
Status:
Color: 🟥
Layer:
Space:



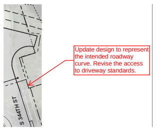
Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:51:14 PM
Status:
Color: 🟥
Layer:
Space:

Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:51:35 PM
Status:
Color: 🟥
Layer:
Space:

Subject: PolyLine
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:51:40 PM
Status:
Color: 🟥
Layer:
Space:

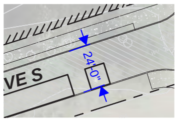


Subject: Cloud
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:52:06 PM
Status:
Color: 🟦
Layer:
Space:


S 344TH ST
Update design to represent the intended roadway curve. Revise the access to driveway standards.

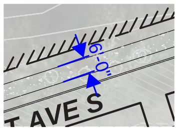
Subject: Text Box
Page Label: 26
Author: Chris Cavallo
Date: 10/23/2023 4:38:39 PM
Status:
Color: 🟥
Layer:
Space:

Update design to represent the intended roadway curve. Revise the access to driveway standards.



Subject: Length Measurement
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:54:25 PM
Status:
Color: 🟦
Layer:
Space:

24'-0"



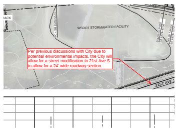
Subject: Length Measurement
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:54:37 PM
Status:
Color: 🟦
Layer:
Space:

6'-0"

21ST AVE S
4'-0"

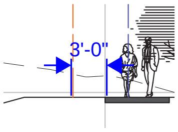
Subject: Length Measurement
Page Label: 26
Author: Chris Cavallo
Date: 10/20/2023 4:54:48 PM
Status:
Color: 🟦
Layer:
Space:

4'-0"



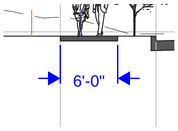
Subject: Text Box
Page Label: 26
Author: Chris Cavallo
Date: 10/23/2023 4:38:21 PM
Status:
Color: 🟥
Layer:
Space:

Per previous discussions with City due to potential environmental impacts, the City will allow for a street modification to 21st Ave S to allow for a 24' wide roadway section



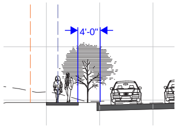
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:27:45 PM
Status:
Color: 🟦
Layer:
Space:

3'-0"



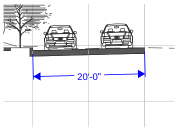
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:28:07 PM
Status:
Color: 🟦
Layer:
Space:

6'-0"



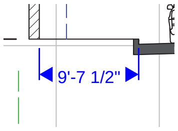
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:28:05 PM
Status:
Color: 🟦
Layer:
Space:

4'-0"



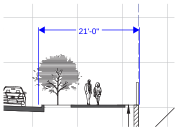
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:28:01 PM
Status:
Color: 🟦
Layer:
Space:

20'-0"



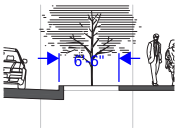
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:29:04 PM
Status:
Color: 🟦
Layer:
Space:

9'-7 1/2"



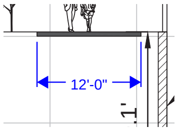
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:29:35 PM
Status:
Color: 🟦
Layer:
Space:

21'-0"



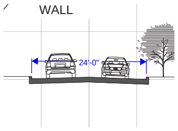
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:29:24 PM
Status:
Color: 🟦
Layer:
Space:

6'-6"



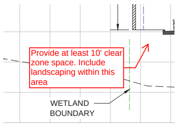
Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:29:31 PM
Status:
Color: 🟦
Layer:
Space:

12'-0"



Subject: Length Measurement
Page Label: 29
Author: Chris Cavallo
Date: 10/20/2023 5:29:43 PM
Status:
Color: 🟦
Layer:
Space:

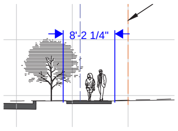
24'-0"


Provide at least 10' clear zone space. Include landscaping within this area
WETLAND BOUNDARY

Subject: Text Box
Page Label: 29
Author: Chris Cavallo
Date: 10/23/2023 4:26:50 PM
Status:
Color: 🟥
Layer:
Space:

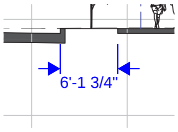
Provide at least 10' clear zone space. Include landscaping within this area

---



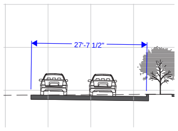
Subject: Length Measurement
Page Label: 30
Author: Chris Cavallo
Date: 10/20/2023 5:24:38 PM
Status:
Color: 🟦
Layer:
Space:

8'-2 1/4"



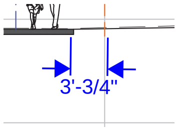
Subject: Length Measurement
Page Label: 30
Author: Chris Cavallo
Date: 10/20/2023 5:24:15 PM
Status:
Color: 🟦
Layer:
Space:

6'-1 3/4"



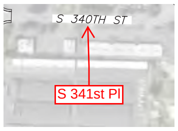
Subject: Length Measurement
Page Label: 30
Author: Chris Cavallo
Date: 10/20/2023 5:24:34 PM
Status:
Color: 🟦
Layer:
Space:

27'-7 1/2"



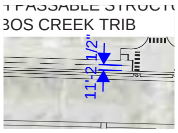
Subject: Length Measurement
Page Label: 30
Author: Chris Cavallo
Date: 10/20/2023 5:26:00 PM
Status:
Color: 🟦
Layer:
Space:

3'-3/4"



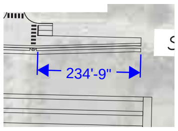
Subject: Text Box
Page Label: 31
Author: Chris Cavallo
Date: 10/20/2023 5:09:31 PM
Status:
Color: 🟥
Layer:
Space:

S 341st Pl



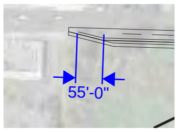
Subject: Length Measurement
Page Label: 31
Author: Chris Cavallo
Date: 10/20/2023 5:16:20 PM
Status:
Color: 🟦
Layer:
Space:

11'-2 1/2"



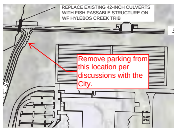
Subject: Length Measurement
Page Label: 31
Author: Chris Cavallo
Date: 10/20/2023 5:17:09 PM
Status:
Color: 🟦
Layer:
Space:

234'-9"



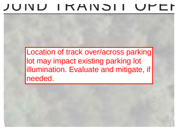
Subject: Length Measurement
Page Label: 31
Author: Chris Cavallo
Date: 10/20/2023 5:17:38 PM
Status:
Color: 🟦
Layer:
Space:

55'-0"


REPLACE EXISTING 42-INCH CULVERTS WITH FISH PASSABLE STRUCTURE ON WF HYLEBOS CREEK TRIB
Remove parking from this location per discussions with the City.

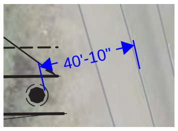
Subject: Text Box
Page Label: 31
Author: Chris Cavallo
Date: 10/23/2023 4:28:16 PM
Status:
Color: 🟥
Layer:
Space:

Remove parking from this location per discussions with the City.


UND TRANSIT OPER
Location of track over/across parking lot may impact existing parking lot illumination. Evaluate and mitigate, if needed.

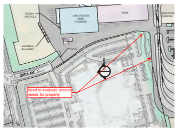
Subject: Text Box
Page Label: 38
Author: Chris Cavallo
Date: 10/20/2023 5:05:59 PM
Status:
Color: 🟥
Layer:
Space:

Location of track over/across parking lot may impact existing parking lot illumination. Evaluate and mitigate, if needed.



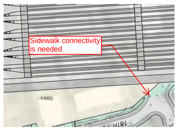
Subject: Length Measurement
Page Label: 40
Author: Chris Cavallo
Date: 10/20/2023 5:04:53 PM
Status:
Color: 🟦
Layer:
Space:

40'-10"



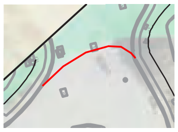
Subject: Text Box
Page Label: 41
Author: Chris Cavallo
Date: 10/23/2023 3:26:29 PM
Status:
Color: 🟥
Layer:
Space:

Need to evaluate access needs for property

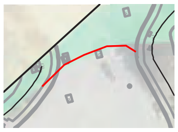

Sidewalk connectivity is needed
YARD

Subject: Text Box
Page Label: 41
Author: Chris Cavallo
Date: 10/23/2023 3:29:44 PM
Status:
Color: 🟥
Layer:
Space:

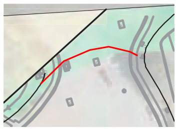
Sidewalk connectivity is needed



Subject: PolyLine
Page Label: 41
Author: Chris Cavallo
Date: 10/23/2023 3:28:46 PM
Status:
Color: 🟥
Layer:
Space:

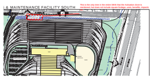


Subject: PolyLine
Page Label: 41
Author: Chris Cavallo
Date: 10/23/2023 3:29:18 PM
Status:
Color: 🟥
Layer:
Space:



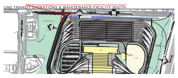
Subject: PolyLine
Page Label: 41
Author: Chris Cavallo
Date: 10/23/2023 3:29:08 PM
Status:
Color: 🟥
Layer:
Space:

Chaney (5)



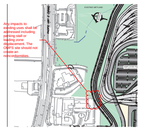
Subject: Cloud+
Page Label: 27
Author: Chaney
Date: 10/31/2023 4:19:51 PM
Status:
Color: 🟥
Layer:
Space:

This is the only time in the entire DEIS that the Activation Zone is mentioned, but does not include square footage, uses, benefits, impacts etc.



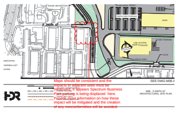
Subject: Cloud+
Page Label: 27
Author: Chaney
Date: 10/26/2023 3:37:04 PM
Status:
Color: 🟥
Layer:
Space:

Activation Zone parking spaces are not shown on this map, but shown in others. Plans should be consistent.



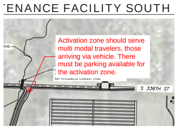
Subject: Cloud+
Page Label: 27
Author: Chaney
Date: 10/31/2023 4:22:24 PM
Status:
Color: 🟥
Layer:
Space:

Any impacts to existing uses shall be addressed including parking stall or loading zone displacement. The OMFS site should not create an nonconformities.



Subject: Cloud+
Page Label: 27
Author: Chaney
Date: 10/31/2023 4:24:30 PM
Status:
Color: 🟥
Layer:
Space:

Maps should be consistent and the impacts to adjacent uses must be measured. It appears Spectrum Business Park parking is being displaced here. Provide more information on how these impact will be mitigated and the creation of any nonconformities will be avoided.



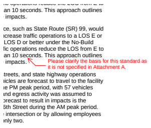
ENANCE FACILITY SOUTH
Activation zone should serve multi modal travelers, those arriving via vehicle. There must be parking available for the activation zone.
S 336TH ST

Subject: Callout
Page Label: 31
Author: Chaney
Date: 11/2/2023 8:56:28 AM
Status:
Color: 🟥
Layer:
Space:

Activation zone should serve multi modal travelers, those arriving via vehicle. There must be parking available for the activation zone.

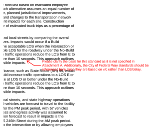
08-OMFS NEPA SEPA DEIS Appendix G.1 Transportation Tech Report.pdf Markup Summary

marisfry (54)



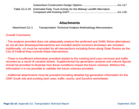
Subject: Callout
Page Label: 2
Author: marisfry
Date: 10/23/2023 6:47:06 AM
Status:
Color: 🟥
Layer:
Space:

Please clarify the basis for this standard as it is not specified in Attachment A.



Subject: Callout
Page Label: 2
Author: marisfry
Date: 10/24/2023 6:45:21 AM
Status:
Color: 🟥
Layer:
Space:

Please clarify the basis for this standard as it is not specified in Attachment A. Additionally, the City of Federal Way standards should be referenced here since they are based on v/c rather than LOS/delay.



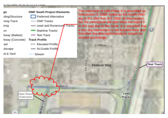
Subject: Text Box
Page Label: 8
Author: marisfry
Date: 10/24/2023 6:56:54 AM
Status:
Color: 🟥
Layer:
Space:

Overall Comments:

- The analysis provided does not adequately analyze the preferred and 344th Street alternatives as not all new driveways/intersections are included and/or incorrect driveways are included. Additionally, v/c must be recorded for all intersections including those along State Routes as the City of Federal Way controls these intersections.

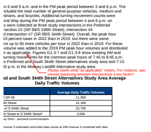
- There is insufficient information provided related to the existing land uses removed and traffic rerouted as a result of vacated streets. Supplemental trip generation analysis and volume figures should be provided to illustrate how these conditions impact the future volumes. Without this information it is not possible to validate the future volumes provided.

- Additional attachments must be provided including detailed trip generation information for the OMF South site and existing land uses; traffic counts; and Synchro worksheets.



Subject: Cloud+
Page Label: 12
Author: marisfry
Date: 10/24/2023 6:46:27 AM
Status:
Color: 🟥
Layer:
Space:

The extension of 18th Place S is described as intersection S 336th Street as the fourth (NB) leg of the 18th Ave S/S 336th St intersection, but the conceptual site plan does not depict it in this way due to the creek. It is assumed that a four-leg intersection is not feasible here and therefore the description/analysis should be revised accordingly.



Subject: Callout

Page Label: 29

Author: marisfry

Date: 10/23/2023 7:09:14 AM

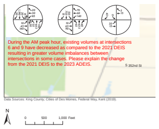
Status:

Color: 🟥

Layer:

Space:

Please clarify what "as applicable" means. For instance, was volume balancing between intersections a key factor?



Subject: Text Box

Page Label: 30

Author: marisfry

Date: 10/24/2023 6:46:55 AM

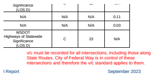
Status:

Color: 🟥

Layer:

Space:

During the AM peak hour, existing volumes at intersections 6 and 9 have decreased as compared to the 2021 DEIS resulting in greater volume imbalances between intersections in some cases. Please explain the change from the 2021 DEIS to the 2023 ADEIS.



Subject: Text Box

Page Label: 38

Author: marisfry

Date: 10/24/2023 6:48:20 AM

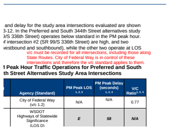
Status:

Color: 🟥

Layer:

Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



Subject: Text Box

Page Label: 40

Author: marisfry

Date: 10/24/2023 6:48:35 AM

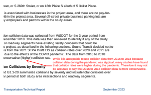
Status:

Color: 🟥

Layer:

Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



Subject: Callout

Page Label: 53

Author: marisfry

Date: 10/23/2023 7:13:47 AM

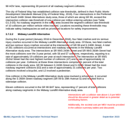
Status:

Color: 🟥

Layer:

Space:

While it is acceptable to use collision data from 2016 to 2018 because collision data during the pandemic was atypical, many studies have found that collision rates were higher during the pandemic. Therefore it may not be accurate to say that 2016 to 2018 collision data is more conservative.



Subject: Callout

Page Label: 60

Author: marisfry

Date: 10/24/2023 7:02:00 AM

Status:

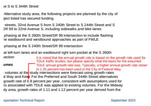
Color: 🟥

Layer:

Space:

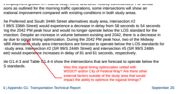
Intersections with a collision rate above 1.0 per MEV should be discussed in greater detail as to potential contributing factors.

Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.



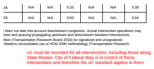
Subject: Callout
Page Label: 63
Author: marisfry
Date: 10/24/2023 7:02:53 AM
Status:
Color: 🟥
Layer:
Space:

It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.



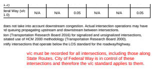
Subject: Callout
Page Label: 64
Author: marisfry
Date: 10/25/2023 2:35:52 PM
Status:
Color: 🟥
Layer:
Space:

Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the siganal timings?



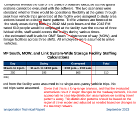
Subject: Text Box
Page Label: 67
Author: marisfry
Date: 10/24/2023 6:49:04 AM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



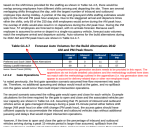
Subject: Text Box
Page Label: 69
Author: marisfry
Date: 10/24/2023 6:49:14 AM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



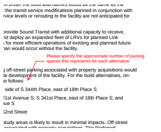
Subject: Callout
Page Label: 77
Author: marisfry
Date: 10/23/2023 7:39:14 AM
Status:
Color: 🟥
Layer:
Space:

Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.



Subject: Callout
Page Label: 78
Author: marisfry
Date: 10/23/2023 8:24:15 AM
Status:
Color: 🟥
Layer:
Space:

A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips)



the transit service modifications planned in conjunction with
rvice levels or rerouting to the facility are not anticipated for

provide Sound Transit with additional capacity to receive,
nd deploy an expanded fleet of LRVs for planned Link
for more efficient operations of existing and planned future
han would occur without the facility.

Please specify the approximate number of parking spaces this represents for each alternative.

off-street parking associated with property acquisitions would
te development of the facility. For the build alternatives, on-
as follows:

side of S 344th Place, east of 18th Place S

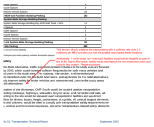
21st Avenue S; S 341st Place, east of 18th Place S; and
nue S

52nd Street

study areas is likely to result in minimal impacts. Off-street

Subject: Callout
Page Label: 79
Author: marisfry
Date: 10/23/2023 8:06:05 AM
Status:
Color: 🟥
Layer:
Space:

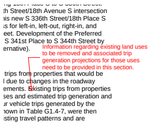
Please specify the approximate number of parking spaces this represents for each alternative.



Subject: Callout
Page Label: 80
Author: marisfry
Date: 10/23/2023 4:02:45 PM
Status:
Color: 🟥
Layer:
Space:

This section should address the intersections with a collision rate over 1.0 collisions per MEV and discuss how the project may impact these locations.

Additionally, if north-south non-motorized facilities would not be feasible as part of the 344th Street Alternative, safety would not improve for non-motorized users and could in fact worsen. Please elaborate.



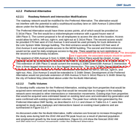
th Street/18th Avenue S intersection
his new S 336th Street/18th Place S
s for left-in, left-out, right-in, and
eet. Development of the Preferred
S 341st Place to S 344th Street by
ernative).

Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.

trips from properties that would be
l due to changes in the roadway
ements. Existing trips from properties
ses and estimated trip generation and
ur vehicle trips generated by the
hown in Table G1.4-7, were then
isting travel patterns and are

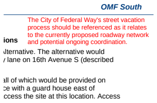
Subject: Callout
Page Label: 81
Author: marisfry
Date: 10/24/2023 7:05:55 AM
Status:
Color: 🟥
Layer:
Space:

Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.



Subject: Cloud+
Page Label: 81
Author: marisfry
Date: 10/24/2023 7:05:51 AM
Status:
Color: 🟥
Layer:
Space:

This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.



OMF South

The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.

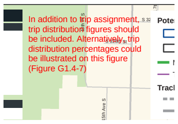
ions

lternative. The alternative would
lane on 16th Avenue S (described

all of which would be provided on
ce with a guard house east of
ccess the site at this location. Access

Subject: Text Box
Page Label: 81
Author: marisfry
Date: 10/24/2023 7:08:12 AM
Status:
Color: 🟥
Layer:
Space:

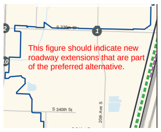
The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.



In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-7)

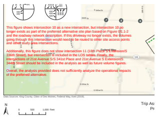
Subject: Text Box
Page Label: 82
Author: marisfry
Date: 10/23/2023 8:28:10 AM
Status:
Color: 🟥
Layer:
Space:

In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-7)


This figure should indicate new roadway extensions that are part of the preferred alternative.

Subject: Text Box
Page Label: 82
Author: marisfry
Date: 10/23/2023 8:28:27 AM
Status:
Color: 🟥
Layer:
Space:

This figure should indicate new roadway extensions that are part of the preferred alternative.

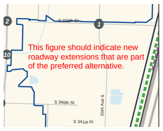


Subject: Text Box
Page Label: 82
Author: marisfry
Date: 10/23/2023 8:28:43 AM
Status:
Color: 🟥
Layer:
Space:

This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.

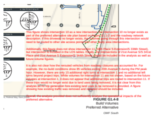
Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures.

Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.


This figure should indicate new roadway extensions that are part of the preferred alternative.

Subject: Text Box
Page Label: 83
Author: marisfry
Date: 10/23/2023 8:29:36 AM
Status:
Color: 🟥
Layer:
Space:

This figure should indicate new roadway extensions that are part of the preferred alternative.



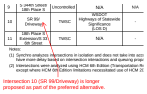
Subject: Text Box
Page Label: 83
Author: marisfry
Date: 10/24/2023 7:11:00 AM
Status:
Color: 🟥
Layer:
Space:

This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.

Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures.

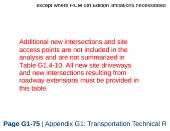
It is also not clear how the rerouted vehicles from roadway closures are accounted for. For example, the no-build conditions show 85 vehicles exiting 20th Avenue S during the PM peak hour. However, there are only 15 additional right turns at intersection 1 and no additional left turns beyond project trips. While volumes for intersection 11 are not shown, based on the future volumes at intersection 1, it does not appear that additional trips are routed to intersection 11. If these trips would no longer exist due to land uses being removed, it is not clear from this analysis as no trip generation fore existing land uses to be removed is provided. A figure showing how existing traffic was removed and rerouted should be included.

Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.



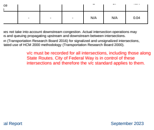
Subject: Callout
Page Label: 84
Author: marisfry
Date: 10/25/2023 2:52:37 PM
Status:
Color: 🟥
Layer:
Space:

Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.



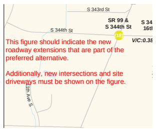
Subject: Text Box
Page Label: 84
Author: marisfry
Date: 10/23/2023 8:32:55 AM
Status:
Color: 🟥
Layer:
Space:

Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.



Subject: Text Box
Page Label: 84
Author: marisfry
Date: 10/24/2023 6:49:44 AM
Status:
Color: 🟥
Layer:
Space:

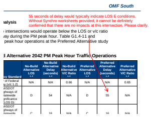
v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



Subject: Text Box
Page Label: 85
Author: marisfry
Date: 10/23/2023 8:33:54 AM
Status:
Color: 🟥
Layer:
Space:

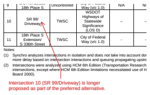
This figure should indicate the new roadway extensions that are part of the preferred alternative.

Additionally, new intersections and site driveways must be shown on the figure.



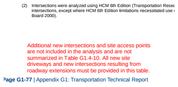
Subject: Callout
Page Label: 86
Author: marisfry
Date: 10/25/2023 2:50:59 PM
Status:
Color: 🟥
Layer:
Space:

55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.



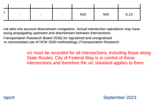
Subject: Callout
Page Label: 86
Author: marisfry
Date: 10/23/2023 8:35:24 AM
Status:
Color: 🟥
Layer:
Space:

Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.



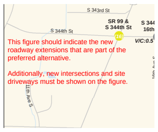
Subject: Text Box
Page Label: 86
Author: marisfry
Date: 10/23/2023 8:35:33 AM
Status:
Color: 🟥
Layer:
Space:

Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.



Subject: Text Box
Page Label: 86
Author: marisfry
Date: 10/24/2023 6:49:50 AM
Status:
Color: 🟥
Layer:
Space:

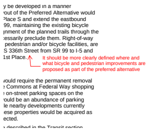
v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



Subject: Text Box
Page Label: 87
Author: marisfry
Date: 10/23/2023 8:37:04 AM
Status:
Color: 🟥
Layer:
Space:

This figure should indicate the new roadway extensions that are part of the preferred alternative.

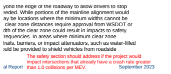
Additionally, new intersections and site driveways must be shown on the figure.



Subject: Callout
Page Label: 88
Author: marisfry
Date: 10/23/2023 8:37:58 AM
Status:
Color: 🟥
Layer:
Space:

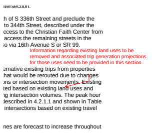
It should be more clearly defined where and what bicycle and pedestrian improvements are proposed as part of the preferred alternative

---



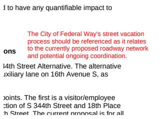
Subject: Text Box
Page Label: 88
Author: marisfry
Date: 10/23/2023 8:38:31 AM
Status:
Color: 🟥
Layer:
Space:

The safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV.



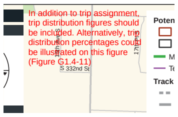
Subject: Callout
Page Label: 89
Author: marisfry
Date: 10/23/2023 8:39:35 AM
Status:
Color: 🟥
Layer:
Space:

Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.



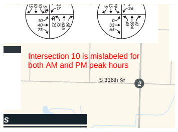
Subject: Text Box
Page Label: 89
Author: marisfry
Date: 10/24/2023 7:07:31 AM
Status:
Color: 🟥
Layer:
Space:

The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.



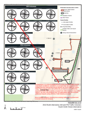
Subject: Text Box
Page Label: 90
Author: marisfry
Date: 10/23/2023 8:41:01 AM
Status:
Color: 🟥
Layer:
Space:

In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-11)



Subject: Text Box
Page Label: 91
Author: marisfry
Date: 10/23/2023 8:41:46 AM
Status:
Color: 🟥
Layer:
Space:

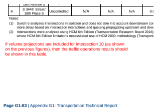
Intersection 10 is mislabeled for both AM and PM peak hours



Subject: Callout
Page Label: 91
Author: marisfry
Date: 10/24/2023 7:12:14 AM
Status:
Color: 🟥
Layer:
Space:

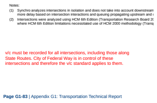
If Intersection 1 is only providing access to the Christian Faith Church under build conditions, and little to no project trips are projected it is unlikely that this intersection would observe as much traffic as it does today. This analysis does not sufficiently account for (or sufficiently document) traffic that would be rerouted from 20th Avenue S due to the closure. As such, this analysis may not adequately take into account additional impacts along SR 99 or 16th Street as a result.

More broadly, a figure showing how existing traffic was removed and rerouted should be included.



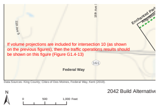
Subject: Text Box
Page Label: 92
Author: marisfry
Date: 10/23/2023 8:45:44 AM
Status:
Color: 🟥
Layer:
Space:

If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.



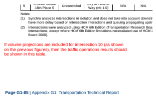
Subject: Text Box
Page Label: 92
Author: marisfry
Date: 10/24/2023 6:49:58 AM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



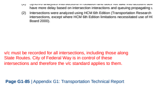
Subject: Text Box
Page Label: 93
Author: marisfry
Date: 10/23/2023 8:47:30 AM
Status:
Color: 🟥
Layer:
Space:

If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-13)



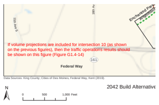
Subject: Text Box
Page Label: 94
Author: marisfry
Date: 10/23/2023 8:47:45 AM
Status:
Color: 🟥
Layer:
Space:

If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.



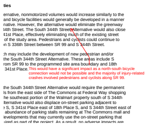
Subject: Text Box
Page Label: 94
Author: marisfry
Date: 10/24/2023 6:50:03 AM
Status:
Color: 🟥
Layer:
Space:

v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.



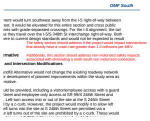
Subject: Text Box
Page Label: 95
Author: marisfry
Date: 10/23/2023 8:47:58 AM
Status:
Color: 🟥
Layer:
Space:

If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-14)



Subject: Callout
Page Label: 96
Author: marisfry
Date: 10/24/2023 7:12:42 AM
Status:
Color: 🟥
Layer:
Space:

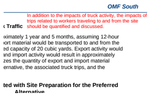
This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved pedestrians and cyclists along SR 99.



Subject: Text Box
Page Label: 97
Author: marisfry
Date: 10/23/2023 8:49:56 AM
Status:
Color: 🟥
Layer:
Space:

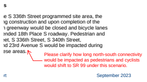
The safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV.

Additionally, this section should address non-motorized safety impacts associated with eliminating a north-south non motorized connection.



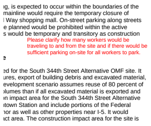
Subject: Text Box
Page Label: 108
Author: marisfry
Date: 10/24/2023 7:13:57 AM
Status:
Color: 🟥
Layer:
Space:

In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.



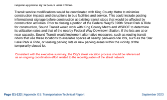
Subject: Callout
Page Label: 113
Author: marisfry
Date: 10/23/2023 8:53:55 AM
Status:
Color: 🟥
Layer:
Space:

Please clarify how long north-south connectivity would be impacted as pedestrians and cyclists would shift to SR 99 under this scenario.



Subject: Text Box
Page Label: 114
Author: marisfry
Date: 10/23/2023 8:54:40 AM
Status:
Color: 🟥
Layer:
Space:

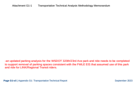
Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.



Subject: Text Box
Page Label: 131
Author: marisfry
Date: 10/24/2023 7:16:43 AM
Status:
Color: 🟥
Layer:
Space:

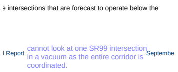
Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.

Desiree Winkler (2)



Subject: Text Box
Page Label: 8
Author: Desiree Winkler
Date: 10/27/2023 11:37:46 AM
Status:
Color: 🟥
Layer:
Space:

-an updated parking analysis for the WSDOT 320th/23rd Ave park and ride needs to be completed to support removal of parking spaces consistent with the FWLE EIS that assumed use of this park and ride for LINK/Regional Transit riders.



e intersections that are forecast to operate below the

l Report

cannot look at one SR99 intersection in a vacuum as the entire corridor is coordinated.

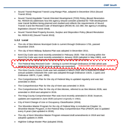
Septembe

Subject: Text Box
Page Label: 64
Author: Desiree Winkler
Date: 10/27/2023 4:49:43 PM
Status:
Color: 🟦
Layer:
Space:

cannot look at one SR99 intersection in a vacuum as the entire corridor is coordinated.

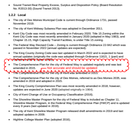
12-OMFS NEPA SEPA DEIS Appendix H Supporting Info for Tech Analyses.pdf Markup Summary

Chaney (17)



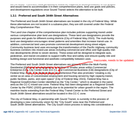
Subject: Cloud+
Page Label: 17
Author: Chaney
Date: 10/31/2023 3:06:06 PM
Status:
Color: 🟥
Layer:
Space:

Inaccurate and should be updated.



Subject: Cloud+
Page Label: 17
Author: Chaney
Date: 10/31/2023 3:06:13 PM
Status:
Color: 🟥
Layer:
Space:

Not accurate and should be updated



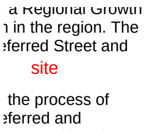
Subject: Cloud+
Page Label: 18
Author: Chaney
Date: 10/31/2023 3:10:01 PM
Status:
Color: 🟥
Layer:
Space:

Inaccurate, needs to be updated.

---

ne region. T
ed ~~Street~~ an

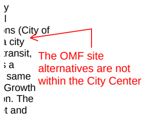
Subject: Line
Page Label: 18
Author: Chaney
Date: 10/31/2023 3:11:08 PM
Status:
Color: 🟥
Layer:
Space:



a Regional Growth
n in the region. The
eferred Street and
site
the process of
eferred and

Subject: Text Box
Page Label: 18
Author: Chaney
Date: 10/31/2023 3:11:16 PM
Status:
Color: 🟥
Layer:
Space:

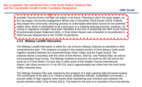
site



y
l
ns (City of
a city
ransit,
s a
same
Growth
n. The
t and
The OMF site alternatives are not within the City Center

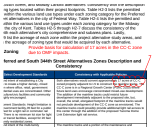
Subject: Callout
Page Label: 18
Author: Chaney
Date: 10/31/2023 3:12:22 PM
Status:
Color: 🟥
Layer:
Space:

The OMF site alternatives are not within the City Center



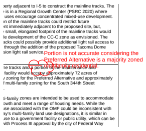
Subject: Cloud+
Page Label: 19
Author: Chaney
Date: 10/25/2023 12:18:27 PM
Status:
Color: 🟥
Layer:
Space:

this is outdated. Not mentioned here is the South Station Subarea Plan and the Countywide Growth Center Candidate Designation



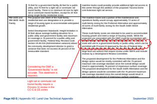
Subject: Cloud+
Page Label: 20
Author: Chaney
Date: 10/31/2023 2:57:24 PM
Status:
Color: 🟥
Layer:
Space:

Provide basis for calculation of 17 acres in the CC-C zone due to OMF impacts.



Subject: Cloud+
Page Label: 20
Author: Chaney
Date: 10/31/2023 3:00:14 PM
Status:
Color: 🟥
Layer:
Space:

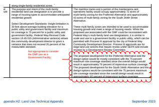
Portion is not accurate considering the Preferred Alternative is a majority zoned multifamily residential.



Subject: Cloud+
Page Label: 20
Author: Chaney
Date: 11/2/2023 4:41:16 PM
Status:
Color: 🟥
Layer:
Space:

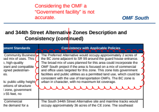
Considering the OMF a “Government facility” is not accurate. This statement is incorrect.

Light rail or commuter rail transit facility require a Process IV review in the CC-C & CE zones



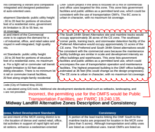
Subject: Cloud+
Page Label: 20
Author: Chaney
Date: 11/2/2023 4:38:34 PM
Status:
Color: 🟥
Layer:
Space:

Not appropriate to consider the OMF use as a Government Facility.



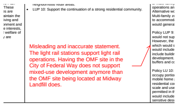
Subject: Cloud+
Page Label: 21
Author: Chaney
Date: 10/31/2023 3:03:13 PM
Status:
Color: 🟥
Layer:
Space:

Considering the OMF a “Government facility” is not accurate.



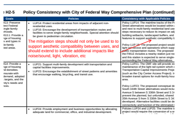
Subject: Cloud+
Page Label: 21
Author: Chaney
Date: 10/25/2023 12:34:59 PM
Status:
Color: 🟥
Layer:
Space:

Incorrect, the permitting use for the OMFS would be Public Transportation Facilities, per FWRC 19.240.135.



Subject: Callout
Page Label: 27
Author: Chaney
Date: 10/31/2023 3:38:41 PM
Status:
Color: 🟥
Layer:
Space:

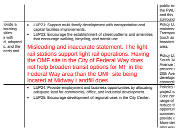
Misleading and inaccurate statement. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not support mixed-use development anymore than the OMF site being located at Midway Landfill does.



Subject: Callout
Page Label: 28
Author: Chaney
Date: 10/31/2023 3:37:22 PM
Status:
Color: 🟥
Layer:
Space:

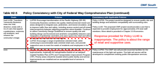
The mitigation steps should not only be used to to support aesthetic compatibility between uses, and should extend to include additional impacts like noise/sound, light, vibration, etc

---



Subject: Text Box
Page Label: 28
Author: Chaney
Date: 10/31/2023 3:39:40 PM
Status:
Color: 🟥
Layer:
Space:

Misleading and inaccurate statement. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not help broaden transit options for MF in the Federal Way area than the OMF site being located at Midway Landfill does.



Subject: Cloud+
Page Label: 30
Author: Chaney
Date: 11/2/2023 4:36:12 PM
Status:
Color: 🟥
Layer:
Space:

Response provided for Policy LU40 is inappropriate. The policy is about the range of retail and supportive uses.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
1	**Alternatives Considered** Page 2-16 • How can environmental impacts from TDLE be considered part of the "no-build" alternative if TDLE does not have an approved environmental document?	As stated in the Draft EIS, the No-Build Alternative represents the transportation system and environment as they would exist without the proposed project and provides a benchmark against which the build alternatives can be compared. It assumes the other Link light rail system improvements listed in Sound Transit 3 would be built, including extensions to West Seattle, Ballard, Everett, downtown Redmond, Issaquah, and Tacoma. The No-Build Alternative also assumes that the new North Corridor OMF would be constructed. Under the target schedule for Sound Transit's System Expansion Plan, each of these projects would be operating by 2042.
2	Page 3.2-8 • 20th Avenue S is listed incorrectly as 20th Avenue E. Please address.	The error has been corrected in the Final EIS.
3	Page 3.2-12 • Historical collision date was collected between January 2016 to December 2018. This should be updated with more current data.	The Final EIS relies on data from 2016 to 2018 as it provides a more conservative (higher) collision rate than data from 2020 and 2021, which reflect lower traffic volumes during the years of the COVID pandemic. As the project alternatives are not expected to result in impacts to traffic safety, the collision data do not have a bearing on decisions related to the alternatives.
4	• Intersections with a collision rate above 1.0 per MEV will need to be discussed in greater detail as to potential contributing factors.	As stated in Section 3.7 of Appendix G1, Transportation Technical Report, of the Final EIS no notable contributing factors were provided for the fatal and serious injury crashes for either of the study areas other than two due to driver inattention and one due to driver disregard for a traffic signal.
5	• Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.	Each OMF South alternative is analyzed with the same type of data and methodology to allow for an equal comparison among alternatives. Therefore, the societal cost of collisions per million entering vehicles (MEV) was not included in the analysis. The analysis assesses accidents currently occurring within the project limits for each alternative in terms of type, cause, and frequency in order to equally compare alternatives across jurisdictions, as described in the transportation section of the 2019 Environmental Technical Analysis Methods Report (Attachment G1-1 to Appendix G1, Transportation Technical Report, of the Final EIS) reviewed by the city of Federal Way in its capacity as a member of the Interagency Group.
6	Page 3.2-13 • It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.	The annual growth rate used for the OMF South analysis (0.8 percent) was based on the Puget Sound Regional Council travel demand model used for TDLE. Although TDLE ended up using a 0.5 percent annual growth rate for their analysis, OMF South continued to use a 0.8 percent annual growth rate to take a more conservative approach. The growth rate represents an average rate over the next 20 years, accounting for higher than average growth in some years and lower than average growth in others.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
7	• Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the signal timings?	Optimizing signal timing is a standard practice based on the assumption that agencies will update their signal timing at some point in the next 20 years. The study team met with the City of Federal Way on July 28, 2022, during which city staff confirmed this approach.
8	Page 3.2-14 • Routes 177 and 577 would still be faster than light rail for several years, so there will be opposition to discontinuing those routes.	Comment acknowledged. Sound Transit and King County Metro would evaluate the need to continue or reduce bus service along I-5 between Seattle and Federal Way as the Link system expands and service needs change.
9	Page 3.2-16 • A more comprehensive trip generation section needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips).	Estimates for the number of employees arriving and departing the site were determined by Sound Transit based on forecast staffing levels. The amount of freight traffic to and from the OMF site is anticipated to be minimal, particularly during the AM and PM peak hours, as deliveries would occur during off-peak hours. Therefore, freight traffic was not included in trip generation estimates from OMF South operations. Section 3.2, Transportation, in the Final EIS and Section 4.2.1.1 of Appendix G1, Transportation Technical Report, were updated to clarify this.
10	• Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns alone. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.	Travel demand modeling was not performed for this study. Many properties between S 336th Street and S 344th Street would be acquired as part of the OMF South project and the remaining trips that currently use 20th Avenue S were relocated. Given there are no other developments in the study area, it is reasonable to assume existing travel patterns to and from the study area would remain in the future.
11	Page 3.2-17 • It cannot be definitely stated that no new safety issues would be introduced and no existing safety issues would be exacerbated. Particularly given the elimination of north-south connectivity for non-motorized traffic in the South 344th Street Alternative.	Final EIS Section 3.2, Transportation, explains the reasons why the project is not expected to introduce new safety issues or exacerbate existing safety issues. If the South 344th Street Alternative were selected as the project to be built, Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street. Section 3.2.2.2, Long-Term Impacts (to Transportation), of the Final EIS has been updated to reflect this along with Section 4.2.3.6 of Appendix G1, Transportation Technical Report.
12	• The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	The Final EIS discusses Federal Way's street vacation process and requirements in Section 3.4, Land Use.
13	Page 3.2-18 • The description of the new 18th Avenue S intersection is not consistent with the provided site plan. The description and if applicable, the associated analysis, should be updated.	The intersection of 18th Place S would form an additional three-legged intersection with S 336th Street east of the three-legged intersection formed by 18th Avenue S and S 336th Street. It would not change the associated traffic analysis. This has been corrected in the Final EIS.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
14	• Parking study needs to be updated from the FWLE EIS to be consistent with ability to remove stalls without replacement. Does this include stalls removed for S324th culvert and roadway grade construction?	The parking analysis does not include stalls removed for grading and culvert installation at S 324th Street, which is part of Federal Way's City Center Access project. The removal of parking spaces associated with OMF South, including from the South 320th Street Park & Ride, would not affect the accommodation of parking demand by FWLE. The Federal Way Link Extension EIS identified that parking demand from FWLE would be accommodated through the parking provided at the Kent Des-Moines, Star Lake, and Federal Way Downtown stations, with excess parking available at the S 272nd Star Lake Station.
15	Page 3.2-19 – Table 3.2-6 • v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	SR 99 is a highway of statewide significance, so the intersections along SR 99 are measured against WSDOT standards for level of service (LOS). This is discussed in Section 3.2.1.2, Arterial and Street Operations, of the Final EIS. Using LOS standards for SR 99 intersections also allows an equal comparison of the impacts between OMF South alternatives in Kent and Federal Way.
16	• Intersection 10 (SR 99/Driveway) is no longer proposed as part of the preferred alternative.	This has been corrected in the Final EIS.
17	• Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-6. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Gate operations are discussed in Final EIS Section 3.2.2.2, Long-Term Impacts. All new trips to/from south of the OMF South Preferred Alternative site are expected to travel through the western driveway with the guard shack and through intersections #5, #6, and #8. No trips are expected to travel through intersection #9, and no new trips are expected to travel along S 341st Street east of the guard shack, so no new trips are expected to travel through either the 21st Avenue S/S 341st Place or 21st Avenue S Extension/S 344th Street intersection.
18	Page 3.2-20 – Table 3.2-7 • v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.
19	• 55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.	LOS E is defined as a delay of 60 to 80 seconds, as shown in Table 3.2-2 in Final EIS Section 3.2, Transportation. The traffic analysis has been updated for the Final EIS, and intersection #2 now has a delay of 49 seconds during the Preferred Alternative 2042 PM Peak Hour Traffic Operations (Table 3.2-7). The Synchro reports will be included with the Traffic Impact Report that will be submitted as part of the design review process during the final design phase of the project.
20	• Intersection 10 (SR 99/Driveway) is no longer proposed as part of the preferred alternative.	Please see response to Comment ID 16.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
21	- Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-7. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see response to Comment ID 17.
22	Page 3.2-21 and page 3.2-25 - Figure 3.2-7 and Figure 3.2-8 - This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.	These figures have been updated in the Final EIS to show the new intersections and roadway extensions. Intersection #11 (18th Place S Extension/S 336th Street) has been included in the analysis in the Final EIS.
23	Page 3.2-22 - The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see response to Comment ID 12.
24	Page 3.2-23 and page 3.2-24 - Table 3.2-8 and Table 3.2-9 - v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.
25	- If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.	Final EIS Appendix G1, Transportation Technical Report, and Section 3.2, Transportation, have been revised to remove intersection #10 from the South 344th Street Alternative analysis as it represents an intersection internal to the site. Tables 3.2-8 and 3.2-9 have been corrected.
26	Page 3.2-26 - This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved ped and cyclists along SR 99.	The design for the South 344th Street Alternative has not been advanced beyond the conceptual design used for the 2021 SEPA Draft EIS, as stated in Section 2.2.8 of the Final EIS. If the South 344th Street Alternative were selected as the project to be built, Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street. Data provided in Section 3.7 of Appendix G1, Transportation Technical Report, in the Final EIS show that most injury-related collisions between 2016 and 2018 involved motor vehicles, not pedestrians and bicyclists.
27	Page 3.2-32 – Table 3.2-13 - S 330th St is inappropriate for a haul route, as it is narrow, has a small traffic circle at 20th Ave S, and traverse’s residential areas with some areas of high parking utilization.	Comment acknowledged. Haul routes would be determined by the contractor during final design and coordinated with the City of Federal Way.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
28	Page 3.2-13 - In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.	The estimates for construction truck traffic were made to differentiate impacts between the three build alternatives and, particularly, between the three subsurface construction design options for the Midway Landfill Alternative. The number of construction workers traveling to and from the site cannot be estimated at this time because it would depend on several factors, primarily the construction means, methods, and schedule, which have not yet been determined.
29	- Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.	The number of construction workers traveling to and from the site cannot be estimated at this time because it would depend on several factors, primarily the construction means, methods, and schedule, which have not yet been determined. However, Sound Transit would require the contractor to develop a construction transportation management plan to address construction employee parking in accordance with Federal Way requirements, as stated in Section 3.2.2.4, Avoidance and Minimization of Impacts, of the Final EIS.
30	Page 3.2-35 - S 330th St is not an acceptable haul route.	Please see response to Comment ID 27.
31	Page 3.2-42 - Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network for both Federal Way alternatives.	Please see response to Comment ID 12.
32	**The following comments are related to Appendix C** Page 1 Additional support information is needed related to access for the proposed driveways for the midway landfill alternative. Support information for the proposed driveway widths and geometry is needed. Channelization and median improvements are needed on Pacific Hwy to support the new accesses.	Appendix C, Conceptual Design Drawings and Engineering Information, was intended to provide illustrative examples of the conceptual site designs for each OMF South alternative. The drawings are not to the level of detail required for formal submittals for permit approval and were not presented as such. Sound Transit has submitted design plans for the Preferred Alternative to Federal Way for review and will continue to address comments through ongoing design coordination should the Board select the Preferred Alternative or South 344th Street Alternative as the project to be built.
33	Page 11 - The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.	Please see response to Comment ID 32.
34	Page 12 - The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.	Please see response to Comment ID 32.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
35	- Location of track over/across S 322nd St may impact driver visibility of existing traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.	Please see response to Comment ID 32.
36	- Location of track over/across 23rd Ave S may impact driver visibility of traffic signal at S 322nd St/23rd Ave S intersection. Evaluate and mitigate, if needed.	Please see response to Comment ID 32.
37	Page 15 - Set gate further from 24th Ave S so that access ST maintenance vehicles can pull completely out of the roadway when opening the gate.	Please see response to Comment ID 32.
38	- Clarity is needed for a section of asphalt shown on the plans along 24th Avenue S near S 333rd St.	Please see response to Comment ID 32.
39	Page 16 - A proposed column is shown within the intersection of Winged Foot Way and Burning Tree Blvd. A revised location shall be provided	Please see response to Comment ID 32.
40	Page 17 and Page 19 - Adjustment to the location of the proposed sidewalk, curb, and landscape strip for 24th Ave S is required.	Please see response to Comment ID 32.
41	Page 22 - Adjustment is needed for the access to the WSDOT stormwater facility at 21st Ave S and S 344th St. Update design to represent the intended roadway curve. Revise the access to driveway standards.	Please see response to Comment ID 32.
42	Page 25 - A 10-foot clear zone is required from roadway edge to face of proposed retaining walls.	Please see response to Comment ID 32.
43	Page 27 - On-street parking is shown along the proposed 18th Place S. On-street parking is allowed provided that it is outside the prescriptive sight triangle of the intersection and does not result in impacts to adjacent critical areas.	Please see response to Comment ID 32.
44	- S 341st Place is incorrectly shown as S 340th St. Please correct.	Please see response to Comment ID 32.
45	Page 34 - The location of the track over/across the parking lot may impact the existing parking lot illumination. Evaluation and potential mitigation are needed as necessary.	Please see response to Comment ID 32.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
46	Page 37 - More evaluation is needed for access needs for existing properties adjacent to the proposed S 344th St Site alternative.	Please see response to Comment ID 32.
47	- Additional sidewalk connectivity is needed for a portion of the removed S 341st Place.	Please see response to Comment ID 32.
48	**The following comments are related to Appendix G1** Overall Comments: The analysis provided does not adequately analyze the preferred and 344th Street alternatives as not all new driveways/intersections are included and/or incorrect driveways are included. Additionally, v/c must be recorded for all intersections including those along State Routes as the City of Federal Way controls these intersections. There is insufficient information provided related to the existing land uses removed and traffic rerouted as a result of vacated streets. Supplemental trip generation analysis and volume figures should be provided to illustrate how these conditions impact the future volumes. Without this information it is not possible to validate the future volumes provided. Additional attachments must be provided including detailed trip generation information for the OMF South site and existing land uses; traffic counts; and Synchro worksheets. An updated parking analysis for the WSDOT 320th/23rd Ave park and ride needs to be completed to support removal of parking spaces consistent with the FWLE EIS that assumed use of this park and ride for LINK/Regional Transit riders.	These comments are addressed more specifically through responses to comments 49 through 97 below.
49	Page G1-i - The summary states that impacts may occur if the delay in an LOS F condition is worsened by more than 10 seconds. Please clarify the basis for this standard as it is not specified in Attachment A. Additionally, the City of Federal Way standards should be referenced here since they are based on v/c rather than LOS/delay.	As described in Section 3.2.3.1 in Final EIS Appendix G1, Transportation Technical Report, Sound Transit typically uses a 10-second or 10 percent additional delay threshold when determining whether mitigation is needed for intersections already operating at LOS F. This threshold is used because it represents the conditions when there would start to be a noticeable vehicle delay increase compared with the No-Build Alternative. The summary text has been corrected in the Final EIS to include Federal Way v/c standards.
50	Page G1-3 – Figure G1.1-2 - The extension of 18th Place S is described as intersection S 336th Street as the fourth (NB) leg of the 18th Ave S/S 336th St intersection, but the conceptual site plan does not depict it in this way due to the creek. It is assumed that a four-leg intersection is not feasible here and therefore the description/analysis should be revised accordingly.	The text has been revised in Section 4.2, Long-Term Impacts, in Final EIS Appendix G1, Transportation Technical Report, to reflect that the extension of 18th Place S would create a new three-legged intersection on the south side of S 336th Street.

City of Federal Way (Communication ID 539072)

Comment ID	Comment Text	Response
51	Page G1-20 • In section 3.2.3 Traffic Volumes, please clarify what "as applicable" means for the adjusted 2022 traffic volumes. For instance, was volume balancing between intersections a key factor?	Additional volume was added to select movements at intersections #2, #4, and #7 to account for the additional volume in 2022. This additional volume was distributed throughout the roadway system as applicable, meaning that this additional volume would not impact every intersection or movement. Volumes between intersections where there are no driveways was also balanced. Section 3.2.2 in Final EIS Appendix G1, Transportation Technical Report was updated to clarify this.
52	Page G1-21 – Figure G1.3-7 • During the AM peak hour, existing volumes at intersections 6 and 9 have decreased as compared to the 2021 DEIS resulting in greater volume imbalances between intersections in some cases. Please explain the change from the 2021 DEIS to the 2023 ADEIS	The AM peak hour volumes for intersections #6 and #9 used in the 2021 Draft EIS were incorrectly input. The updated volumes used for the transportation analysis in Appendix G.1, Transportation Technical Report, and Section 3.2, Transportation, in the Final EIS more accurately reflects the intersection counts collected in September 2019.
53	Page G1-29, G1-31, G1-58, and G1-60 – Table G1.3-9, Table G1.3-11, Table G1.4-1, and Table G1.4-3 • v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.
54	Page G1-44 • Under section 3.7 Safety, while it is acceptable to use collision data from 2016 to 2018 because collision data during the pandemic was atypical, many studies have found that collision rates were higher during the pandemic. Therefore, it may not be accurate to say that 2016 to 2018 collision data is more conservative	The 2016 to 2018 data are more conservative than the collision data from 2020 and 2021 because the 2016 to 2018 data showed higher collision frequencies.
55	Page G1-55 • Intersections with a collision rate above 1.0 per MEV will need to be discussed in greater detail as to potential contributing factors. Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.	Please see responses to Comment IDs 4 and 5.
56	Page G1-54 • Under section 4.1.1.2 Traffic Volumes, it is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.	Please see response to Comment ID 6.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
57	Page G1-55 • In the 2042 PM analysis there is a mention of a decrease in delay due to signal optimization. Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the signal timings? Additionally, you cannot look at one SR-99 intersection in a vacuum as the entire corridor is coordinated.	Please see response to Comment ID 7.
58	Page G1-68 • Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.	Please see response to Comment ID 10.
59	Page G1-69 • A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips).	Please see response to Comment ID 9.
60	Page G1-70 • Under section 4.2.1.5 Parking, please specify the approximate number of parking spaces this represents for each alternative.	These streets do not have delineated parking spaces, so it is difficult to estimate the number of spaces lost. Final EIS Appendix G1, Transportation Technical Report, gives estimates in the Parking subsection under the discussion of Long-Term Impacts for each build alternative, when possible. In most cases, developments that may currently use the on-street parking that would be removed would be acquired as part of the project.
61	Page G1-71 • Under section 4.2.1.6 Safety, this section should address the intersections with a collision rate over 1.0 collisions per MEV and discuss how the project may impact these locations. Additionally, if north-south non-motorized facilities would not be feasible as part of the 344th Street Alternative, safety would not improve for non-motorized users and could in fact worsen. Please elaborate	As described in Section 4.2 of Final EIS Appendix G1, Transportation Technical Report, the OMF South alternatives are not expected to result in any safety impacts to roadway intersections in the study area, including those with a crash rate greater than 1.0 collision per MEV. As described in Appendix G1 Section 4.2.3.6, Nonmotorized Facilities, the South 344th Street Alternative would result in the removal of the greenway between S 336th Street and S 344th Street, which would eliminate an existing north-south nonmotorized connection. If the South 344th Street Alternative were selected as the project to be built, Sound Transit would evaluate options for replacing the function of the greenway between S 336th Street and S 344th Street.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
62	Page G1-72 - The City of Federal Way's street vacation process should be referenced for both City of Federal Way alternatives as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see response to Comment ID 12.
63	- In section 4.2.2.1 regarding the extension of 18th Place S there is a section indicating that it would convert the existing S 336th St/18th Avenue S intersection into a four-legged intersection. This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.	Please see response to Comment ID 50.
64	- Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in section 4.2.2.2 Traffic Volumes	Section 4.2.2.2, Traffic Volumes, has been updated in Final EIS Appendix G1, Transportation Technical Report, to provide more information about trip generation projections for the Preferred Alternative and includes two new figures, Figures G1.4-7 and G1.4-8, that show existing trips to be removed and projected rerouted trips from roadway closures, respectively. Appendix G1 Section 4.2.3.2, Traffic Volumes has been similarly updated for the South 344th Street Alternative.
65	Page G1-73 – Figure G1.4-7 - In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-7).	Figures G1.4-7 and G1.4-8 in Final EIS Appendix G1, Transportation Technical Report, have been added that show existing trips to be removed and projected rerouted trips from roadway closures, respectively. (Figures G1.4-7 and G1.4-8 have been renumbered as Figures G1.4-9 and G1.4-10, respectively.)
66	- This figure should indicate new roadway extensions that are part of the preferred alternative.	This figure, now labeled Figure G1.4-9, has been updated in Final EIS Appendix G1, Transportation Technical Report to show the new intersections and roadway extensions.
67	- This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.	This figure, now labeled Figure G1.4-9, has been corrected in the Final EIS.
68	Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables.	Intersection #11 has been added to this figure in Final EIS Appendix G1, Transportation Technical Report, now Figure G1.4-9.

City of Federal Way (Communication ID 539072)		
Comment ID	Comment Text	Response
	Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures. Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.	All new trips to/from south of the OMF South Preferred Alternative site are expected to travel through the western driveway with the guard shack and through intersections #5, #6, and #8. No trips are expected to travel through intersection #9, and no new trips are expected to travel along S 341st Street east of the guard shack, so no new trips are expected to travel through either the 21st Avenue S/S 341st Place or 21st Avenue S Extension/S 344th Street intersection.
69	Page G1-74 – Figure G1.4-8 • This figure should indicate new roadway extensions that are part of the preferred alternative.	This figure, now labeled Figure G1.4-10, has been updated in Final EIS Appendix G1, Transportation Technical Report to show the new intersections and roadway extensions.
70	• This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections.	This figure, now labeled Figure G1.4-10, has been corrected in Final EIS Appendix G1, Transportation Technical Report
71	Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables.	Intersection #11 has been added to this figure, now labeled Figure G1.4-10 in Final EIS Appendix G1, Transportation Technical Report.
72	Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures.	Please see response to Comment ID 68.
73	It is also not clear how the rerouted vehicles from roadway closures are accounted for. For example, the no-build conditions show 85 vehicles exiting 20th Avenue S during the PM peak hour. However, there are only 15 additional right turns at intersection 1 and no additional left turns beyond project trips. While volumes for intersection 11 are not shown, based on the future volumes at intersection 1, it does not appear that additional trips are routed to intersection 11. If these trips would no longer exist due to land uses being removed, it is not clear from this analysis as no trip generation fore existing land uses to be removed is provided. A figure showing how existing traffic was removed and rerouted should be included. Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.	Please see response to Comment ID 64.
74	Page G1-75 – Table G1.4-10 • Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Table G1.4-10 has been corrected in Final EIS Appendix G1, Transportation Technical Report.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
75	- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.
76	- Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Gate operations are discussed in Section 4.2, Long-Term Impacts, in Final EIS Appendix G1, Transportation Technical Report. All new trips to/from south of the OMF South Preferred Alternative site are expected to travel through the western driveway with the guard shack and through intersections #5, #6, and #8. No trips are expected to travel through intersection #9, and no new trips are expected to travel along S 341st Street east of the guard shack, so no new trips are expected to travel through either the 21st Avenue S/S 341st Place or 21st Avenue S Extension/S 344th Street intersection.
77	Page G1-76 and G1-78 – Figure G1.4-9 and Figure G1.4-10 - This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be shown on the figure.	These figures, now labeled Figures G1.4-11 and G1.4-12, have been updated in Final EIS Appendix G1, Transportation Technical Report, to show the new site driveways, intersections, and roadway extensions.
78	Page G1-77 – Table G1.4-11 - 55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.	Please see response to Comment ID 19.
79	- Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Table G1.4-11 in Final EIS Appendix G1, Transportation Technical Report, has been corrected by removing intersection #10.
80	- v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.
81	- Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see response to Comment ID 76.
82	Page G1-79 - In section 4.2.2.6 Nonmotorized Facilities, it should be more clearly defined where and what bicycle and pedestrian improvements are proposed as part of the preferred alternative.	Section 4.2.2.6, Nonmotorized Facilities, in Final EIS Appendix G1, Transportation Technical Report, describes the proposed nonmotorized facilities for the Preferred Alternative based on the current preliminary design. If the Preferred Alternative is selected as the project to be built, these facilities will be more clearly defined as design progresses in coordination with Federal Way.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
83	• In section 4.2.2.8 Safety, the safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV.	Please see response to Comment ID 61.
84	Page G1-80 • In section 4.2.3.2 Traffic Volumes, information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.	Please see response to Comment ID 64.
85	Page G1-81 – Figure G1.4-11 • In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-11).	Figures G1.4-13 and G1.4-14 in Final EIS Appendix G1, Transportation Technical Report, have been added that show existing trips to be removed and projected rerouted trips from roadway closures, respectively. (Figures G1.4-11 and G1.4-12 have been renumbered as Figures G1.4-15 and G1.4-16, respectively.)
86	Page G1-82 – Figure G1.4-12 • Intersection 10 is mislabeled for both AM and PM peak hours.	Final EIS Appendix G1, Transportation Technical Report, and Section 3.2, Transportation, have been revised to remove intersection #10 from the South 344th Street analysis because it represents an intersection internal to the site. This figure, now labeled G1.4-16, has been corrected to remove intersection #10 from the analysis.
87	• If Intersection 1 is only providing access to the Christian Faith Church under build conditions, and little to no project trips are projected it is unlikely that this intersection would observe as much traffic as it does today. This analysis does not sufficiently account for (or sufficiently document) traffic that would be rerouted from 20th Avenue S due to the closure. As such, this analysis may not adequately consider additional impacts along SR 99 or 16th Street as a result. More broadly, a figure showing how existing traffic was removed and rerouted should be included.	Section 4.2.3.2 in Final EIS Appendix G1, Transportation Technical Report explains that existing trips from properties that would be acquired were removed and existing trips that would be rerouted due to changes in the roadway network were rerouted to other intersections or intersection movements. The existing trips from properties that would be acquired and the existing trips that would be rerouted due to changes in the roadway network are shown in Appendix G1 Figures G1.4-13 and G1.4-14, respectively.
88	Page G1-83 and G1-85 – Table G1.4-12 and Table G1.4-13 • If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.	Tables G1.4-12 and G1.4-13 in Final EIS Appendix G1, Transportation Technical Report, have been corrected to remove intersection #10 from the analysis.
89	• v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see response to Comment ID 15.

City of Federal Way (Communication ID 539072)		
Comment ID	Comment Text	Response
90	Page G1-84 – Figure G1.4-13 - If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-13).	This figure, now labeled G1.4-17 in Final EIS Appendix G1, Transportation Technical Report, has been corrected to remove intersection #10 from the analysis.
91	Page G1-86 – Figure G1.4-14 - If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.414).	This figure, now labeled Figure G1.4-18 in Final EIS Appendix G1, Transportation Technical Report, has been corrected to remove intersection #10 from the analysis.
92	Page G1-87 - In section 4.2.3.6 Nonmotorized Facilities, if the alternative eliminates the greenway between S 336th Street and S 344th Street this would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved pedestrians and cyclists along SR 99.	Please see responses to Comment IDs 61 and 26.
93	Page G1-88 - In section 4.2.3.8 Safety, the safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV. Additionally, this section should address non-motorized safety impacts associated with eliminating a north-south non-motorized connection.	Please see response to Comment ID 61.
94	Page G1-99 - In section 4.3.11 Estimation of Construction Truck Traffic, in addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.	Please see response to Comment ID 28.
95	Page G1-104 - In section 4.3.1.6 Impacts to Nonmotorized Facilities, please clarify how long north-south connectivity would be impacted as pedestrians and cyclists would shift to SR 99 under this scenario.	Based on the anticipated construction schedule, the greenway currently along 20th Avenue S could be impacted for over 4 years. However, as stated in Final EIS Section 3.2.2.4, Avoidance and Minimization of Impacts (to Transportation), and Section 4.4, Avoidance and Minimization Measures, of Appendix G1, Transportation Technical Report, Sound Transit would require the contractor to develop a construction transportation management plan to address site access and traffic control, including for bicycles and pedestrians, in accordance with Federal Way requirements.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
96	Page G1-105 - In Section 4.3.1.7 Impacts to Parking, please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.	Please see response to Comment ID 29.
97	Page G1-122 - In section 4.7 Long Term Mitigation Measures, consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.	Please see response to Comment ID 12.
98	**Social Resources, Community Facilities, and Neighborhoods** Page 3.6-8 - Belmor is a manufactured home community, zoned multifamily residential.	The sentence has been revised in Section 3.6.2.2 of the Final EIS to reflect this comment.
99	- Clarification is needed on the expected displaced residences. Provide methodology for calculating impacted residents and provide addresses.	As described in Section 3.3, Acquisitions, Displacements, and Relocations, of the Final EIS, Sound Transit used King County Assessor's data and aerial imagery in combination with the project operational and construction footprints to determine potential property impacts and displacements. In most cases, where the OMF South project footprint overlapped with a building (e.g., residence), it was assumed that the use would be displaced. The level of acquisition discussed in the EIS is provided for comparing alternatives. Estimates of displaced properties reflect the condition at the time the analysis was conducted. Because property uses change over time, the number and/or type of displacements could vary between what is described in the Final EIS and what would be required. Appendix H1, Potentially Affected Parcels, includes a table and maps showing the potentially affected parcels for each OMF South build alternative.
100	- What analysis went in to this conclusion? Airtime Aviation, Inc. is located in a custom designed building for the use. The impact to this business and others like it is inadequately evaluated.	The referenced text concerns the impacts of the Preferred Alternative to community cohesion. The Final EIS concludes that the displacement of businesses from the Preferred Alternative would not impact community cohesion due to the small size of the businesses and relative abundance of similar types of businesses in the study area.
101	Page 3.6-11 - In the environmental justice summary; country of origin and immigration status should also be considered.	The EJ analysis follows Executive Order 12898, U.S. Department of Transportation (DOT) Order on Environmental Justice, and the FTA Circular C-403.1. It uses definitions from the DOT order to define minority and low-income persons which are described in Section 1.1 of Final EIS Appendix E, Environmental Justice Assessment. FTA does not use country of origin or immigration status in its definition of EJ populations.

City of Federal Way (Communication ID 539072)

Comment ID	Comment Text	Response
102	**Economic and Fiscal Impacts** Page 3.5-1 - Clarification is required if the entire dataset in Section 3.5 “Economics” was calculated using King County level datasets or specific South King County Data Sets. South King County is defined as: Renton, Tukwila, SeaTac, Burien, Des Moines, Normandy Park, Kent, Auburn, and Federal Way.	As stated in Final EIS Section 3.5, Economics, regional economic activity, such as jobs and labor income, was evaluated for the Puget Sound region, including King, Kitsap, Pierce, and Snohomish counties. Potential displacement of business activity and tax revenues were evaluated at the city level for Federal Way and Kent. Economic data specific to only King County were not used in the evaluation.
103	- Using King County macro level data is not representative of the economic landscape of South King County as it relates to wages, demographics, type & size of industry, etc	See response to Comment ID 102.
104	**Land Use Impacts** There appear to be unaccounted for impacts from the preferred and S 344th St Alternatives related to affected parking, impacted businesses, and number of employees displaced. These need to be addressed. The use of the OMF site is inconsistent with the City's urbanizing vision. Address the lack of planning for a smaller footprint for the facility or planning for mixed use by either placing parking in structures thereby allowing for other use of a portion of the property or the use by others of air rights above any of the planned facilities. The possibility of such a project could offset the economic impact of prohibiting the development of 60 acres of strategically located commercial land to its highest and best use. Specific comments include:	These comments are addressed more specifically through responses to comments 105 through 107 below.
105	Page ES-11 Figure ES-4 - Apparent unaccounted for impact from the Preferred Alternative to the parking/loading in the northeast corner of the Spectrum Business Park. The EIS should determine if the required parking for the uses at the Spectrum Business Park will be impacted, reduced, or result in any non-conformance.	The reconstruction of S 340th Street (a private road) could require a temporary construction easement through the northeast corner of Spectrum Business Park. Neither the Preferred nor South 344th Street alternatives are anticipated to permanently impact parking or loading zones. The Spectrum Business Park is listed as a potentially affected parcel in Final EIS Appendix H-1.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
106	Page ES-19 - How was this calculated? What are the exact businesses that are being displaced? Is there a spreadsheet of this information? According to Washington State Department of Revenue there are significantly more 6 active business licenses that will be impacted. This misrepresentation also applies to the South 344th Street Alternative.	As stated in Section 3.3, Acquisitions, Displacements, and Relocations, of the Final EIS, Sound Transit used a geographic information system (GIS) to compare the proposed OMF South alternatives with King County parcel data and high-resolution aerial imagery to determine potential acquisitions and displacements for each build alternative. The potentially affected businesses were identified through King County assessor data and verified through windshield surveys, when possible, consistent with the EIS methodology reviewed by the city of Federal Way. As stated in Section 3.3, the level of acquisitions discussed provides information for comparing alternatives. Estimates of displaced properties reflect the conditions at the time the analysis was conducted. Because property uses change over time, the number and/or type of displacements could vary between what is disclosed in the Final EIS and what would be acquired.
107	- Provide methodology for how the number of employees impacted was calculated. These numbers do not accurately reflect the true number of active businesses that may be impacted and the actual number of impacted employees are likely underrepresented.	As explained in Final EIS Section 3.5, Economics, Table 3.5-5, Property Acquisition Impacts on Businesses and Employees (note 3), the number of displaced employees is based on the business building size (King County Department of Assessment data) and the type of business activity using square-foot-per-employee factors from the U.S. Department of Energy and the Institute for Transportation Engineers and not on an actual survey of businesses. The analysis for estimating employees assumes that the businesses are not abandoned or vacant.
108	**The following comments are related to Appendix C** Page 23 - Activation Zone parking spaces are not shown on this map, but shown in others. Plans should be consistent.	Please see response to Comment ID 32.
109	- This is the only time in the entire DEIS that the Activation Zone is mentioned, but does not include square footage, uses, benefits, impacts, etc. Additional information for the activation zone is required.	Please see response to Comment ID 32.
110	- Any impacts to existing uses shall be addressed including parking stall or loading zone displacement. The OMFS site shall not create any nonconformities.	Please see response to Comment ID 32.
111	- Maps should be consistent and the impacts to adjacent uses must be measured. It appears Spectrum Business Park parking is being displaced here. Provide more information on how these impacts will be mitigated and the creation of any nonconformities will be avoided.	Please see response to Comment ID 32.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
112	Page 27 • The activation zone should serve multi-modal travelers, including those arriving via vehicle. There must be parking available for the activation zone.	Please see response to Comment ID 32.
113	**The Following comments are related to Appendix H2** Page H2-2 • The reference information for the Federal Way Revised Code and Federal Way Comprehensive Plan are inaccurate and should be updated to reflect the current standards.	Section 1.2.2 of Final EIS Appendix H2, Land Use Technical Appendix, has been updated to reflect the current dates for local codes and comprehensive plans.
114	Page H2-3 • The preferred and South 344th St alternatives reference some smaller areas within the City Center Core land use designation. This is inaccurate and needs to be updated.	The mainline tracks are included as an element of both the Preferred and South 344th Street alternatives. The mainline tracks for both alternatives extend into The Commons at Federal Way mall and the S 320th Street Park & Ride, which are zoned City Center Core.
115	Page H2-4 • The section concerning the Tacoma Dome Link Extension is outdated and needs revision. Not mentioned here is the South Station Subarea Plan and the Countywide Growth Center Candidate Designation which should be included.	Appendix H2, Land Use Technical Appendix, has been revised in the Final EIS to include mention of the Countywide Growth Center Candidate designation and South Station Subarea Plan.
116	Page H2-5 – Table H2-1 • Please provide basis for calculation of 17 acres in the CC-C zone due to OMF impacts.	Acreages were calculated using GIS, overlaying the project boundaries on the zoning map.
117	• For the section concerning City of Federal Way Zone (RM-2400 and RM-3600: Multi-Family), it is not accurate to consider only a portion of the site as zoned multi-family. The preferred alternative is a majority zoned multi-family residential. Additionally, it is not appropriate to consider the OMF use as a Government Facility. Light rail or commuter rail transit facility require a Process IV review in the CC-C & CE zones.	Consistent with the comment, Section 1.3.1 of Appendix H2, Land Use Technical Appendix, to the Final EIS states, "The Preferred and South 344th Street alternatives are primarily within the Multi-Family Residential (RM) land use designation, in addition to smaller areas within Commercial Enterprise (CE), City Center Core (CC-C), and Commercial Business (CB) designations." Table H2-1 in Appendix H2, Land Use Technical Appendix, to the Final EIS has been updated to remove reference to the OMF as a government facility in the RM-2400 and RM-3600 zones and notes that it would be permitted as an essential public facility.
118	Page H2-6 – Table H2-1 • For the BC: Community Business and CE: Commercial Enterprise zones, the permitting use for the OMFS would be Public Transportation Facilities, per FWRC 19.240.135. Considering the OMF a “Government facility” is not accurate.	Table H2-1 in Appendix H2, Land Use Technical Appendix, to the Final EIS has been updated to remove reference to the OMF as a government facility in the BC and CE zones. The table notes that the OMF would be permitted as a light rail or commuter rail transit facility in the CE zone and as an essential public facility in the BC zone.

City of Federal Way (Communication ID 539072)		
Comment ID	Comment Text	Response
119	Page H2-12 – Table H2-5 - Under Policy LUP 9, the statement that the OMFS site supports light rail operation which would support mixed use development is misleading and inaccurate. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not support mixed-use development any more than the OMF site being located at Midway Landfill does.	Reference to LUP9 has been deleted from Final EIS Appendix H2, Land Use Technical Appendix.
120	Page H2-13 – Table H2-5 - Under Topic 2.7 Land Use Designations (Single Family). For Policy LUP14, the mitigation steps should not only be used to support aesthetic compatibility between uses, and should extend to include additional impacts like noise/sound, light, vibration, etc.	The environmental analysis did not identify any noise, vibration, or light impacts to adjacent residents from operation of the OMF site. Please see Section 3.9, Noise and Vibration, and Section 3.7, Visual and Aesthetic Resources, of the Final EIS.
121	- Under Topic 2.7 Land Use Designations (Multi-Family). It is inaccurate to state that this project helps broaden transit options for multi-family households in the Federal Way area. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not help broaden transit options for MF in the Federal Way area.	The proposed project supports Sound Transit’s goals to expand Link light rail service at planned service levels, including that provided by TDLE, which includes a station in South Federal Way. OMF South is necessary to support continued expansion of light rail service south through Federal Way to Tacoma.
122	Page H2-15 – Table H2-5 - The response provided for consistency with comprehensive Plan Policy LU40 is inappropriate. The policy is about the range of retail and supportive uses.	Comment acknowledged. The discussion of LU40 was removed from Final EIS Appendix H2, Land Use Technical Appendix.
123	**Visual and Aesthetic Resources** Page 3.7-7 - The i5 and Pac Hwy corridor in Federal Way consists of significant asphalt surfacing, removing trees within this area will have an increasingly negative impact on the City's urban heat index and citywide tree canopy coverage. Impacts to the urban heat index and the citywide tree canopy coverage should be evaluated between alternatives. Tree planting to meet the average Citywide canopy (35%) should be a target for this facility, if located in Federal Way.	Section 3.10, Ecosystems, of the Final EIS discusses the impacts associated with vegetation removal. Analysis of impacts to the urban heat index is not required by NEPA or SEPA and is not part of the methodology for the EIS that was reviewed by the city.
124	Page 3.7-11 – Figure 3.7-6 - The image shows redirected power lines. Confirm if this was intentional? Will they be redirected?	The power lines would be relocated.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
125	Page 3.7-16 – Figure 3.7-12 • The photo for the existing condition and simulation of proposed conditions appear to be the same. Confirm that no visual change is expected.	This Key Observation Point was selected because it is a major intersection near a site that would have a relatively large number of viewers. In the far right of the simulation, there is a new building shown.
126	Page 3.7-17 – Figure 3.7-14 • A cell tower appears to be removed in the simulation of proposed conditions. Confirm this removal and provide mitigation method for tower if removal is expected.	The tower is a broadcasting tower associated with the former office of Trinity Broadcasting, which no longer operates at this location.
127	**Noise and Vibration** Page 3.9-7 • Confirm the methodology and noise sources used in the noise analysis. Were the maintenance activity and testing of horns noise generators included in the projections?	As described in Final EIS Section 3.9, Noise and Vibration, and Appendix G2, Noise and Vibration Technical Report, Sound Transit modeled noise-generating activities that could be expected at the OMF site itself and on the mainline and test tracks. Noise and vibration from facility and mainline track operations were modeled using the methods described in the 2018 FTA Transit Noise and Vibration Impact Assessment Manual (FTA Report No. 0123). Noise-generating activities would include vehicles moving within the facility, vehicle washing and drying, a traction power substation, vehicles moving on the mainline track (for the Preferred Alternative and the S 344th Street Alternative) into service in the morning and back to the facility in the late evening, and operations on the test track. This included limited testing of train bells and horns. See Final EIS Section 3.9.2.2, Long-Term Impacts, Preferred Alternative.
128	• The evaluation of noise impacts shall measure and account for any increase in ambient Interstate 5 noise resulting from tree removal and sound barrier as part of the track construction for both the preferred and S 344th alternatives.	Potential impacts to noise walls are discussed in Final EIS Section 3.9, Noise and Vibration, under Section 3.9.2.2, Long-Term Impacts, Preferred Alternative. Modification of the existing berm and noise walls adjacent to I-5 would result in traffic noise impacts at about one to three residences in Belmor. Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing berm and noise wall. The limited number of tree removals would have no effect on noise levels.
129	**Ecosystems and Resources** Page 3.10-26 • Language indicates that ‘frontage improvements along S 336th Street to meet city standards may necessitate the installation of a replacement structure where West Fork Hylebos Tributary is crossed by the road.’ This should be changed to ‘must replace the culvert.’	Section 3.10, Ecosystem Resources, in the Final EIS has been clarified to say that the frontage improvements along S 336th Street would necessitate the installation of a replacement culvert at the crossing of West Fork Hylebos Tributary. Final design would confirm whether that specific structure would be affected and require replacement.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
130	Page 3.11-12 - Any impacts to wetlands related to the extension of 18th Place S shall be eliminated or demonstrated to the City that impacts have been minimized and mitigated.	Sound Transit will comply with all regulations concerning potential impacts to wetlands, including the federal 404(b)(1) analysis required by the Clean Water Act and City of Federal Way critical area ordinances. Avoidance and minimization of impacts will be part of the mitigation sequencing used during design and permitting of the project.
131	Page 3.11-19 - Any impacts to wetlands related to the extension of 18th Place S shall be eliminated or demonstrated to the City that impacts have been minimized and mitigated.	Please see the response to Comment ID 130.
132	**Cumulative Effects** Page 4-3 - There is a large tree canopy with mature trees that will be heavily impacted by the proposed 18th Place S extension as part of the preferred alternative. Currently as proposed neither OMFS sites in Federal Way will meet Tree retention requirements. Please address.	Potential impacts to vegetation are addressed in Section 3.10, Ecosystem Resources, and Section 3.7, Visual and Aesthetic Resources, in the Final EIS. If the Preferred Alternative is selected as the project to be built, Sound Transit will continue to work with Federal Way regarding city development requirements.
133	Page 4-8 - Within section 4.1 under transportation, the City Center Access Project for Federal Way is described as unfunded. This is incorrect, the construction phase is currently unfunded however the design and right of way is funded. Please adjust.	Section 4.4.1, Transportation, in Chapter 4, Cumulative Effects Analysis, in the Final EIS has been revised to reflect this comment.
134	Other sections of the report reference 610 jobs, rather than 470 jobs	The correction has been made to the Final EIS Fact Sheet.
135	City center access received funding for phase 1 design and ROW. I believe the Triangle Project also has current design funding.	The Final EIS has been modified to reflect this comment.
136	Why does the OMF site need to accommodate all of these LRVs when another OMF site is being planned for in the north. How is the OMF capacity being balanced across sites. A reduction in the minimum LRV capacity at OMFS should be able to reduce the land take, preserve more trees, reduce stream and wetland impact, and reduce impacts to neighboring residential uses.	As discussed in Section 2.1 of the Final EIS, Background and Project Development, Sound Transit 3 calls for a total fleet (existing plus new) of approximately 460 light rail vehicles (LRVs). To meet Sound Transit 3's system expansion goals, Sound Transit needs two additional operations and maintenance facilities: one in both the North and South Corridors. The proposed OMF South project will satisfy the need for an OMF in the South Corridor and LRV testing to support system expansion.
137	Why is preferred option most land intensive? 6 acres more than 344th St.	The acreage for each alternative is a function of the shape of the site and how efficiently the various OMF site components can fit within the site boundaries. As described in Final EIS Chapter 2, the Preferred Alternative is 66 acres, the South 344th Street Alternative is 64 acres, and the Midway Landfill Alternative is 68 acres.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
138	Although S 344th alternative has more facilities impacted, CFC is huge and this analysis does not access or account for the cumulative number of community members impacted.	The Final EIS discusses potential impacts to the Christian Faith Center in Section 3.3, Acquisitions, Displacements, and Relocations, and Section 3.6, Social Resources, Community Facilities, and Neighborhoods.
139	Provide methodology for calculating business displacement and provide list of those counted business. These number are under counting the true impacts	Please see the response to Comment ID 106.
140	Any changes to schedule beyond a standard 5 day, 8 hr daytime schedule will require approval by the City. Nighttime work may not be allowed due to proximity to residential properties.	Comment acknowledged.
141	[Section 3.2.1.4, in reference to “20th Avenue E”] S, not E	The error has been corrected in the Final EIS.
142	Routes 177 and 577 would still be faster than light rail for several years, so there will be opposition to discontinuing those routes.	Please see the response to Comment ID 8.
143	S 330th St is inappropriate for a haul route, as it is narrow, has a small traffic circle at 20th Ave S, and traverses residential areas with some areas of high parking utilization.	Please see the response to Comment ID 27.
144	S 330th St is not an acceptable haul route.	Please see the response to Comment ID 27.
145	[Chapter 4, Section 4.4.1] for construction. Design and R/W is funded.	Please see the response to Comment ID 135.
146	Intersections with a collision rate above 1.0 per MEV should be discussed in greater detail as to potential contributing factors. Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.	Please see the response to Comment IDs 4 and 5.
147	It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.	Please see the response to Comment ID 6.
148	Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the siganal timings?	Please see the response to Comment ID 7.
149	A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips)	Please see the response to Comment ID 9.

City of Federal Way (Communication ID 539072)		
Comment ID	Comment Text	Response
150	Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.	Please see the response to Comment ID 10.
151	It cannot be definitely stated that no new safety issues would be introduced and no existing safety issues would be exacerbated. Particularly given the elimination of north-south connectivity for non-motorized traffic in the South 344th Street Alternative.	Please see the response to Comment ID 11.
152	The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see the response to Comment ID 12.
153	This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.	Please see the response to Comment ID 50.
154	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
155	Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Please see the response to Comment ID 16.
156	Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-6. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see the response to Comment ID 17.
157	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
158	55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.	Please see the response to Comment ID 19.
159	Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Please see the response to Comment ID 16.
160	Additional new intersections and site access points are not included in the analysis and are not summarized in Table 3.2-7. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see the response to Comment ID 17.

City of Federal Way (Communication ID 539072)		
Comment ID	Comment Text	Response
161	This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.	Please see the response to Comment ID 22.
162	The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see the response to Comment ID 12.
163	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
164	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.	Please see the response to Comment ID 25.
165	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
166	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.	Please see the response to Comment ID 25.
167	This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be included in the analysis and shown on the figure.	Please see the response to Comment ID 22.
168	This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved ped and cyclists along SR 99	Please see the response to Comment ID 26.
169	In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.	Please see the response to Comment ID 28.
170	Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.	Please see the response to Comment ID 29.
171	Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.	Please see the response to Comment ID 12.
172	this last sentence seems out of context with the paragraph. What 1,000 SF building?	There would be a building associated with the test track. The previous sentence in Final EIS Section 2.2.8, Design Updates, mentions a test track facility separate from the OMF site. The description of the 1,000-square-foot building pertains to that facility.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
173	How can environmental impacts from TDLE be considered part of the "no-build" alternative if TDLE does not have an approved environmental document?	Please see the response to Comment ID 1.
174	should this 3-year time period be updated to more current?	Comment pertaining to traffic safety data. Please see response to Comment ID 3.
175	Parking study needs to be updated from the FWLE EIS to be consistent with ability to remove stalls without replacement. Does this include stalls removed for S324th culvert and roadway grade construction?	Please see the response to Comment ID 14.
176	these photos look the same	Please see the response to Comment ID 125.
177	cell tower removed?	Please see the response to Comment ID 126.
178	Were the maintenance activity and testing of horns noise generators analyzed? Is this like a automatic car wash... those dryers are loud. Seems to only be analysis of train movement (squeal). Mitigation?	Please see the response to Comment ID 127.
179	this should be a MUST vs. may replace the culvert.	Please see the response to Comment ID 129.
180	18th Pl S should not be "blamed" for wetland impacts. The project needs site can be modified/reduced to NOT require impacts to the wetland west of the preferred site.	Please see the response to Comment ID 130.
181	*[comment to delete the word “may” in reference to replacing the culvert]*	Please see the response to Comment ID 129.
182	site design needs to eliminate wetland impacts related to 18th Pl S; need to avoid encroachment	Please see the response to Comment ID 130.
183	Apparent unaccounted for impact from the Preferred Alternative to the parking/loading in the northeast corner of the Spectrum Business Park. The EIS should determine if the required parking for the uses at the Spectrum Business Park will be impacted, reduced, or result in any non-conformance.	Please see the response to Comment ID 105.
184	How was this calculated? What are the exact businesses that are being displaced? Is there a spreadsheet of this information? According to Washington State Department of Revenue there are way more 6 active business licenses that will be impacted. This also applies to the South 344th Street Alternative	Please see the response to Comment ID 106.
185	Provide methodology for how the number of employees impacted was calculated. I am concerned these numbers do not accurately reflect the true number of active businesses that may be impacted and undercount the actual number of impacted employees.	Please see the response to Comment ID 107.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
186	Provide more information regarding how this conclusion was arrived to. Are there no sensitive receptors?	Table ES-1, Key Characteristics and Impacts of the Build Alternatives in the Executive Summary is a summary of the EIS analysis. Section 3.9, Noise and Vibration, of the Final EIS and Appendix G2, Noise and Vibration Technical Report, include the requested information.
187	Belmor is a manufactured home community, zoned multifamily residential.	Please see the response to Comment ID 98.
188	This is 14, what is the remaining 1 unit? Provide methodology for calculating impacted residents and provide addresses.	Section 3.6.2 of the Final EIS has been revised to say, “The OMF site would also displace 15 residences, composed of one four-unit multi-family residential property and 10 single-family residential properties, one of which has two separate houses.”
189	What analysis went in to this conclusion? Airtime Aviation, Inc. is located in a custom designed building for the use. The impact to this business and others like it is inadequately evaluated.	Please see the response to Comment ID 100.
190	County of origin, immigration status should also be considered.	Please see the response to Comment ID 101.
191	There is already a lot of asphalt and concrete between the i5 and Pac Hwy corridor in Federal Way, Removing trees within this area will have an increasingly negative impact on the City's urban heat index and citywide tree canopy coverage. Impacts to the urban heat index and the citywide tree canopy coverage should be evaluated between alternatives.	Please see the response to Comment ID 123.
192	Image shows redirected power lines. Confirm if this was intentional? Will they be redirected?	Please see the response to Comment ID 124.
193	The evaluation of noise impact should measure and account for any increase in ambient I5 noise caused from tree removal and sound barrier as part of the track construction.	Please see the response to Comment ID 128.
194	There is a large tree canopy with mature trees that will be heavily impacted by the proposed 18th Place S Extension as part of the Preferred alternative. Currently as proposed neither OMF sites in Federal Way will meet Tree Retention requirements	Please see the response to Comment ID 132.
195	Please clarify the basis for this standard as it is not specified in Attachment A.	Please see the response to Comment ID 49.
196	Please clarify the basis for this standard as it is not specified in Attachment A. Additionally, the City of Federal Way standards should be referenced here since they are based on v/c rather than LOS/delay.	Please see the response to Comment ID 49.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
197	Overall Comments: • The analysis provided does not adequately analyze the preferred and 344th Street alternatives as not all new driveways/intersections are included and/or incorrect driveways are included. Additionally, v/c must be recorded for all intersections including those along State Routes as the City of Federal Way controls these intersections. • There is insufficient information provided related to the existing land uses removed and traffic rerouted as a result of vacated streets. Supplemental trip generation analysis and volume figures should be provided to illustrate how these conditions impact the future volumes. Without this information it is not possible to validate the future volumes provided. • Additional attachments must be provided including detailed trip generation information for the OMF South site and existing land uses; traffic counts; and Synchro worksheets.	Please see the response to Comment ID 48.
198	The extension of 18th Place S is described as intersection S 336th Street as the fourth (NB) leg of the 18th Ave S/S 336th St intersection, but the conceptual site plan does not depict it in this way due to the creek. It is assumed that a four-leg intersection is not feasible here and therefore the description/analysis should be revised accordingly.	Please see the response to Comment ID 50.
199	Please clarify what "as applicable" means. For instance, was volume balancing between intersections a key factor?	Please see the response to Comment ID 51.
200	During the AM peak hour, existing volumes at intersections 6 and 9 have decreased as compared to the 2021 DEIS resulting in greater volume imbalances between intersections in some cases. Please explain the change from the 2021 DEIS to the 2023 ADEIS.	Please see the response to Comment ID 52.
201	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
202	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
203	While it is acceptable to use collision data from 2016 to 2018 because collision data during the pandemic was atypical, many studies have found that collision rates were higher during the pandemic. Therefore it may not be accurate to say that 2016 to 2018 collision data is more conservative.	Please see the response to Comment ID 54.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
204	Intersections with a collision rate above 1.0 per MEV should be discussed in greater detail as to potential contributing factors. Additionally, the societal cost per MEV must be provided in the collision summary tables and discussed.	Please see the response to Comment ID 4 and 5.
205	It is noted that the annual growth rate is based on the growth rate used for TDLE traffic studies, but please specify what the basis for the assumed TDLE annual growth rate was. Typically, a higher annual growth rate closer to 1.25 percent has been used in the City of Federal Way.	Please see the response to Comment ID 6.
206	Was this signal timing optimization vetted with WSDOT and/or City of Federal Way? Are there other external factors outside of the study area that would impact the ability to optimize the siganal timings?	Please see the response to Comment ID 7.
207	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
208	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
209	Given that this is a long-range analysis, and that the evaluated alternatives result in major changes to the roadway network, it is not appropriate to base trip distribution assumptions on existing travel patterns along. Trip distribution patterns should be based on the regional travel model and adjusted as needed based on changes to the roadway network.	Please see the response to Comment ID 10.
210	A more comprehensive trip generation sections needs to be provided in this report. The appendices do not include detailed calculations and the methodology outlined here does not match with the methodology outlined in the appendices (i.e. trip generation does not appear to account for delivery-related trips or other non-employee trips)	Please see the response to Comment ID 9.
211	Please specify the approximate number of parking spaces this represents for each alternative.	Please see the response to Comment ID 60.
212	This section should address the intersections with a collision rate over 1.0 collisions per MEV and discuss how the project may impact these locations. Additionally, if north-south non-motorized facilities would not be feasible as part of the 344th Street Alternative, safety would not improve for non-motorized users and could in fact worsen. Please elaborate.	Please see the response to Comment ID 61.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
213	Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.	Please see the response to Comment ID 64.
214	This is not consistent with the provided site plan. The description and if applicable, the associated analysis should be updated.	Please see the response to Comment ID 50.
215	The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see the response to Comment ID 12.
216	In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-7)	Please see the response to Comment ID 65.
217	This figure should indicate new roadway extensions that are part of the preferred alternative.	Please see the response to Comment ID 66.
218	This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections. Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures. Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.	Please see the response to Comment IDs 67, 68, and 69.
219	This figure should indicate new roadway extensions that are part of the preferred alternative.	Please see the response to Comment ID 69.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
220	This figure shows intersection 10 as a new intersection, but intersection 10 no longer exists as part of the preferred alternative site plan based on Figure G1.1-2 and the roadway network description. If this driveway no longer exists, the volumes going through this intersection would need to be routed to other site access points and other study area intersections. Additionally, this figure does not show intersection 11 (18th Place S Extension/S 336th Street), but intersection is included in the LOS tables. Finally, the intersections of 21st Avenue S/S 341st Place and 21st Avenue S Extension/S 344th Street should be included in the analysis as well as future volume figures. It is also not clear how the rerouted vehicles from roadway closures are accounted for. For example, the no-build conditions show 85 vehicles exiting 20th Avenue S during the PM peak hour. However, there are only 15 additional right turns at intersection 1 and no additional left turns beyond project trips. While volumes for intersection 11 are not shown, based on the future volumes at intersection 1, it does not appear that additional trips are routed to intersection 11. If these trips would no longer exist due to land uses being removed, it is not clear from this analysis as no trip generation fore existing land uses to be removed is provided. A figure showing how existing traffic was removed and rerouted should be included. Overall, the analysis provided does not sufficiently analyze the operational impacts of the preferred alternative.	Please see the response to Comment IDs 70, 71, 72, and 73.
221	Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Please see the response to Comment ID 74.
222	Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see the response to Comment ID 76.
223	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
224	This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be shown on the figure.	Please see the response to Comment ID 77.
225	55 seconds of delay would typically indicate LOS E conditions. Without Synchro worksheets provided, it cannot be definitely confirmed that there are no impacts at this intersection. Please clarify.	Please see the response to Comment ID 19.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
226	Intersection 10 (SR 99/Driveway) is longer proposed as part of the preferred alternative.	Please see the response to Comment ID 16.
227	Additional new intersections and site access points are not included in the analysis and are not summarized in Table G1.4-10. All new site driveways and new intersections resulting from roadway extensions must be provided in this table.	Please see the response to Comment ID 17.
228	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
229	This figure should indicate the new roadway extensions that are part of the preferred alternative. Additionally, new intersections and site driveways must be shown on the figure.	Please see the response to Comment ID 77.
230	It should be more clearly defined where and what bicycle and pedestrian improvements are proposed as part of the preferred alternative.	Please see the response to Comment ID 82.
231	The safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV.	Please see the response to Comment ID 61.
232	Information regarding existing land uses to be removed and associated trip generation projections for those uses need to be provided in this section.	Please see the response to Comment ID 64.
233	The City of Federal Way's street vacation process should be referenced as it relates to the currently proposed roadway network and potential ongoing coordination.	Please see the response to Comment ID 12.
234	In addition to trip assignment, trip distribution figures should be included. Alternatively, trip distribution percentages could be illustrated on this figure (Figure G1.4-11)	Please see the response to Comment ID 85.
235	Intersection 10 is mislabeled for both AM and PM peak hours	Please see the response to Comment ID 86.
236	If Intersection 1 is only providing access to the Christian Faith Church under build conditions, and little to no project trips are projected it is unlikely that this intersection would observe as much traffic as it does today. This analysis does not sufficiently account for (or sufficiently document) traffic that would be rerouted from 20th Avenue S due to the closure. As such, this analysis may not adequately take into account additional impacts along SR 99 or 16th Street as a result. More broadly, a figure showing how existing traffic was removed and rerouted should be included.	Please see the response to Comment ID 87.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
237	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table.	Please see the response to Comment ID 88.
238	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
239	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-13)	Please see the response to Comment ID 90.
240	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown in this table	Please see the response to Comment ID 88.
241	v/c must be recorded for all intersections, including those along State Routes. City of Federal Way is in control of these intersections and therefore the v/c standard applies to them.	Please see the response to Comment ID 15.
242	If volume projections are included for intersection 10 (as shown on the previous figures), then the traffic operations results should be shown on this figure (Figure G1.4-14)	Please see the response to Comment ID 91.
243	This would have a significant impact as a north-south bicycle connection would not be possible and the majority of injury-related crashes involved pedestrians and cyclists along SR 99.	Please see responses to Comment IDs 26.
244	The safety section should address if the project would impact intersections that already have a crash rate greater than 1.0 collisions per MEV. Additionally, this section should address non-motorized safety impacts associated with eliminating a north-south non motorized connection.	Please see the response to Comment ID 61.
245	In addition to the impacts of truck activity, the impacts of trips related to workers traveling to and from the site should be quantified and discussed.	Please see the response to Comment ID 28.
246	Please clarify how long north-south connectivity would be impacted as pedestrians and cyclists would shift to SR 99 under this scenario.	Please see the response to Comment ID 95.
247	Please clarify how many workers would be traveling to and from the site and if there would be sufficient parking on-site for all workers to park.	Please see the response to Comment ID 29.
248	Consistent with the executive summary, the City's street vacation process should be referenced as an ongoing coordination effort related to the reconfiguration of the street network.	Please see the response to Comment ID 12.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
249	-an updated parking analysis for the WSDOT 320th/23rd Ave park and ride needs to be completed to support removal of parking spaces consistent with the FWLE EIS that assumed use of this park and ride for LINK/Regional Transit riders.	Please see the response to Comment ID 14.
250	cannot look at one SR99 intersection in a vacuum as the entire corridor is coordinated.	Please see the response to Comment ID 7.
251	Inaccurate and should be updated.	Please see the response to Comment ID 113.
252	Not accurate and should be updated	Please see the response to Comment ID 113.
253	Inaccurate, needs to be updated.	Please see the response to Comment ID 115.
254	Strike out of the word "street"	Appendix H2, Land Use Technical Appendix, to the Final EIS was revised to reflect this comment.
255	site Replacing where strikeout in previous comment was.	Please see the response to Comment ID 254.
256	The OMF site alternatives are not within the City Center	Please see the response to Comment ID 114.
257	this is outdated. Not mentioned here is the South Station Subarea Plan and the Countywide Growth Center Candidate Designation	Please see the response to Comment ID 115.
258	Provide basis for calculation of 17 acres in the CC-C zone due to OMF impacts.	Please see the response to Comment ID 116.
259	Portion is not accurate considering the Preferred Alternative is a majority zoned multifamily residential.	Please see the response to Comment ID 117.
260	Considering the OMF a “Government facility” is not accurate. This statement is incorrect. Light rail or commuter rail transit facility require a Process IV review in the CC-C & CE zones	Please see the response to Comment ID 117.
261	Not appropriate to consider the OMF use as a Government Facility.	Please see the response to Comment ID 118.
262	Considering the OMF a “Government facility” is not accurate.	Please see the response to Comment ID 118.
263	Incorrect, the permitting use for the OMFS would be Public Transportation Facilities, per FWRC 19.240.135.	Please see the response to Comment ID 118.
264	Misleading and inaccurate statement. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not support mixed-use development anymore than the OMF site being located at Midway Landfill does.	Please see the response to Comment ID 119.
265	The mitigation steps should not only be used to to support aesthetic compatibility between uses, and should extend to include additional impacts like noise/sound, light, vibration, etc.	Please see the response to Comment ID 120.

City of Federal Way (Communication ID 539072)		
Comment ID	**Comment Text**	**Response**
266	Misleading and inaccurate statement. The light rail stations support light rail operations. Having the OMF site in the City of Federal Way does not help broaden transit options for MF in the Federal Way area than the OMF site being located at Midway Landfill does.	Please see the response to Comment ID 119.
267	Response provided for Policy LU40 is inappropriate. The policy is about the range of retail and supportive uses.	Please see the response to Comment ID 122.

Public Commenters

In the interest of privacy, personal phone numbers and email addresses have been redacted.

Barry Turnbull

[redacted]
right across the street from Casey Treats building and I'm affected by the new ruling that you're going to make and I'm in favor of the South 344th Street Alternative and the reason why is the the preferred alternative is kinda crowded in to one different area but the 344th goes down the freeway and it has more towards the freeway whereas the other one is all on the land. It's crowded in there it's spread out on 344thth. I'm sorry if I got you confused but 344th is the one I wanna go for. Thank you very much. I left my address and let me know. Thank you. Bye bye."

Barry Turnbull (Communications ID 537037)		
Comment ID	**Comment Text**	**Response**
1	I live right across the street from Casey Treats building and I'm affected by the new ruling that you're going to make and I'm in favor of the South 344th Street Alternative and the reason why is the preferred alternative is kinda crowded in to one different area but the 344th goes down the freeway and it has more towards the freeway whereas the other one is all on the land. It's crowded in there it's spread out on 344thth. I'm sorry if I got you confused but 344th is the one I wanna go for.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Wrong streets listed?

Glenn Sawyer [redacted]
Wed 9/27/2023 12:25 PM
To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

On your website for the south operational proposals, you list 18th Avenue Southwest.
It is nowhere near this project. It should say 18th Avenue South.

Glenn Sawyer (Communications ID 537189)		
Comment ID	**Comment Text**	**Response**
1	On your website for the south operational proposals, you list 18th Avenue Southwest. It is nowhere near this project. It should say 18th Avenue South.	Thank you for your comment; this was corrected to 18th Place South on the website.

Communication ID: 537204

OMF South NEPA DEIS OOH Comment 1

09/22/2023

To put it simply, the preferred alternative is the only way to go here. The sight should be selected and it should get up and running as soon as possible to support Link operations.

Anonymous/OOH (Communications ID 537204)		
Comment ID	**Comment Text**	**Response**
1	To put it simply, the preferred alternative is the only way to go here. The sight should be selected and it should get up and running as soon as possible to support Link operations.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537207

OMF South NEPA DEIS OOH Comment 2

09/22/2023

The shrub scrub wetlands and forested wetland to the west of the new proposed road in the preferred alternative really should be maintained and improved as mitigation for the projects rather than turned to landscaping and buying into a mitigation bank elsewhere or attenpting mitigation elsewhere. Impacts to the hylebos watershes should also be mitigated within the watershed to improve water storage and fish passage especially since this project has so many impacts within the watershed. Additional flood storage should be planned for for the likely beaver deonfliction that will arise in the future along that section of the stream in the project site as well. Since this project has also disproportianately impacted so many low income and protected people in the South sound particularly compared to the north and east extensions, special consideration should be given to the people sound transit continues to displace from their homes and value assessments from 3rd party assessors should be made more accessible as should the process to counter the valuations provided by sound transits assessors. Furthermore, in the interest of sound transit being better stewards of tax payer funds, additional consideration to staying within budget, and measures for staying within budget when unforseen project challenges arise should be implemented into the project contracts.

Anonymous/OOH (Communications ID 537207)		
Comment ID	**Comment Text**	**Response**
1	The shrub scrub wetlands and forested wetland to the west of the new proposed road in the preferred alternative really should be maintained and improved as mitigation for the projects rather than turned to landscaping and buying into a mitigation bank elsewhere or attempting mitigation elsewhere. Impacts to the Hylebos watershed should also be mitigated within the watershed to improve water storage and fish passage especially since this project has so many impacts within the watershed. Additional flood storage should be planned for for the likely beaver deonfliction that will arise in the future along that section of the stream in the project site as well.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Since this project has also disproportionately impacted so many low income and protected people in the South sound particularly compared to the north and east extensions, special consideration should be given to the people sound transit continues to displace from their homes and value assessments from 3rd party assessors should be made more accessible as should the process to counter the valuations provided by sound transits assessors.	Please see the response to Common Comment 2 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	Furthermore, in the interest of sound transit being better stewards of tax payer funds, additional consideration to staying within budget, and measures for staying within budget when unforeseen project challenges arise should be implemented into the project contracts.	Sound Transit will implement measures to control costs and manage the budget throughout the design and construction phases of the project. These include risk assessments, value management reviews, and value engineering evaluations and conditions in the contract for contract amendments, change orders, and unforeseen circumstances.

Communication ID: 537209

OMF South NEPA DEIS OOH Comment 3

09/22/2023

Jacob Davidson

Hi. I live at 1830 S. 336th St in federal way. I'm Really concerned about this project effecting traffic and and damage to our natural areas. We have creeks and West lands. I'm also concerned that the noise from the facility will be horrible and affect my quality of life. The traffic and dust from semi is also a concern. It seems mid way would be the best option as it affects the least amount of people. I'm concerned my property value will go down, I won't be able to sell if i wanted. What will sound transit to to mitigate the affects of our property. The noise during construction and after, traffic property values. I'm very concerned that the facility will be noise 24 7 and have a negative affect on our quality of life. I would ask for more trees to be planted around facility and along 336th as well as requesting a noise study. Being we would be directly across for the facility we may need to upgrade our windows and insulation to ensure our homes are unchanged as far ad noise. .

Jacob Davidson (Communications ID 537209)		
Comment ID	**Comment Text**	**Response**
1	I live at 1830 S. 336th St in federal way. I'm Really concerned about this project effecting traffic and damage to our natural areas. We have creeks and West lands.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, and Section 3.10, Ecosystems, of the Final EIS for more detail about impacts and mitigation measures concerning natural resources. Please see Section 3.2, Transportation, for more detail about anticipated impacts and mitigation measures concerning traffic.
2	I'm also concerned that the noise from the facility will be horrible and affect my quality of life.	Please see response to Comment ID 5 below.
3	The traffic and dust from semi is also a concern.	Potential construction impacts are addressed in Section 3.2, Transportation, and Section 3.8, Air Quality, in the Final EIS. The contractor would be required to use project controls and best management practices to reduce impacts to air quality, including dust.
4	It seems mid way would be the best option as it affects the least amount of people.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
5	I'm very concerned that the facility will be noise 24 7 and have a negative affect on our quality of life. I would ask for more trees to be planted around facility and along 336th as well as requesting a noise study. Being we would be directly across for the facility we may need to upgrade our windows and insulation to ensure our homes are unchanged as far ad noise.	As part of the EIS, Sound Transit conducted a noise and vibration analysis. The findings of the analysis are summarized in Section 3.9, Noise and Vibration, of the Final EIS and described in more detail in Appendix G2, Noise and Vibration Technical Report. Based on the current design, the OMF South facility for all the alternatives would not have noise impacts to nearby sensitive receptors. Noise impacts from the mainline guideway would be mitigated following Sound Transit's Link Light Rail Noise and Vibration Policy. Section 3.7, Visual and Aesthetic Resources, includes simulations that show the proposed landscaping for the site, which includes a large number of trees and other vegetation to help screen the facility from view.

Communication ID: 537210

OMF South NEPA DEIS OOH Comment 4

09/23/2023

Please put the OMF on the Midway landfill site. This is exactly the type of government project that is worth spending the additional time and dollars for. Look at how many business, residences are not displased, and how many streams and wetlands are not impacted. This site would probably never be used for private business and will remain under utilzed and an eyesore for decades to come. The alternative sites could make a bigger impact to mass transit by being rezoned for MFH, with quick access to mass transit/light rail access. Thank you.

Anonymous/OOH (Communications ID 537210)		
Comment ID	**Comment Text**	**Response**
1	Please put the OMF on the Midway landfill site. This is exactly the type of government project that is worth spending the additional time and dollars for. Look at how many business, residences are not displaced, and how many streams and wetlands are not impacted. This site would probably never be used for private business and will remain under utilized and an eyesore for decades to come.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The alternative sites could make a bigger impact to mass transit by being rezoned for MFH, with quick access to mass transit/light rail access.	The OMF is a maintenance facility and would not provide any public access to the Link light rail system. Zoning and comprehensive plan designations are discussed in Section 3.3, Land Use, of the Final EIS. Note that Sound Transit does not have jurisdiction over local agency zoning.

Communication ID: 537211

OMF South NEPA DEIS OOH Comment 5

09/23/2023

Please reconsider the Midway site for your primary site. The environmental, residential, and business impact is minimal compared to the other sites. This is how we want government to spend funds, utilizing sites that the public sector won't. Who is going to buy that eyesore? You don't have to tear down any trees or take away any wetlands. I know there is other considerations but I really think it is a better utilization of space for both communities

Anonymous/OOH (Communication ID 537211)		
Comment ID	**Comment Text**	**Response**
1	Please reconsider the Midway site for your primary site. The environmental, residential, and business impact is minimal compared to the other sites. This is how we want government to spend funds, utilizing sites that the public sector won't. Who is going to buy that eyesore? You don't have to tear down any trees or take away any wetlands. I know there is other considerations but I really think it is a better utilization of space for both communities	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537212

OMF South NEPA DEIS OOH Comment 6

09/26/2023

Eric Johnson,Eric Johnson

Amphibian populations are declining worldwide, and amphibians are experiencing high extinction rates due to habitat loss, chytrid fungus, pollutants, pesticides, and climate change. Amphibians are the most threatened class of vertebrates and merit special attention in the Sound Transit Operations and Maintenance Facility South Project Environmental Impact Statement (EIS). The EIS should identify amphibian habitat and potential impacts to amphibians. Where possible, the project should minimize impacts to wetland, stream, and forest habitats. The project's proposed detention and treatment of stormwater runoff appears to be a good practice to protect water quality and reduce impacts to amphibians. References: Catenazzi, A. 2015. State of the World's Amphibians. Annual Review of Environment and Resources, 40, 911-119 Collins, J.P., and M.L. Crump. 2009. Extinction in Our Times: Global Amphibian Decline. New York, NY: Oxford University Press. Kolbert, E. 2014. The Sixth Extinction, an Unnatural History, Chapter 1. New York, NY: Bloomsbury. McCallum, M.L. 2007. Amphibian Decline or Extinction? Current Declines Dwarf Background Extinction Rate. Journal of Herpetology, Volume 41, Number 3, pp. 483-491.

Eric Johnson (Communication ID 537212)		
Comment ID	**Comment Text**	**Response**
1	Amphibian populations are declining worldwide, and amphibians are experiencing high extinction rates due to habitat loss, chytrid fungus, pollutants, pesticides, and climate change. Amphibians are the most threatened class of vertebrates and merit special attention in the Sound Transit Operations and Maintenance Facility South Project Environmental Impact Statement (EIS). The EIS should identify amphibian habitat and potential impacts to amphibians. Where possible, the project should minimize impacts to wetland, stream, and forest habitats. The project's proposed detention and treatment of stormwater runoff appears to be a good practice to protect water quality and reduce impacts to amphibians. References: Catenazzi, A. 2015. State of the World's Amphibians. Annual Review of Environment and Resources, 40, 911-119 Collins, J.P., and M.L. Crump. 2009. Extinction in Our Times: Global Amphibian Decline. New York, NY: Oxford University Press. Kolbert, E. 2014. The Sixth Extinction, an Unnatural History, Chapter 1. New York, NY: Bloomsbury. McCallum, M.L. 2007. Amphibian Decline or Extinction? Current Declines Dwarf Background Extinction Rate. Journal of Herpetology, Volume 41, Number 3, pp. 483-491.	The environmental analysis in the Final EIS considers potential impacts to amphibians. Please see Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, for more detail. There are no recent reports of the Western toad, a species of concern, near the study area. Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS for information on minimizing impacts to wetland, stream, and forest habitats.

Communication ID: 537213

OMF South NEPA DEIS OOH Comment 7

09/26/2023

Sue Cornell

Vote for preferred alternative at 336th St.

Sue Cornell (Communication ID 537213)		
Comment ID	**Comment Text**	**Response**
1	Vote for preferred alternative at 336th St.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537214

OMF South NEPA DEIS OOH Comment 8

09/27/2023

Glenn Sawyer

I would prefer the "Preferred Alternative" site. The city of Federal Way has already lost 53 acres of property tax revenue from the Christian Faith Center. Please do not chose the South 344th Alternative since it will take additional property tax revenue and take jobs and businesses away.

Glenn Sawyer (Communication ID 537214)

Comment ID	Comment Text	Response
1	I would prefer the "Preferred Alternative" site. The city of Federal Way has already lost 53 acres of property tax revenue from the Christian Faith Center.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Please do not chose the South 344th Alternative since it will take additional property tax revenue and take jobs and businesses away.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537215

OMF South NEPA DEIS OOH Comment 9

09/27/2023

The City of Federal Way Public Works Department often creates roadblocks to allowing projects within the City to complete quickly and efficiently which results in increased impacts to the traveling public and also increased environmental impacts due to longer project durations. These additional City requirements also result in added costs to taxpayers. What is ST doing to preemptively avoid this as part of the EIS and pre-project planning?

Anonymous/OOH (Communications ID 537215)		
Comment ID	**Comment Text**	**Response**
1	The City of Federal Way Public Works Department often creates roadblocks to allowing projects within the City to complete quickly and efficiently which results in increased impacts to the traveling public and also increased environmental impacts due to longer project durations. These additional City requirements also result in added costs to taxpayers. What is ST doing to preemptively avoid this as part of the EIS and pre-project planning?	Sound Transit has been closely coordinating with Federal Way on the preliminary design of the Preferred Alternative and will continue to do so if it or the South 344th Street Alternative are selected as the project to be built.

Communication ID: 537217

OMF South NEPA DEIS OOH Comment 10

09/27/2023

Dusty Wilson

I recognize that the Christian Faith Center site is preferred for a variety of good reasons ... not the least of which is cost. But I drive/walk by the abandoned Midway Landfill nearly every day and it is hard not to want to see it put to use. I think that is why you can't escape it remaining on the list. So, I have a suggestion. Instead of pouring over a billion dollars into that site, why don't you find a way to spend a million and turn it into a simple public park. Maybe there is an easy way to make it a useful space which would change it's image from "abandoned and vacant lot" to "community asset."   Our community benefits and you save millions of dollars and get to move on from this issue.

Dusty Wilson (Communications ID 537217)		
Comment ID	**Comment Text**	**Response**
1	I recognize that the Christian Faith Center site is preferred for a variety of good reasons... not the least of which is cost. But I drive/walk by the abandoned Midway Landfill nearly every day and it is hard not to want to see it put to use. I think that is why you can't escape it remaining on the list. So, I have a suggestion. Instead of pouring over a billion dollars into that site, why don't you find a way to spend a million and turn it into a simple public park. Maybe there is an easy way to make it a useful space which would change it's image from "abandoned and vacant lot" to "community asset." Our community benefits and you save millions of dollars and get to move on from this issue.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537218

OMF South NEPA DEIS OOH Comment 11

10/01/2023

Kay Vallejo

Midway landfill would be the smartest site, with less disruption of people and business. It is important to respect the citizens of the community you will disturb. Federal Way, is a large community of older residence, and the light rail will be a huge disruption enough, without a repair facility, too. Midway Landfill would be best! Thank You!

Kay Vallejo (Communications ID 537218)		
Comment ID	**Comment Text**	**Response**
1	Midway landfill would be the smartest site, with less disruption of people and business. It is important to respect the citizens of the community you will disturb. Federal Way, is a large community of older residence, and the light rail will be a huge disruption enough, without a repair facility, too. Midway Landfill would be best!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537672

OMF South NEPA DEIS OOH Comment 12

10/02/2023

Eduardo Munoz

Regardless of location i do agree on the preferred location! And Conection to pac highway..

Eduardo Munoz (Communications ID 537672)		
Comment ID	**Comment Text**	**Response**
1	Regardless of location i do agree on the preferred location! And Conection to pac highway.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 537673

OMF South NEPA DEIS OOH Comment 13

10/04/2023

Rick Barnett

I believe the preferred site is still be far the best choice. The property configuration, location and development options are the best. In addition, the current uses in that selection could have a much better chance to relocate in close proximity to existing locations. Overall less impact on business, homes and community. Thank You,

Rick Barnett (Communications ID 537673)		
Comment ID	**Comment Text**	**Response**
1	I believe the preferred site is still by far the best choice. The property configuration, location and development options are the best. In addition, the current uses in that selection could have a much better chance to relocate in close proximity to existing locations. Overall less impact on business, homes and community.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

NOT on the Midway Landfill

Fran Je [redacted]

Sun 10/8/2023 7:10 PM

To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

You don't often get email from memoimwen@gmail.com. Learn why this is important

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

To whom it may concern,

I live in the Federal Way High School neighborhood and I want to remind you that it would be hazardous to build on the Midway Landfill. Wherever you choose to build, DO NOT BUILD ON THE MIDWAY LANDFILL!

Sincerely.

Francois J. Ryf

Francois Ryf (Communication ID 537687)		
Comment ID	**Comment Text**	**Response**
1	I live in the Federal Way High School neighborhood and I want to remind you that it would be hazardous to build on the Midway Landfill. Wherever you choose to build, DO NOT BUILD ON THE MIDWAY LANDFILL!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Leota Miller

[redacted]
comment regarding the facility for the Link around 336th. I'm just in Federal way now since 1973 so it's been 50 years and I really feel like this spot down here would not be a good spot because Federal Way has not become a wonderful city because of all the homelessness and I feel like this facility would make it actually a worse city and we don't need any more noise or any more industry, large industry things down here in the city. I believe up in Des Moines would be a better
[redacted]
citizen down here in Federal Way for 50 years. I'm 78 years old, raise my children here and I feel like it would hinder the city. Thank you and goodbye."

Leotta Miller (Communications ID 537872)		
Comment ID	**Comment Text**	**Response**
1	The facility for the Link around 336th. I'm just in Federal way now since 1973 so it's been 50 years and I really feel like this spot down here would not be a good spot because Federal Way has not become a wonderful city because of all the homelessness and I feel like this facility would make it actually a worse city and we don't need any more noise or any more industry, large industry things down here in the city.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I believe up in Des Moines would be a better site	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 538026

OMF South NEPA DEIS OOH Comment 13

10/14/2023

Karl Hallesy

Best location for this is where you now have it. It is going to affect the least amount of people. Just get the review process done as inexpensive as possible because its going to happen just so much red tape increases the costs which increase our taxes.

Karl Hallesy (Communications ID 538026)		
Comment ID	**Comment Text**	**Response**
1	Best location for this is where you now have it. It is going to affect the least amount of people. Just get the review process done as inexpensive as possible because its going to happen just so much red tape increases the costs which increase our taxes.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

proposed light rail maintenance facility

Patricia Clayton [redacted]
Mon 10/16/2023 5:40 PM
To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

You don't often get email from [redacted]. Learn why this is important

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

I suggest the preferred alternative in brochure or the south 344th ....NOT the Midway Landfill. Thank you.

Patricia Clayton (Communications ID 538156)		
Comment ID	**Comment Text**	**Response**
1	I suggest the preferred alternative in brochure or the south 344th	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	NOT the Midway Landfill	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 538473

OMF South NEPA DEIS OOH Comment 14

10/16/2023

The Midway landfill location is best because it will be improving land that has been damaged. Both sites further south would have significant impact to habitat, wildlife and mature trees and forests. Please help preserve our great Evergreen State!

Anonymous/OOH (Communications ID 538473)		
Comment ID	**Comment Text**	**Response**
1	The Midway landfill location is best because it will be improving land that has been damaged. Both sites further south would have significant impact to habitat, wildlife and mature trees and forests. Please help preserve our great Evergreen State!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Bill Pugnetti

“Following the presentation today, I see the comment on impacts on businesses and residences and persons of different backgrounds, and it appears that the non minority person carries more weight than the majority person. Excuse me. It appears that the minority person carries more weight in considerations than a majority person. That seems like a level of discrimination and unbalanced consideration between the parties, so I'd like to call you out on that matter. That's an unbalanced approach. It's not individual by individual, but it's racial or other grounds that some persons are worth more than others in considering the handling of the project, so I see an unbalanced approach and a level of discrimination there. Thank you.”

Bill Pugnetti (Communications ID 538475 and 538479)		
Comment ID	**Comment Text**	**Response**
1	Stepping back from any one of the three OMFS alternatives and considering them overall. It appears the driving force behind building any one of them is support of operations from Federal Way on south. Which is predominately Pierce County. Given that Pierce County residents voted 'NO' on ST3, by what authority Legal - Constitutional (United States and Washington) - Moral - other is Sound Transit able to disregard the vote of Pierce County residents ?	OMF South would service the overall Sound Transit 3 system expansion in Pierce, Snohomish, and King counties. Sound Transit 3 was a regional measure that voters approved funding for in 2016.
2	Following the presentation today, I see the comment on impacts on businesses and residences and persons of different backgrounds, and it appears that the non minority person carries more weight than the majority person. Excuse me. It appears that the minority person carries more weight in considerations than a majority person. That seems like a level of discrimination and unbalanced consideration between the parties, so I'd like to call you out on that matter. That's an unbalanced approach. It's not individual by individual, but it's racial or other grounds that some persons are worth more than others in considering the handling of the project, so I see an unbalanced approach and a level of discrimination there.	Under federal and state environmental laws, agencies such as FTA and Sound Transit are required to identify disproportionate and adverse human health or environmental effects of programs, policies, and activities on minority and low-income populations and how those effects would be mitigated.

Patricia Pugnetti

“This is Patricia Pugnetti. In previous discussions on this subject, I, well, I'm wondering. You did not state how many people would be put out of jobs that were in existing companies that were in the 324th area like Garage Town, and there's small electronic companies there. Could you fill me in on that, please?”

Patricia Pugnetti (Communications ID 538480)		
Comment ID	**Comment Text**	**Response**
1	You did not state how many people would be put out of jobs that were in existing companies that were in the 324th area like Garage Town, and there's small electronic companies there. Could you fill me in on that, please?	Potential employment impacts are addressed in Final EIS Section 3.5, Economics. Please also see response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Operations & Maintenance & Facility location

Susan Strong [redacted]

Sun 11/5/2023 8:01 PM

To:OMF South <OMFsouth@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Your first choice to locate the O&M Facility is on the property currently being used by the Christian Faith Center, So 336th St and So 344th St, Federal Way. This is the wrong location for such an operation. As the Washington State Tribes stated in 2021: Tens of millions of dollars were spent on property acquisition, habitat, restoration, contaminant, cleanup sites, and stream enhancements located downstream below the 336th – 344th sites. Pipelines and underground drainage conveyances offer no means of water treatment or groundwater recharge whatsoever, and are therefore viewed as incompatible with fish recovery. Many reaches of the Hylebos Creek that were formally whetted year-round are now EPHEMERAL. Reduced flow conditions are more susceptible to thermal inputs and rapid heating which puts additional stress on fish populations. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribes.

Your last choice to locate the Facility is the Midway Landfill. The cities of Kent, Des Moines and Federal Way stand in unison and approve the Midway landfill location.

I believe that the Midway Landfill is the best location for this Facility. The contaminated soil needs to be completely removed. This would be similar to the Superfund site in Tacoma where the Asarco smelter left a toxic legacy in the soil, groundwater, and sediments in Puget Sound. The cleanup began in 1983 and continues to this day. The Midway contaminated soil needs to be completely removed, not covered over.

In conclusion, the wetlands of the Hylebos Creek need to be protected, and the Midway landfill needs to be completely removed and put to better use. One better use would be your Facility.

Sincerely, Susan Strong

FW Resident since 1975, Born in Seattle

Susan Strong (Communications ID 539015)		
Comment ID	**Comment Text**	**Response**
1	Your first choice to locate the O&M Facility is on the property currently being used by the Christian Faith Center, So 336th St and So 344th St, Federal Way. This is the wrong location for such an operation.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	As the Washington State Tribes stated in 2021: Tens of millions of dollars were spent on property acquisition, habitat, restoration, contaminant, cleanup sites, and stream enhancements located downstream below the 336th – 344th sites. Pipelines and underground drainage conveyances offer no means of water treatment or groundwater recharge whatsoever, and are therefore viewed as incompatible with fish recovery. Many reaches of the Hylebos Creek that were formally whetted year-round are now EPHEMERAL. Reduced flow conditions are more susceptible to thermal inputs and rapid heating which puts additional stress on fish populations. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribes.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	Your last choice to locate the Facility is the Midway Landfill. The cities of Kent, Des Moines and Federal Way stand in unison and approve the Midway landfill location. I believe that the Midway Landfill is the best location for this Facility. The contaminated soil needs to be completely removed. This would be similar to the Superfund site in Tacoma where the Asarco smelter left a toxic legacy in the soil, groundwater, and sediments in Puget Sound. The cleanup began in 1983 and continues to this day. The Midway contaminated soil needs to be completely removed, not covered over. In conclusion, the wetlands of the Hylebos Creek need to be protected, and the Midway landfill needs to be completely removed and put to better use. One better use would be your Facility.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

November 6, 2023

To: OMF South @ Erin Green

Sound Transit

401 Jackson Street

Seattle, WA 98104

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.

The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.

We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.

These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.

There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church.

Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave. The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species.

The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.

Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hyebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.

The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as **The Preferred** OMF site. They stand in opposition with the city of Federal Way for the construction of the OMFSouth at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.

The Executive Summary consistently refers to the S. 336th Site as THE PREFERRED site which feels like a deliberate attempt to persuade the reader/voting public. I do not feel this is a fair representation of the three options before us.

I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.

Kerry Lesinski (Communications ID 539016)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.	Sound Transit and FTA have updated Final EIS Appendix E, Environmental Justice Assessment, and Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, to discuss in greater detail the potential impacts to minority and low-income populations as well as project mitigation and benefits. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.

Kerry Lesinski (Communications ID 539016)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted.	An OMF would not have the same effects as a heavy industrial facility. The potential impacts of OMF South for the topics mentioned in the comment are described in Section 3.2, Transportation, and Section 3.9, Noise and Vibration, of the Final EIS.
6	The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave.	Appendix G1, Transportation Technical Analysis, and Section 3.2, Transportation, of the Final EIS have been updated to correct errors that were identified in the public comments. Potential impacts to emergency vehicle response times under the Preferred and South 344th Street alternatives are discussed in Section 3.14, Public Services.
7	The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, “we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Kerry Lesinski (Communications ID 539016)		
Comment ID	**Comment Text**	**Response**
8	Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Chapter 4, Cumulative Effects Analysis, discusses the potential cumulative impacts to each element of the environment, including ecosystem resources.
9	The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.	The Fife sites were eliminated from further consideration because they are farther than 1.5 miles south of the FWLE terminus and would not be able to efficiently connect to an operating light rail mainline track when OMF South opens. The complete results of the alternatives evaluation are summarized in the OMF South Alternatives Technical Memorandum (Sound Transit 2019c).

Operations and Maintenance Facility South

Share your thoughts on our Draft EIS findings for OMF South
Comparta sus opiniones sobre los hallazgos de nuestro borrador de la EIS para OMF Sur
Поделитесь своими мыслями о нашем проекте выводов EIS для OMF South
OMF South에 대한 Draft EIS 조사 결과에 대한 귀하의 생각을 공유하십시오.

Do you have new comments about our environmental analysis? ¿Desea compartir nuevos comentarios sobre nuestros análisis ambientales? 환경 분석에 대해공유하고 싶은 새로운 의견이 있으십니까? У вас есть новые комментарии по поводу проводимого нами экологического анализа?

[redacted]

Can we see more details on 55 mph option?
– We live in Unit 208
and online appears to be above our home.
Can we get more photos/plans, etc.?

CONTACT INFORMATION (OPTIONAL)/ INFORMACIÓN DE CONTACTO (OPCIONAL)/ КОНТАКТНАЯ ИНФОРМАЦИЯ (НЕОБЯЗАТЕЛЬНО)/ 연락처 정보(선택사항)

If you'd like us to notify you that we've included and responded to your comment in the Final EIS, please include your contact information.

Si desea que le notifiquemos que hemos incluido y respondido a su comentario en la EIS final, incluya su información de contacto.

Если вы хотите, чтобы мы уведомили вас о том, что мы включили ваш комментарий в окончательную версию EIS и ответили на него, укажите свою контактную информацию.

최종 EIS에 귀하의 의견을 포함하고 응답했음을 알리고 싶으시면 귀하의 연락처 정보를 포함해 주십시오.

Name/Nombre/Имя/이름 Miguel & Olivia Torres

Organization/Organización/o[redacted]

Address/Dirección/Адрес/주

Email/Correo electrónico/Эле

Phone number/Número de te

Miguel Torres, Olivia Torres (Communications ID539020)		
Comment ID	**Comment Text**	**Response**
1	Can we see more details on 55 mph option? We live in Unit 208 and online appears to be above our home. Can we get more photos/ plans, etc.?	Please see Final EIS Appendix C, Conceptual Design Drawings and Engineering Information, for the conceptual design plans for the 55 mph Design Option. A simulation of the alignment is included in Figure 3.7-5 of the Final EIS.

Operations and Maintenance Facility South

Share your thoughts on our Draft EIS findings for OMF South
Comparta sus opiniones sobre los hallazgos de nuestro borrador de la EIS para OMF Sur
Поделитесь своими мыслями о нашем проекте выводов EIS для OMF South
OMF South에 대한 Draft EIS 조사 결과에 대한 귀하의 생각을 공유하십시오.

Do you have new comments about our environmental analysis? ¿Desea compartir nuevos comentarios sobre nuestros análisis ambientales? 환경 분석에 대해공유하고 싶은 새로운 의견이 있으십니까? У вас есть новые комментарии по поводу проводимого нами экологического анализа?

I live in Belmor Park I have lived 4 yrs there I would not be affected but I am deeply concerned about the traffic effect, noise as to daytime, I understand people are being removed and Belmor snt cooperating as I know many have asked to have the mobiles moved elsewhere in the park, but were toed no open spots to move them plus some of the older people cant afford to move. and increase their debt I hope that Sound Transit pay them and not make them homeless

CONTACT INFORMATION (OPTIONAL)/ INFORMACIÓN DE CONTACTO (OPCIONAL)/ КОНТАКТНАЯ ИНФОРМАЦИЯ (НЕОБЯЗАТЕЛЬНО)/ 연락처 정보(선택사항)

If you'd like us to notify you that we've included and responded to your comment in the Final EIS, please include your contact information.

Si desea que le notifiquemos que hemos incluido y respondido a su comentario en la EIS final, incluya su información de contacto.

Если вы хотите, чтобы мы уведомили вас о том, что мы включили ваш комментарий в окончательную версию EIS и ответили на него, укажите свою контактную информацию.

최종 EIS에 귀하의 의견을 포함하고 응답했음을 알리고 싶으시면 귀하의 연락처 정보를 포함해 주십시오.

Name/Nombre/Имя/이름 Helen Price

Organization/Organización [redacted]

Address/Dirección/Адрес/

Email/Correo electrónico/

Phone number/Número de

Helen Price (Communications ID 539021)		
Comment ID	**Comment Text**	**Response**
1	I live in Belmor Park. I have lived 4 years there. I would not be affected but I am deeply concerned about the traffic effect, noise as to daytime	Final EIS Section 3.2, Transportation, and Section 3.9, Noise and Vibration, discuss traffic and noise impacts. No traffic or noise impacts were identified from OMF operations. Noise from LRVs traveling along the mainline would be fully mitigated. Modification of the existing berm and noise walls adjacent to I-5 would result in traffic noise impacts at about one to three residences in Belmor. Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing berm and noise wall.
2	I understand people are being removed and Belmor isn't cooperating as I know many have asked to have the mobiles moved elsewhere in the park, but were told no open spots to move them plus some of the older people can't afford to move and increase their debt I hope that Sound Transit pay them and not make them homeless.	Final EIS Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, outlines the process for compensation of property owners.

Operations and Maintenance Facility South

Share your thoughts on our Draft EIS findings for OMF South
Comparta sus opiniones sobre los hallazgos de nuestro borrador de la EIS para OMF Sur
Поделитесь своими мыслями о нашем проекте выводов EIS для OMF South
OMF South에 대한 Draft EIS 조사 결과에 대한 귀하의 생각을 공유하십시오.

Do you have new comments about our environmental analysis? ¿Desea compartir nuevos comentarios sobre nuestros análisis ambientales? 환경 분석에 대해공유하고 싶은 새로운 의견이 있으십니까? У вас есть новые комментарии по поводу проводимого нами экологического анализа?

A WALL SHOULD BE MORE THAN 4' IF I LOOK OUT MY WINDOW AND CAN WAVE AT EVERYONE.

THE RAIL LOOKS LIKE IT'S GOING OVER HOMES IN THE PARK, IS THIS THE CASE?

CONTACT INFORMATION (OPTIONAL)/ INFORMACIÓN DE CONTACTO (OPCIONAL)/ КОНТАКТНАЯ ИНФОРМАЦИЯ (НЕОБЯЗАТЕЛЬНО)/ 연락처 정보(선택사항)

If you'd like us to notify you that we've included and responded to your comment in the Final EIS, please include your contact information.

Si desea que le notifiquemos que hemos incluido y respondido a su comentario en la EIS final, incluya su información de contacto.

Если вы хотите, чтобы мы уведомили вас о том, что мы включили ваш комментарий в окончательную версию EIS и ответили на него, укажите свою контактную информацию.

최종 EIS에 귀하의 의견을 포함하고 응답했음을 알리고 싶으시면 귀하의 연락처 정보를 포함해 주십시오.

Name/Nombre/Имя/이름 TILENA CORQUR
Organization/Organización/орган
Address/Dirección/Адрес/주소
Email/Correo electrónico/Электр
Phone number/Número de teléfon

[redacted]

Tilena Cooper (Communications ID 539023)		
Comment ID	**Comment Text**	**Response**
1	A wall should be more than 4' if I look at my window and can wave at everyone. The rail likes like it's going over homes in the park. Is this the case?	The mainline track options for the Preferred and South 344th Street alternatives would be elevated mainline through the north end of Belmor before descending in elevation to travel at grade or on a retained fill slope through the south end of Belmor. The mainline would not travel directly over or immediately adjacent to any homes. Please see Figure 3.7-5 in Final EIS Section 3.7, Visual and Aesthetic Resources, for a conceptual rendering of the elevated mainline tracks through Belmor.

Operations and Maintenance Facility South

Share your thoughts on our Draft EIS findings for OMF South
Comparta sus opiniones sobre los hallazgos de nuestro borrador de la EIS para OMF Sur
Поделитесь своими мыслями о нашем проекте выводов EIS для OMF South
OMF South에 대한 Draft EIS 조사 결과에 대한 귀하의 생각을 공유하십시오.

Do you have new comments about our environmental analysis? ¿Desea compartir nuevos comentarios sobre nuestros análisis ambientales? 환경 분석에 대해공유하고 싶은 새로운 의견이 있으십니까? У вас есть новые комментарии по поводу проводимого нами экологического анализа?

How can you feel it is fair to dislocate SENIOR CITIZENS from their homes? There has to be a better route that wouldn't affect so many people. I think you felt the frustration in the room tonight. This is a terrible situation! These people felt they were in their "forever home" only to be forced out without any say in the matter. That's shameful?! This is a beautiful place and you are going to destroy our peace and tranquility – for what!!? I know I am just one person and I

(over)

CONTACT INFORMATION (OPTIONAL)/ INFORMACIÓN DE CONTACTO (OPCIONAL)/ КОНТАКТНАЯ ИНФОРМАЦИЯ (НЕОБЯЗАТЕЛЬНО)/ 연락처 정보(선택사항)

If you'd like us to notify you that we've included and responded to your comment in the Final EIS, please include your contact information.

Si desea que le notifiquemos que hemos incluido y respondido a su comentario en la EIS final, incluya su información de contacto.

Если вы хотите, чтобы мы уведомили вас о том, что мы включили ваш комментарий в окончательную версию EIS и ответили на него, укажите свою контактную информацию.

최종 EIS에 귀하의 의견을 포함하고 응답했음을 알리고 싶으시면 귀하의 연락처 정보를 포함해 주십시오.

Name/Nombre/Имя/이름 ______

Organization/Organización/организация/조직 ______

Address/Dirección/Адрес/주소 ______

Email/Correo electrónico/Электронная почта/이메일 ______

Phone number/Número de teléfono/Номер телефона/전화 번호 ______

can't influence Sound Transit at all. I just needed to let you know how you are affecting my family and many others. I think it's disgraceful!

Anonymous/Belmor Briefing (Communications ID 539026)		
Comment ID	**Comment Text**	**Response**
1	How can you feel it is fair to dislocate SENIOR CITIZENS from their homes? There has to be a better route that wouldn't affect so many people. I think you felt the frustration in the room tonight. This is a terrible situation! These people felt they were in their "forever home" only to be forced out without any say in the matter. That's shameful! This is a beautiful place and you are going to destroy our peace and tranquility – for what!!? I know I am just one person and I can't influence Sound Transit at all. I just needed to let you know how you are affecting my family and many others. I think it's disgraceful!	Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, outlines the process for compensation of property owners. The proposed mainline alignment location was determined through the TDLE alternative evaluation process, as detailed in the Tacoma Dome Link Extension Level 2 Alternatives Evaluation Report (Sound Transit 2019). Alternative alignments were ranked based on their ability to meet objectives, including (1) providing effective transportation solutions to meet mobility, access, and capacity needs; (2) supporting sustainable land use plans, transit-oriented development, and multimodal station access; (3) preserving the environment; and (4) supporting equitable mobility.

Operations and Maintenance Facility South

Share your thoughts on our Draft EIS findings for OMF South
Comparta sus opiniones sobre los hallazgos de nuestro borrador de la EIS para OMF Sur
Поделитесь своими мыслями о нашем проекте выводов EIS для OMF South
OMF South에 대한 Draft EIS 조사 결과에 대한 귀하의 생각을 공유하십시오.

Do you have new comments about our environmental analysis? ¿Desea compartir nuevos comentarios sobre nuestros análisis ambientales? 환경 분석에 대해공유하고 싶은 새로운 의견이 있으십니까? У вас есть новые комментарии по поводу проводимого нами экологического анализа?

My Name is Patricia M. Pugnetti – Born in Tacoma almost 75 years ago I remember my father reading the paper every night. We discussed what would happen to the Land fill area. I remember him saying that the city "fathers" were going to ~~use~~ relocate the "land fill area" for some special use that would benefit the citizen in the years to come. That was in the late 50's & 60's. We've waited all these years. Why not use it now! That we are not displacing homeowner or business. Yes I realize it cost more, but our representative seem to find push what they want through ~~the~~ dispite what others ~~what~~ want. Why not use this property Now.

CONTACT INFORMATION (OPTIONAL)/ INFORMACIÓN DE CONTACTO (OPCIONAL)/ КОНТАКТНАЯ ИНФОРМАЦИЯ (НЕОБЯЗАТЕЛЬНО)/ 연락처 정보(선택사항)

If you'd like us to notify you that we've included and responded to your comment in the Final EIS, please include your contact information.

Si desea que le notifiquemos que hemos incluido y respondido a su comentario en la EIS final, incluya su información de contacto.

Если вы хотите, чтобы мы уведомили вас о том, что мы включили ваш комментарий в окончательную версию EIS и ответили на него, укажите свою контактную информацию.

최종 EIS에 귀하의 의견을 포함하고 응답했음을 알리고 싶으시면 귀하의 연락처 정보를 포함해 주십시오.

Name/Nombre/Имя/이름 __________

Organization/Organización/организация/조직 __________

Address/Dirección/Адрес/주소 __________

Email/Correo electrónico/Электронная почта/이메일 __________

Phone number/Número de teléfono/Номер телефона/전화 번호 __________

Live my whole life in Tacoma, Federal Way area. Now your going to take away my property. In "Garage Round".

~~[illegible]~~ I feel like I am being cheeted out of ~~pal~~ part of my ~~[illegible]~~ life that I worked hard for. As a retired Boeing/Nasa employee of over 30 years. I don't think that you have been taugh to learn to your ~~[illegible]~~ history before you try to chang the present.

Patricia Pugnetti (Communications ID 539033)		
Comment ID	**Comment Text**	**Response**
1	I remember my father reading the paper every night. We discussed what would happen to the landfill area. I remember him saying that the city “fathers” were going to hold onto the “land” fill area for some special use that would benefit the citizens in the years to come. That was in the late 50’s + 60’s. We’ve waited all those years. Why not use it now! That we are not displacing homeowners or businesses. Yes I realize it cost more, but our representative seems to find push what they want thought despite what voters want. Why not use this property now.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Live my whole life in Tacoma, Federal Way area. Now your [sic] going to take away my property. In “Garage Town”. I feel like I am being cheated out of part of my life that I worked hard for.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Operations & Maintenance & Facility Location

Bob Strong [redacted]
Mon 11/6/2023 3:32 PM
To:OMF South <OMFsouth@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the "fish" button in Outlook. Thank you! ST Information Security

The following are comments regarding the proposed location of the Sound Transit OMF South Facility at the current location of a major church (Christian Faith) and school in Federal Way:

1. I recall that the down selection process for site location for this facility was interesting. One location was removed from consideration due to a Dick's Burgers being on the site. It's interesting how priorities (burgers over religion and education) and politics determine the location of infrastructure in this county/state.
2. The site with the least impact on **people** and the **environment** is the Midway Landfill site (full excavation option). The only logical and sensible solution for that land is to finally clean it up and use it for a practical purpose, such as OMF South. King County and /or the state of Washington should share in covering the cost of the cleanup of the site, then Sound Transit should build the facility on the cleaned up land after removal of the contaminated soil. There would be no displacement of churches, businesses, burger restaurants, schools, or impact to a sensitive environmental area (eg stream impacts, wetland impact or forest impact) (page ES-24 in the executive summary)
3. The cities of Federal Way, Kent and Des Moines have provided input that the Midway landfill site is the best location for OMF South. Please listen to their input.
4. The proposed site at the Christian Faith Center property would impact the Hylebos Creek and wetlands, without proper mitigation. The Washington State Tribes have pointed out that much money has been spent on this property for habitat restoration, containment , cleanup and stream enhancements located downstream below the 336th-344th sites. Pipelines and underground drainage offer no means of water treatment or groundwater recharge and are viewed as incompatible with fish recovery. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribes.
5. The Midway landfill site will not incur any real estate costs (which don't appear to be in the S. 336th st alternative estimate)

The Midway Landfill site is the obvious location for OMF South.

Thanks for your time.
Robert (Bob) Strong
Federal Way resident since 1981

Bob Strong (Communication ID 539034)		
Comment ID	**Comment Text**	**Response**
1	1. The cost estimates of the 3 options aren't that much different, especially when considering impact to people, streams, environment. The Midway/Kent option would take longer (perhaps) but impact the least people--- is the schedule really that important, given the delays already encountered?	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	2. What is the input from the Federal Way City Council and mayor?	The city of Federal Way submitted comment letters on both the 2021 SEPA Draft EIS and the 2023 NEPA Draft/SEPA Supplemental Draft EIS. See their comments and Sound Transit's responses in Appendix L1 above and in this appendix, L2.

Vickie Chynoweth

“Hello, my name is Vickie Chynoweth, and I guess I think about people more than I do about money. I think that the Midway Landfill would be the best alternative even though it's your lowest alternative here. When you start looking at the displacement for residential impact, it's zero on the Midway Landfill. If you look at the business displacement, there's only four, the community and social resource impacts, zero, estimated employee displacement, 43.You look at the other two, and it's all here. I don't need to read it, but this light rail system has been set back, set back, set back, and now you're saying it will take seven to eight years for us to build on the Midway Landfill. Well, let's get started now because it's been we were supposed to be done with Federal Way light rail in 2023. Then it was 2024. Then it was 2025. If we start now with the Midway Landfill, you could probably be done in seven or eight years, and we might be done with the Federal Way light rail. We're not going to be moving onto 356th or Tacoma for several years, so there's no need for the rush to displace all of these lives and businesses. Thank you.”

Vickie Chynoweth (Communications ID 539042)		
Comment ID	**Comment Text**	**Response**
1	I think that the Midway Landfill would be the best alternative even though it’s your lowest alternative here. When you start looking at the displacement for residential impact, it’s zero on the Midway Landfill. If you look at the business displacement, there’s only four, the community and social resource impacts, zero, estimated employee displacement, 43. You look at the other two, and it’s all here.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I don’t need to read it, but this light rail system has been set back, set back, set back, and now you’re saying it will take seven to eight years for us to build on the Midway Landfill. Well, let’s get started now because it’s been we were supposed to be done with Federal Way light rail in 2023. Then it was 2024. Then it was 2025. If we start now with the Midway Landfill, you could probably be done in seven or eight years, and we might be done with the Federal Way light rail. We’re not going to be moving onto 356th or Tacoma for several years, so there’s no need for the rush to displace all of these lives and businesses.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Michael Hoag

“Good evening, my name is Michael Hoag. I'm a Federal Way resident, and my biggest concern with the Midway Landfill is the uncertainties around everything I've read or heard about that, that we just don't know how much that's going to cost over time and how long it will take because of those costs over time.

I'm a big fan of really Option 1. I think that seems to have the most credence to me. Given the people who will have to be moved, that's part of really getting moving forward with this big project that we've been working on now for however many years and many years ahead of us still, so I'm a fan of Option 1.

I think that that makes a lot of sense, and I'm really looking forward to having the benefits of all the jobs of a maintenance facility supporting our community. Thank you.”

Michael Hog (Communications ID 539043)		
Comment ID	**Comment Text**	**Response**
1	Good evening, my name is Michael Hoag. I'm a Federal Way resident, and my biggest concern with the Midway Landfill is the uncertainties around everything I've read or heard about that, that we just don't know how much that's going to cost over time and how long it will take because of those costs over time.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	I'm a big fan of really Option 1. I think that seems to have the most credence to me. Given the people who will have to be moved, that's part of really getting moving forward with this big project that we've been working on now for however many years and many years ahead of us still, so I'm a fan of Option 1. I think that that makes a lot of sense, and I'm really looking forward to having the benefits of all the jobs of a maintenance facility supporting our community. Thank you.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Bill Pugnetti

“Hello, Bill Pugnetti, Auburn, Washington, and I certainly agree with the first commenter. That's very good. I'm looking at your figures you had for the residential and business displacements in the preferred location in South 344th. Residential on the preferred show a figure of 15, and on 344th you show a figure of 20. Now, 344th includes Garage Town, and what you're not reflecting in your figures is that Garage Town is an extension of households. Those are garages and not all, but many of the folks have an extension of their home there. They park their motorhome, their boat, extra cars, storage of just family items that they can't accommodate at home and a mix of those, hobby equipment, whatever it is.You do not reflect the impact that that is having on households by giving a figure of 20. It's not where they live, but it's their household operation, their lifestyle, and their planning to do appropriately. Also, there's our businesses in Garage Town. You don't reflect the impact on those businesses. An ice cream company has three to five locations in there, and I know the restaurant in Tacoma, they work out of there with their supplies and extra furniture. Your figures are lacking in the impact on households and businesses for South 344th. They do not reflect real impact.”

Bill Pugnetti (Communications ID 539044)		
Comment ID	**Comment Text**	**Response**
1	Hello, Bill Pugnetti, Auburn, Washington, and I certainly agree with the first commenter. That's very good. I'm looking at your figures you had for the residential and business displacements in the preferred location in South 344th. Residential on the preferred show a figure of 15, and on 344th you show a figure of 20. Now, 344th includes Garage Town, and what you're not reflecting in your figures is that Garage Town is an extension of households. Those are garages and not all, but many of the folks have an extension of their home there. They park their motorhome, their boat, extra cars, storage of just family items that they can't accommodate at home and a mix of those, hobby equipment, whatever it is. You do not reflect the impact that that is having on households by giving a figure of 20. It's not where they live, but it's their household operation, their lifestyle, and their planning to do appropriately. Also, there's our businesses in Garage Town. You don't reflect the impact on those businesses. An ice cream company has three to five locations in there, and I know the restaurant in Tacoma, they work out of there with their supplies and extra furniture. Your figures are lacking in the impact on households and businesses for South 344th. They do not reflect real impact	Please see the response to Common Comment 1 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Karen Brugato

“My name is Karen Brugato. I wanted to comment about the Midway Landfill. It was a logical choice for me. Down in Federal Way, we don't get just one. We get two light rail stations, and we get the OMF. That's three big chunks of land. I noticed Bellevue only has one station and a 25 acre OMF. Down in the central part of Seattle they have an OMF. It's 25 acres. The one in Federal Way is 66 acres. How can something be over twice as big? Maybe we should be called Sound Transit Way instead of Federal Way. I'm not quite sure, but if you notice, our representative on the Sound Transit board, Pete von Reichbauer, voted that it should be the OMF should be at the Midway Landfill. I think it should be there too. Please don't let money stand in the way. Don't let time stand in the way. In this day and age, grants are available. The administration is up for new things. Please have it be at the Midway Landfill for the OMF, thanks.”

Karen Brugato (Communications ID 539045)		
Comment ID	**Comment Text**	**Response**
1	I wanted to comment about the Midway Landfill. It was a logical choice for me	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	Down in Federal Way, we don't get just one. We get two light rail stations, and we get the OMF. That's three big chunks of land. I noticed Bellevue only has one station and a 25 acre OMF. Down in the central part of Seattle they have an OMF. It's 25 acres. The one in Federal Way is 66 acres. How can something be over twice as big? Maybe we should be called Sound Transit Way instead of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. In Bellevue, OMF East is approximately 28 acres, and there are six stations. In Seattle, OMF Central is approximately 25 acres. As described in Chapter 2, Alternatives Considered, OMF South needs to be at least 59 acres to accommodate the functions of the facility.
3	I'm not quite sure, but if you notice, our representative on the Sound Transit board, Pete von Reichbauer, voted that it should be the OMF should be at the Midway Landfill. I think it should be there too. Please don't let money stand in the way. Don't let time stand in the way. In this day and age, grants are available. The administration is up for new things. Please have it be at the Midway Landfill for the OMF, thanks.	Please see the response to Common Comments 4 and 5 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Suzanne Vargo

“Lots of things to say. I'm quite concerned with the fact that this site was brought up late in the game. They've been working on this since 2015 of where your OMF would go, and this site was never considered. I do believe it is a conflict of interest with Mr. Pete von Reichbauer, who presented this to Sound Transit. He is on the board, and he is personal friends with the owner of the church, so that seems rather convenient, and the timing was rather interesting. The citizens of Federal Way fought for four years for environmental protections and mitigations when the church was built, and I just don't understand how we are able to go back and take that same 20 percent 20 years later. That's not usually something that is done. The land belongs with a concomitant agreement that runs forever along with the Weyerhaeuser campus. There are recreational restrictions. There is storm water management restrictions and requirements and a few others that need to be considered. I am concerned about the petroleum pipeline that runs along South 336th. It was one of the reasons we were able to stop a toxic fish warehouse on the campus because of the heavy loads traversing over that road, so that is a great concern of when we were hauling. I'm a huge advocate for the Hylebos watershed, and it is my belief that the east branch, which actually feeds two watersheds, the Green River and the Hylebos, will be extinguished. You got comments from the Tribe. That's just a few of the things I'm concerned about. You've already bulldozed the land and done great harm at this point. Thank you so much.”

Suzanne Vargo (Communications ID 539046)		
Comment ID	**Comment Text**	**Response**
1	I'm quite concerned with the fact that this site was brought up late in the game. They've been working on this since 2015 of where your OMF would go, and this site was never considered. I do believe it is a conflict of interest with Mr. Pete von Reichbauer, who presented this to Sound Transit. He is on the board, and he is personal friends with the owner of the church, so that seems rather convenient, and the timing was rather interesting.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS. The South 336th Street Alternative (Preferred Alternative) was identified during the 2018 OMF South early scoping process. After an alternatives screening process and public and agency comments, in May 2019 the Sound Transit Board identified the South 336th Street Alternative for study in the Draft EIS, along with the South 344th Street Alternative and the Midway Landfill Alternative.
2	The citizens of Federal Way fought for four years for environmental protections and mitigations when the church was built, and I just don't understand how we are able to go back and take that same 20 percent 20 years later. That's not usually something that is done. The land belongs with a concomitant agreement that runs forever along with the Weyerhaeuser campus. There are recreational restrictions. There is storm water management restrictions and requirements and a few others that need to be considered. I am concerned about the petroleum pipeline that runs along South 336th. It was one of the reasons we were able to stop a toxic fish warehouse on the campus because of the heavy loads traversing over that road, so that is a great concern of when we were hauling. I'm a huge advocate for the Hylebos watershed, and it is my belief that the east branch, which actually feeds two watersheds, the Green River and the Hylebos, will be extinguished. You got comments from the Tribe. That's just a few of the things I'm concerned about. You've already bulldozed the land and done great harm at this point.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. A segment of the tributary to the East Fork Hylebos would be daylighted by the project under the Preferred Alternative. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek. Temporary impacts have occurred along the stream and buffer related to geotechnical borings. All appropriate permits and approvals were secured in advance of geotechnical investigations and temporarily disturbed soils have been restored.

Francine Martin

“Hello, my name is Francine Martin. I am not a resident of any of these areas. My father in law and my mother in law are. They have been residents at Belmor Park for almost 25 years. This Christmas day will be 24 years. I agreed with the first commenter. That was actually a very good statement that it should be the landfill because it's less impact to people like them. Mom is 75. Dad just turned 79. They've been there for, like I said, quite a while. It's their retirement home, and it's just too much of a personal impact for people like this. Actually, our daughter Marielle is with mom right now, and she's been going to that home to spend time with them since her birth. That's all she knows as far as where her grandparents live, and if that landfill is an option that won't disrupt their lives, that is something we definitely agree with.

We'd like for you folks to really consider the things, the place that will not impact families like ours. The Martins have been a stronghold in this community for quite a while, and we'd like to stay that way. Thank you.”

Francine Martin (Communications ID 539047)		
Comment ID	**Comment Text**	**Response**
1	I am not a resident of any of these areas. My father in law and my mother in law are. They have been residents at Belmor Park for almost 25 years. This Christmas day will be 24 years. I agreed with the first commenter. That was actually a very good statement that it should be the landfill because it's less impact to people like them.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Lawson Bronson

“My name is Lawson Bronson, and I've been a resident of Federal Way since 1973. I would like to again or I'd like to question why we're not looking at the Midway Landfill. I don't really understand why you're having so many problems with it. We were able to take the Asarco site, which had all sorts of terrible contamination, and we've now built four sets of condominiums over the top of that, and we can't put a work facility on the top of that landfill? It just doesn't make sense to me, and I'm an engineer by profession.”

Lawson Bronson (Communications ID 539048)		
Comment ID	**Comment Text**	**Response**
1	My name is Lawson Bronson, and I’ve been a resident of Federal Way since 1973. I would like to again or I’d like to question why we’re not looking at the Midway Landfill. I don’t really understand why you’re having so many problems with it. We were able to take the Asarco site, which had all sorts of terrible contamination, and we’ve now built four sets of condominiums over the top of that, and we can’t put a work facility on the top of that landfill? It just doesn’t make sense to me, and I’m an engineer by profession	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Susan Strong

“Hi, I'm Susan Strong. I moved here in 1975. I grew up in Seattle, and I remember going to the Midway dump with my dad. It was really exiting. The previous gentleman had a good point about the Asarco mess in Tacoma. They managed to clean that up. I think it was a Superfund or something, got a lot of money to help clean that up. They cleaned it up and built those million dollar condos over there. I wouldn't live over there, but those people are happy. The Midway Landfill can be cleaned up and used for this project. Thank you.

Susan Strong (Communications ID 539049)		
Comment ID	**Comment Text**	**Response**
1	I grew up in Seattle, and I remember going to the Midway dump with my dad. It was really exiting. The previous gentleman had a good point about the Asarco mess in Tacoma. They managed to clean that up. I think it was a Superfund or something, got a lot of money to help clean that up. They cleaned it up and built those million dollar condos over there. I wouldn’t live over there, but those people are happy. The Midway Landfill can be cleaned up and used for this project.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 539051

OMF South NEPA DEIS OOH Comment 16

10/31/2023

Eugene Onishchenko

The midway landfill in my opinion is the only way to go! It puts way less people out of employment and affects way less small business! It also does not affect the wetlands as much as the other 2 options!

Eugene Onishchenko (Communications ID 539051)		
Comment ID	**Comment Text**	**Response**
1	The midway landfill in my opinion is the only way to go! It puts way less people out of employment and affects way less small business! It also does not affect the wetlands as much as the other 2 options!	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 539052

OMF South NEPA DEIS OOH Comment 17

10/31/2023

Russ Hibbard

If you take my property located at 2011 So 341st pl   Northwest Equipment Sales and rentals ! It would have catastrophic impact on our business as well as hundreds of our customers!

Russ Hibbard (Communications ID 539052)		
Comment ID	**Comment Text**	**Response**
1	If you take my property located at 2011 So 341st pl Northwest Equipment Sales and rentals! It would have catastrophic impact on our business as well as hundreds of our customers!	Please see Section 3.3.4, Sound Transit Acquisition and Relocation Policy Summary, for information on Sound Transit's policies for property acquisition.

Communication ID: 539053

OMF South NEPA DEIS OOH Comment 18

10/31/2023

William Terrance

I think the preferred alternative is the superior option. The greatest need for the light rail system is expansion, the other options take longer for construction to complete. Not only does construction have a greater impact on the environment it is also difficult to anticipate the necessary closures and needs for different routes for residents in the area.

William Terrance (Communications ID 539053)		
Comment ID	**Comment Text**	**Response**
1	I think the preferred alternative is the superior option. The greatest need for the light rail system is expansion, the other options take longer for construction to complete. Not only does construction have a greater impact on the environment it is also difficult to anticipate the necessary closures and needs for different routes for residents in the area.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 539054

OMF South NEPA DEIS OOH Comment 19

10/31/2023

Bruce Tecklenburg

If you use one of the two Federal Way sites, you don't need a test track because all of the track from 320th to 344th is not revenue service track. You can use that track as test track. Save the tax payers a couple of bucks and knock the test track off the plan until you actually extend the line and put it into service. You can also use mainline for testing trains. Just use signals and switches or off peak times. Stop wasting money

Bruce Tecklenburg (Communications ID 539054)

Comment ID	Comment Text	Response
1	If you use one of the two Federal Way sites, you don't need a test track because all of the track from 320th to 344th is not revenue service track. You can use that track as test track. Save the tax payers a couple of bucks and knock the test track off the plan until you actually extend the line and put it into service. You can also use mainline for testing trains. Just use signals and switches or off peak times. Stop wasting money	If either the Preferred or South 344th Street alternative is selected as the project to be built, a test track would be necessary. As the commenter notes, the mainline track connecting the OMF South to the FWLE terminus would be used in the morning and night to deploy trains and thus would be unused for most of the day. However, if TDLE is constructed, this length of mainline would become part of the active Link system and would be unavailable for use as a test track. It would be more efficient from a schedule and a cost standpoint to construct the test track at the same time as the mainline. Constructing the test track at the same time as the mainline would also reduce the duration of construction, minimizing impacts to the adjacent land uses.

Communication ID: 539055

OMF South NEPA DEIS OOH Comment 20

10/31/2023

Finn S

I think that they are good alternatives, but I would like to see a bigger OMF that can address capacity issues that we currently see in the future. I would also like to ask if the midway landfill option would be dependent or independent on TDLE, meaning that if there are delays to TDLE that the midway landfill could open up sooner.

Finn S (Communications ID 539055)		
Comment ID	**Comment Text**	**Response**
1	I think that they are good alternatives, but I would like to see a bigger OMF that can address capacity issues that we currently see in the future.	As described in Chapter 2, Alternatives Considered, of the Final EIS, the OMF South has been sized to meet the operational needs of Sound Transit as set out in the Sound Transit 3 Plan.
2	I would also like to ask if the midway landfill option would be dependent or independent on TDLE, meaning that if there are delays to TDLE that the midway landfill could open up sooner.	None of the proposed OMF South build alternatives are dependent on the development of TDLE. As outlined in the Purpose and Need statement for the project in Chapter 1 of the Final EIS, the current regional system lacks a facility with sufficient capacity and suitable location to support the efficient and reliable long-term operations for system-wide Link light rail expansion, including the next phase of expansion in King and Pierce counties.

Communication ID: 539056

OMF South NEPA DEIS OOH Comment 21

11/02/2023

Jacob Davidson

Hello, I live at 1830 S. 336th street in Federal way. I have serious concerns about the budling and living next to a OMF directly across the street from my home. I worry about the noise while building and after when it is up and running. I have concerns of the noise affecting quality of life for me and my community. I worry that my homes value will plumet and I think I will have a hard time selling, especially during construction. Looking at the environmental impacts. The preferred site directly across the street from my condo complex will affect 2.7 acres of wetlands, 1500 feet of streams and 11 acres of mature native Forrest. As a native Pacific Northwest resident the rate at which our beautiful evergreen trees are disappearing is alarming. They recently took down several acres of trees to the north of my condos to build 94 townhomes. I can now hear I-5 in my bedroom and I worry that it will get even worse if Sound Transit takes out 11 more acres of Forrest. I work at a local hospital as an monitor tech, I watch patient's hearts and alert nurses of changes and lethal cardiac events. Would you want a person monitoring your heart or a families members heart who can not sleep because of freeway noise and construction noise, not to mention it will be a 24/7 facility. I would move now but everything is so expensive and once the construction is announced I fear I will owe more than I will be able to get for my condo. I understand that the midway station will cost more but what else can be done with that area? To me using the midway landfill is the preferred area and best for the environment. We must try to reduce our carbon footprint and chopping down 11 acres of Forrest, reducing wetlands and affecting a stream will not do our planet any favors. I feel midway is the best option and the name says it all, "mid - way" between Seattle and Tacoma, it uses land otherwise useless and would save 11 acres of trees, homes for animals and a sound / pollution buffer for Interstate 5. Please do not build OMF next to my home. Sincerely, Jacob Davison

Jacob Davidson (Communication ID 539056)		
Comment ID	**Comment Text**	**Response**
1	Hello, I live at 1830 S. 336th street in Federal way. I have serious concerns about the budling and living next to a OMF directly across the street from my home. I worry about the noise while building and after when it is up and running. I have concerns of the noise affecting quality of life for me and my community. I worry that my homes value will plumet and I think I will have a hard time selling, especially during construction.	Please see Final EIS Section 3.9, Noise and Vibration, for a discussion of potential construction and operational impacts and the avoidance, minimization, and mitigation measures to address those impacts.
2	Looking at the environmental impacts. The preferred site directly across the street from my condo complex will affect 2.7 acres of wetlands, 1500 feet of streams and 11 acres of mature native Forrest. As a native Pacific Northwest resident the rate at which our beautiful evergreen trees are disappearing is alarming. They recently took down several acres of trees to the north of my condos to build 94 townhomes.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	I can now hear I-5 in my bedroom and I worry that it will get even worse if Sound Transit takes out 11 more acres of Forrest. I work at a local hospital as an monitor tech, I watch patient's hearts and alert nurses of changes and lethal cardiac events. Would you want a person monitoring your heart or a families members heart who can not sleep because of freeway noise and construction noise, not to mention it will be a 24/7 facility. I would move now but everything is so expensive and once the construction is announced I fear I will owe more than I will be able to get for my condo.	Please see Final EIS Section 3.9, Noise and Vibration, for a discussion of potential construction and operational impacts. No noise impacts were identified from motor vehicle traffic associated with OMF operations, and noise from LRVs traveling along the mainline would be fully mitigated. Modification of the existing berm and noise walls adjacent to I-5 would result in traffic noise impacts at about one to three residences in Belmor. Sound Transit would provide traffic noise mitigation measures where traffic noise levels are predicted to be above the 2042 No-Build levels from removal of the existing berm and noise wall.
4	I understand that the midway station will cost more but what else can be done with that area? To me using the midway landfill is the preferred area and best for the environment. We must try to reduce our carbon footprint and chopping down 11 acres of Forrest, reducing wetlands and affecting a stream will not do our planet any favors. I feel midway is the best option and the name says it all, "mid - way" between Seattle and Tacoma, it uses land otherwise useless and would save 11 acres of trees, homes for animals and a sound / pollution buffer for Interstate 5. Please do not build OMF next to my home.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Communication ID: 539057

OMF South NEPA DEIS OOH Comment 22

11/06/2023

Lani Akers

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way. The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation. We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end, resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is outrageous to expect that our city is to accommodate all of Sound Transits needs, especially one that is industrialized and goes against city developmental policies. These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of housing, community facilities, daycares would further exploit our community members and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are current bus line options already in place. There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our city's Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. There is a distinction between "working with the city" and expecting the city to disregard their policies. The Transportation Technical report needs to be corrected and clarified on numerous issues. This includes eliminating 20th Ave. S., as this is the only access for emergency vehicles. Any delay in response time can have serious negative health impacts to our community members. The suggested solution to bulldoze a road through a critical wetland is also not an acceptable option. Mitigations took place in 1994, our water district operates within this area, it serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas." A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife. The open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources. Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated portions of the East Branch of the Hylebos, a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise. The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMFSouth at either of these locations. The landfill is a most doable site. if the Federal government or the state would be invited to assist in the funding, according to public conversations posted, between Sound Transit planners and engineers. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way. I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward. Respectfully submitted by ¦Lani Akers resident[redacted]

Lani Akers (Communication ID 539057)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 1.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 2.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end, resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is outrageous to expect that our city is to accommodate all of Sound Transits needs, especially one that is industrialized and goes against city developmental policies.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 3.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of housing, community facilities, daycares would further exploit our community members and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are current bus line options already in place.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 4..

Lani Akers (Communication ID 539057)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our city's Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. There is a distinction between "working with the city" and expecting the city to disregard their policies.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 5.
6	The Transportation Technical report needs to be corrected and clarified on numerous issues. This includes eliminating 20th Ave. S., as this is the only access for emergency vehicles. Any delay in response time can have serious negative health impacts to our community members.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 6.
7	The suggested solution to bulldoze a road through a critical wetland is also not an acceptable option. Mitigations took place in 1994, our water district operates within this area, it serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas." A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife. The open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 7.

Lani Akers (Communication ID 539057)		
Comment ID	**Comment Text**	**Response**
8	Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated portions of the East Branch of the Hylebos, a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 8.
9	The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site. if the Federal government or the state would be invited to assist in the funding, according to public conversations posted, between Sound Transit planners and engineers. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 9.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 10.

November 6, 2023

To: OMF South @ Erin Green

Sound Transit

401 Jackson Street

Seattle, WA 98104

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.

The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.

We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.

These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.

There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church.

Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave. The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species.

The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.

Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hyebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.

The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as **The Preferred** OMF site. They stand in opposition with the city of Federal Way for the construction of the OMFSouth at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.

The Executive Summary consistently refers to the S. 336th Site as THE PREFERRED site which feels like a deliberate attempt to persuade the reader/voting public. I do not feel this is a fair representation of the three options before us.

I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.

Suzanne Vargo (Communications ID 539061)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.	Sound Transit and FTA have updated Final EIS Appendix E, Environmental Justice Assessment, and Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, to discuss in greater detail the potential impacts to minority and low-income populations as well as project mitigation and benefits. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.

Suzanne Vargo (Communications ID 539061)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted.	An OMF would not have the same effects as a heavy industrial facility. The potential impacts of OMF South for the topics mentioned in the comment are described in Section 3.2, Transportation, and Section 3.9, Noise and Vibration, of the Final EIS.
6	The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave.	Appendix G1, Transportation Technical Analysis, and Section 3.2, Transportation, of the Final EIS have been updated to correct errors that were identified in the public comments. Potential impacts to emergency vehicle response times under the Preferred and South 344th Street alternatives are discussed in Section 3.14, Public Services.
7	The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, “we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Suzanne Vargo (Communications ID 539061)		
Comment ID	**Comment Text**	**Response**
8	Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Chapter 4, Cumulative Effects Analysis, discusses the potential cumulative impacts to each element of the environment, including ecosystem resources.
9	The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.	The Fife sites were eliminated from further consideration because they are farther than 1.5 miles south of the FWLE terminus and would not be able to efficiently connect to an operating light rail mainline track when OMF South opens. The complete results of the alternatives evaluation are summarized in the OMF South Alternatives Technical Memorandum (Sound Transit 2019c).

November 6, 2023

To: OMF South @ Erin Green

Sound Transit

401 Jackson Street

Seattle, WA 98104

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.

The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.

We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.

These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.

There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church.

Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave. The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species.

The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.

Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hyebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.

The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as **The Preferred** OMF site. They stand in opposition with the city of Federal Way for the construction of the OMFSouth at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.

The Executive Summary consistently refers to the S. 336th Site as THE PREFERRED site which feels like a deliberate attempt to persuade the reader/voting public. I do not feel this is a fair representation of the three options before us.

I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.

Dave Lesinski (Communications ID 539062)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transits needs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.	Sound Transit and FTA have updated Final EIS Appendix E, Environmental Justice Assessment, and Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, to discuss in greater detail the potential impacts to minority and low-income populations as well as project mitigation and benefits. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.

Dave Lesinski (Communications ID 539062)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellenos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted.	An OMF would not have the same effects as a heavy industrial facility. The potential impacts of OMF South for the topics mentioned in the comment are described in Section 3.2, Transportation, and Section 3.9, Noise and Vibration, of the Final EIS.
6	The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave.	Appendix G1, Transportation Technical Analysis, and Section 3.2, Transportation, of the Final EIS have been updated to correct errors that were identified in the public comments. Potential impacts to emergency vehicle response times under the Preferred and South 344th Street alternatives are discussed in Section 3.14, Public Services.
7	The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, “we have commitments to stormwater management, site access, mitigation, and recreational areas. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Dave Lesinski (Communications ID 539062)		
Comment ID	**Comment Text**	**Response**
8	Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Chapter 4, Cumulative Effects Analysis, discusses the potential cumulative impacts to each element of the environment, including ecosystem resources.
9	The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site, if the Federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.	The Fife sites were eliminated from further consideration because they are farther than 1.5 miles south of the FWLE terminus and would not be able to efficiently connect to an operating light rail mainline track when OMF South opens. The complete results of the alternatives evaluation are summarized in the OMF South Alternatives Technical Memorandum (Sound Transit 2019c).

Operations & Maintenance & Facility Location

Bob Strong [redacted]
Mon 11/6/2023 3:32 PM
To:OMF South <OMFsouth@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

The following are comments regarding the proposed location of the Sound Transit OMF South Facility at the current location of a major church (Christian Faith) and school in Federal Way:

1. I recall that the down selection process for site location for this facility was interesting. One location was removed from consideration due to a Dick’s Burgers being on the site. It’s interesting how priorities (burgers over religion and education) and politics determine the location of infrastructure in this county/state.
2. The site with the least impact on **people** and the **environment** is the Midway Landfill site (full excavation option). The only logical and sensible solution for that land is to finally clean it up and use it for a practical purpose, such as OMF South. King County and /or the state of Washington should share in covering the cost of the cleanup of the site, then Sound Transit should build the facility on the cleaned up land after removal of the contaminated soil. There would be no displacement of churches, businesses, burger restaurants, schools, or impact to a sensitive environmental area (eg stream impacts, wetland impact or forest impact) (page ES-24 in the executive summary)
3. The cities of Federal Way, Kent and Des Moines have provided input that the Midway landfill site is the best location for OMF South. Please listen to their input.
4. The proposed site at the Christian Faith Center property would impact the Hylebos Creek and wetlands, without proper mitigation. The Washington State Tribes have pointed out that much money has been spent on this property for habitat restoration, containment , cleanup and stream enhancements located downstream below the 336th-344th sites. Pipelines and underground drainage offer no means of water treatment or groundwater recharge and are viewed as incompatible with fish recovery. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribes.
5. The Midway landfill site will not incur any real estate costs (which don’t appear to be in the S. 336th st alternative estimate)

The Midway Landfill site is the obvious location for OMF South.

Thanks for your time.
Robert (Bob) Strong
Federal Way resident since 1981

Bob Strong (Communications ID 539063)		
Comment ID	**Comment Text**	**Response**
1	The following are comments regarding the proposed location of the Sound Transit OMF South Facility at the current location of a major church (Christian Faith) and school in Federal Way: I recall that the down selection process for site location for this facility was interesting. One location was removed from consideration due to a Dick's Burgers being on the site. It's interesting how priorities (burgers over religion and education) and politics determine the location of infrastructure in this county/state. The site with the least impact on people and the environment is the Midway Landfill site (full excavation option). The only logical and sensible solution for that land is to finally clean it up and use it for a practical purpose, such as OMF South. King County and /or the state of Washington should share in covering the cost of the cleanup of the site, then Sound Transit should build the facility on the cleaned up land after removal of the contaminated soil. There would be no displacement of churches, businesses, burger restaurants, schools, or impact to a sensitive environmental area (eg stream impacts, wetland impact or forest impact) (page ES-24 in the executive summary) The cities of Federal Way, Kent and Des Moines have provided input that the Midway landfill site is the best location for OMF South. Please listen to their input.	The alternatives development process for the project is described in Section 2.2 of Chapter 2, Alternatives Development and Scoping, of the Final EIS. Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The proposed site at the Christian Faith Center property would impact the Hylebos Creek and wetlands, without proper mitigation. The Washington State Tribes have pointed out that much money has been spent on this property for habitat restoration, containment, cleanup and stream enhancements located downstream below the 336th-344th sites. Pipelines and underground drainage offer no means of water treatment or groundwater recharge and are viewed as incompatible with fish recovery. Any further loss of water treatment opportunities and recharge are not an acceptable option for the tribes.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The Midway landfill site will not incur any real estate costs (which don't appear to be in the S. 336th st alternative estimate) The Midway Landfill site is the obvious location for OMF South.	The majority of the Midway Landfill Alternative site is owned by the City of Seattle. If selected as the project to be built, Sound Transit would lease the property from the city. Table 2.5-1, Opinion of Probable Cost for Preliminary Engineering Design of the Build Alternatives, in the Final EIS lists estimated real estate and relocation costs for each alternative.

OPPOSITION LETTER, due 11/6/2023

Julie Seitz [redacted]
Mon 11/6/2023 3:37 PM
To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

You don't often get email from [redacted]. Learn why this is important

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

November 6, 2023

OMF South Project
c/o Erin Green
Sound Transit
401 Jackson Street
Seattle, WA 98104

RE: OPPOSITION LETTER, due 11/6/2023

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the City of Federal Way.

The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic invertebrates that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.

We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our city's core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transit's needs.

These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.

There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the City of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellenos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church.

Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave. The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species.

The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, “we have commitments to stormwater management, site access, mitigation, and recreational areas”. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents, domestic animals, and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.

Sound Transit, King County and the City of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus have already negated a head water tributary that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.

The Cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the City of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site if the federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way. The Executive Summary consistently refers to the S. 336th Site as The Preferred site which feels like a deliberate attempt to persuade the reader/voting public. I do not feel this is a fair representation of the three options before us.

I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed too quickly, due to a lag of a mere 22 seconds in train journey travel in regard to reaching its set destinations. Surely this can be managed by qualified personnel at Sound Transit, and should be a priority task moving forward.

Sincerely,

Julie Seitz
[redacted]

Citizen of Federal Way since 1986

Julie Seitz (Communications ID 539077)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the City of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic invertebrates that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our city's core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end (location to be determined) resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is unacceptable to expect that our city is to accommodate all of Sound Transit's needs.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of community facilities, daycares and housing would further exploit and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are sufficient bus line options already in place.	Sound Transit and FTA have updated Final EIS Appendix E, Environmental Justice Assessment, and Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, to discuss in greater detail the potential impacts to minority and low-income populations as well as project mitigation and benefits. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.

Julie Seitz (Communications ID 539077)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the City of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellenos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted.	An OMF would not have the same effects as a heavy industrial facility. The potential impacts of OMF South for the topics mentioned in the comment are described in Section 3.2, Transportation, and Section 3.9, Noise and Vibration, of the Final EIS.
6	The Transportation Technical report is riddled with needed corrections and clarification, as well as disregarding emergency vehicles the ability to use S. 20th Ave.	Appendix G1, Transportation Technical Analysis, and Section 3.2, Transportation, of the Final EIS have been updated to correct errors that were identified in the public comments. Potential impacts to emergency vehicle response times under the Preferred and South 344th Street alternatives are discussed in Section 3.14, Public Services.
7	The suggested solution to bulldoze a road through a critical class 5 wetland is not an acceptable option as our water district operates within this area, serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, “we have commitments to stormwater management, site access, mitigation, and recreational areas”. A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents, domestic animals, and wildlife, as the open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Julie Seitz (Communications ID 539077)		
Comment ID	**Comment Text**	**Response**
8	Sound Transit, King County and the City of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus have already negated a head water tributary that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Chapter 4, Cumulative Effects Analysis, discusses the potential cumulative impacts to each element of the environment, including ecosystem resources.
9	The Cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the City of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site if the federal government or the state would be invited to assist in the funding. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed too quickly, due to a lag of a mere 22 seconds in train journey travel in regard to reaching its set destinations. Surely this can be managed by qualified personnel at Sound Transit, and should be a priority task moving forward.	The Fife sites were eliminated from further consideration because they are farther than 1.5 miles south of the FWLE terminus and would not be able to efficiently connect to an operating light rail mainline track when OMF South opens. The complete results of the alternatives evaluation are summarized in the OMF South Alternatives Technical Memorandum (Sound Transit 2019c).

OMF concerns

JACOB DAVISON [redacted]
Thu 11/2/2023 10:18 PM
To:OMFSouthDEIS <OMFSouthDEIS@soundtransit.org>

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

Hello, I live at [redacted] in Federal way. I have serious concerns about the budling and living next to a OMF directly across the street from my home. I worry about the noise while building and after when it is up and running. I have concerns of the noise affecting quality of life for me and my community. I worry that my homes value will plumet and I think I will have a hard time selling, especially during construction. Looking at the environmental impacts. The preferred site directly across the street from my condo complex will affect 2.7 acres of wetlands, 1500 feet of streams and 11 acres of mature native Forrest. As a native Pacific Northwest resident the rate at which our beautiful evergreen trees are disappearing is alarming. They recently took down several acres of trees to the north of my condos to build 94 townhomes. I can now hear I-5 in my bedroom and I worry that it will get even worse if Sound Transit takes out 11 more acres of Forrest. I work at a local hospital as an monitor tech, I watch patient's hearts and alert nurses of changes and lethal cardiac events. Would you want a person monitoring your heart or a families members heart who can not sleep because of freeway noise and construction noise, not to mention it will be a 24/7 facility. I would move now but everything is so expensive and once the construction is announced I fear I will owe more than I will be able to get for my condo. I understand that the midway station will cost more but what else can be done with that area? To me using the midway landfill is the preferred area and best for the environment. We must try to reduce our carbon footprint and chopping down 11 acres of Forrest, reducing wetlands and affecting a stream will not do our planet any favors. I feel midway is the best option and the name says it all, "mid - way" between Seattle and Tacoma, it uses land otherwise useless and would save 11 acres of trees, homes for animals and a sound / pollution buffer for Interstate 5. Please do not build OMF next to my home.
Sincerely,
Jacob Davison
[redacted]

Jacob Davidson (Communications ID 539081)		
Comment ID	**Comment Text**	**Response**
1	Hello, I live at 1830 S. 336th street in Federal way. I have serious concerns about the budling and living next to a OMF directly across the street from my home. I worry about the noise while building and after when it is up and running. I have concerns of the noise affecting quality of life for me and my community. I worry that my homes value will plumet and I think I will have a hard time selling, especially during construction.	Please see response to Jacob Davidson (Communication ID 539056) comment 1.
2	Looking at the environmental impacts. The preferred site directly across the street from my condo complex will affect 2.7 acres of wetlands, 1500 feet of streams and 11 acres of mature native Forrest. As a native Pacific Northwest resident the rate at which our beautiful evergreen trees are disappearing is alarming. They recently took down several acres of trees to the north of my condos to build 94 townhomes.	Please see response to Jacob Davidson (Communication ID 539056) comment 2.
3	I work at a local hospital as an monitor tech, I watch patient’s hearts and alert nurses of changes and lethal cardiac events. Would you want a person monitoring your heart or a families members heart who can not sleep because of freeway noise and construction noise, not to mention it will be a 24/7 facility. I would move now but everything is so expensive and once the construction is announced I fear I will owe more than I will be able to get for my condo.	Please see response to Jacob Davidson (Communication ID 539056) comment 2.
4	I understand that the midway station will cost more but what else can be done with that area? To me using the midway landfill is the preferred area and best for the environment. We must try to reduce our carbon footprint and chopping down 11 acres of Forrest, reducing wetlands and affecting a stream will not do our planet any favors. I feel midway is the best option and the name says it all, “mid – way” between Seattle and Tacoma, it uses land otherwise useless and would save 11 acres of trees, homes for animals and a sound / pollution buffer for Interstate 5. Please do not build OMF next to my home.	Please see response to Jacob Davidson (Communication ID 539056) comment 4.

GarageTown Federal Way Condominium Association

2010 S 344th St
Federal Way WA 98003
425 503 2000
mill425@comcast.net

November 4, 2023

OMF South
℅ Elma Borbe, Sr. Environmental Planner
Sound Transit
401 S Jackson Street
Seattle, WA 98104

To Sound Transit,

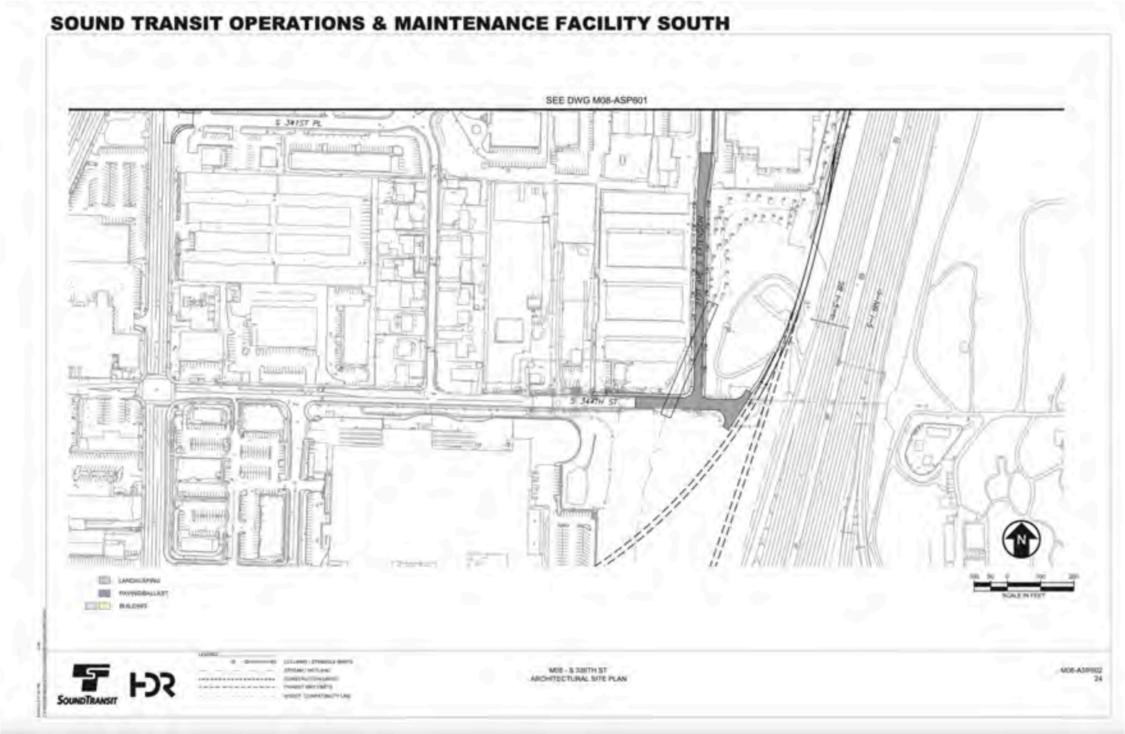
The GarageTown Federal Way Condominium Association is responsible for maintenance of the GarageTown Federal Way property at 2010 S 344th St in Federal Way. In this capacity we have the following comments on the NEPA Draft/ Supplemental SEPA Draft:

1) The GarageTown Federal Way Condominium Association continues to advocate for the Midway Landfill site, Full Excavation option. The technical and cost issues, clearly summarized in the Draft, are within the capabilities of Sound Transit to overcome, and are worth undertaking to avoid the substantial impact to private property of the other two alternatives.

The Preferred Alternative is the better choice of the remaining alternatives.

The GarageTown Federal Way Condominium Association remains **strongly opposed to the S 344th alternative** - it has the most impact on private property and appears to be the least desirable of the options from a design standpoint.

2) The revised design of the Preferred Alternative indicates an extension of 21st Ave S, connecting S 341st Pl with S344th St.


SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH
SEE DWG M08-ASP601
S 341ST PL
S 344TH ST
LANDSCAPING
PAVING/BALLAST
BUILDING
SCALE IN FEET
SOUNDTRANSIT
HDR
M08 - S 336TH ST
ARCHITECTURAL SITE PLAN
M08-ASP602
24

Preferred Alternative - proposed 21st Ave S extension

The GarageTown Federal Way Condominium Association has a number of concerns about this planned extension:

A. intrusion onto property outside of easement

The existing fence line at the eastern GarageTown Federal Way property border is located approximately 16 feet west of the actual property border, following an easement on the property for future road construction. The GarageTown Federal Way Condominium Association **strongly opposes** incursion onto the property outside of the existing easement. Such incursion would necessarily reduce the width of the eastern driveway of the property. The eastern driveway at its current width is essential for operations to allow for circulation of large vehicles, including tractor-trailers and fire engines. Changing this access pattern would be extremely detrimental to the use of GarageTown Federal by its occupants.

B. fire road access too near the intersection of 21st Ave S and S 344th

The SE corner of the property supports an emergency secondary access to the property for fire equipment. The driveway for this entrance currently terminates at S 344th St, immediately adjacent to the proposed new intersection. This may present a concern to the City of Federal Way in that it would be too close to the proposed intersection as designed.

As an alternative, the intersection could be designed as a curve connecting the two streets, with the fire access in the approximate center of the curve. Such a design would necessarily intrude on the SE corner of the GarageTown Federal Way property corner. This corner is not vital to operations at GarageTown Federal Way, such that the GarageTown Federal Way Condominium is **not opposed** to routing the 21st Ave S extension in a curve over the SE property corner.

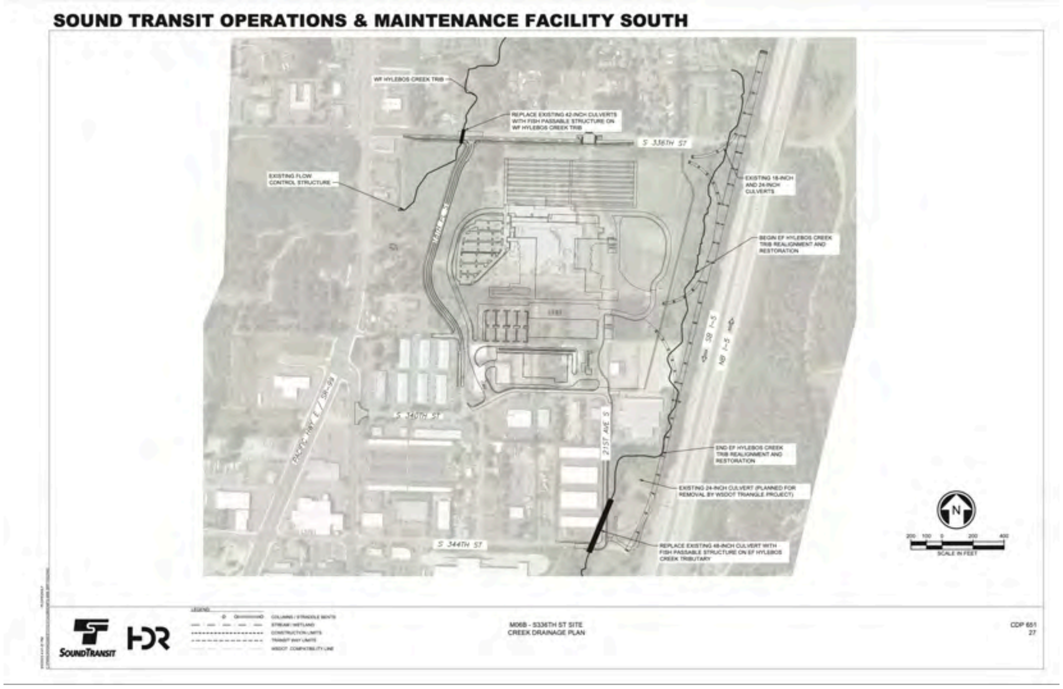
A secondary emergency property access gate is located at the NE property corner. Although currently unused, this gate could be re-purposed for an emergency fire entrance if the SE corner entrance is deemed to be unusable from the new street extension. The NE corner is very near the elevation of the existing road to the north, and would require little modification to serve as a secondary emergency entrance. The GarageTown Federal Way Condominium Association is **not opposed** to such a modification, should it become necessary.

Locating other property entrances at the eastern property border is undesirable due to the likely change in elevation from the existing property driveway and the proposed new 21st Ave S extension, which will be several feet below.

C. retention of cul-de-sac - unnecessary and undesirable

The proposed design shows that the cul-de-sac at the eastern terminus of S 344th St would be retained, although redesigned. Such a turn-around would no longer be necessary since vehicles could exit through the new 21st Ave S extension rather than having to execute a u-turn as they do now. In addition, this isolated cul-de-sac is well-known to the Federal Way Police as a site for illicit activity, illegal dumping, and vagrancy. Removing this nuisance would be a net benefit to the area, and the Garage Town Federal Way Condominium Association **strongly advocates** removing this cul-de-sac should the 21st Ave S extension be constructed.

3) Proposed revisions to the path of the east fork of Hylebos Creek in the S 344th St Alternative impose significant risk to the GarageTown Federal Way property. As proposed in Appendix C, page 15, the existing culvert will be replaced with a fish-passable structure.


SOUND TRANSIT OPERATIONS & MAINTENANCE FACILITY SOUTH
WF HYLEBOS CREEK TRIB
REPLACE EXISTING 42-INCH CULVERTS WITH FISH PASSABLE STRUCTURE ON WF HYLEBOS CREEK TRIB
S 336TH ST
EXISTING FLOW CONTROL STRUCTURE
EXISTING 18-INCH AND 24-INCH CULVERTS
BEGIN EF HYLEBOS CREEK TRIB REALIGNMENT AND RESTORATION
SB I-5
NB I-5
PACIFIC HWY S / SR-99
S 340TH ST
21ST AVE S
END EF HYLEBOS CREEK TRIB REALIGNMENT AND RESTORATION
EXISTING 24-INCH CULVERT (PLANNED FOR REMOVAL BY WSDOT TRIANGLE PROJECT)
S 344TH ST
REPLACE EXISTING 48-INCH CULVERT WITH FISH PASSABLE STRUCTURE ON EF HYLEBOS CREEK TRIBUTARY
N
200 100 0 200 400
SCALE IN FEET
LEGEND
COLUMNS / STRADDLE BENTS
STREAM / WETLAND
CONSTRUCTION LIMITS
TRANSIT WAY LIMITS
WSDOT COMPATIBILITY LINE
SOUNDTRANSIT
HDR
M06B - S336TH ST SITE
CREEK DRAINAGE PLAN
CDP 651
27

Preferred Alternative - Hylebos Creek plan

Page G3-81 | Appendix G3: Ecosystem Resources Technical Report

"...the stream would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long culvert. "

The GarageTown Federal Way Condominium Association is **strongly opposed** to this feature. The culvert passes through the GarageTown property near the SE corner of a concrete building. The culvert is buried approximately 15 feet, requiring substantial excavation on the property, imposing risk of damage to the adjacent building through settling or vibration. As an alternative, the creek could be re-routed to the east of the intersection with the new 21st Ave S extension and S 344th St. Such a re-route would remove the requirement to excavate the existing culvert and would benefit the stream hydraulics through additional daylighting of the stream path through the area. This option is suggested in the same appendix as part of the S344th Alternative:

Page G3-83 | Appendix G3: Ecosystem Resources Technical Report

"...approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from an existing culvert and restored to approximately 570 linear feet of surface-flowing channel. Daylighting this segment would increase the amount of functioning aquatic and riparian habitat available in the stream system."

The GarageTown Federal Condominium Association **strongly advocates** consideration of this design change since it both benefits the stream and removes a substantial risk to the GarageTown Federal Way property.

The GarageTown Federal Way Condominium Association respectfully requests that this information be considered when making decisions regarding the location of OMF South so that the significant impact of those decisions on affected property owners can be properly evaluated.

Sincerely yours,

Edward Miller

President, GarageTown Federal Way Condominium Association

GarageTown Federal Way Condominium Association (Communication ID 539132)		
Comment ID	**Comment Text**	**Response**
1	1. The GarageTown Federal Way Condominium Association continues to advocate for the Midway Landfill site, Full Excavation option. The technical and cost issues, clearly summarized in the Draft, are within the capabilities of Sound Transit to overcome, and are worth undertaking to avoid the substantial impact to private property of the other two alternatives.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Preferred Alternative is the better choice of the remaining alternatives.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
3	The GarageTown Federal Way Condominium Association remains strongly opposed to the S 344th alternative - it has the most impact on private property and appears to be the least desirable of the options from a design standpoint.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	2. The revised design of the Preferred Alternative indicates an extension of 21st Ave S, connecting S 341st Pl with S344th St. The GarageTown Federal Way Condominium Association has a number of concerns about this planned extension: A. intrusion onto property outside of easement The existing fence line at the eastern GarageTown Federal Way property border is located approximately 16 feet west of the actual property border, following an easement on the property for future road construction. The GarageTown Federal Way Condominium Association strongly opposes incursion onto the property outside of the existing easement. Such incursion would necessarily reduce the width of the eastern driveway of the property. The eastern driveway at its current width is essential for operations to allow for circulation of large vehicles, including tractor/trailers and fire engines. Changing this access pattern would be extremely detrimental to the use of GarageTown Federal by its occupants. B. fire road access too near the intersection of 21st Ave S and S 344th The SE corner of the property supports an emergency secondary access to the property for fire equipment. The driveway for this entrance currently terminates at S 344th St, immediately adjacent to the proposed new intersection. This may present a concern to the City of Federal Way in that it would be too close to the proposed intersection as designed. As an alternative, the intersection could be designed as a curve connecting the two streets, with the fire access in the approximate center of the curve. Such a design would necessarily intrude on the SE corner of the GarageTown Federal Way property corner. This corner is not vital to operations at GarageTown Federal Way, such that the GarageTown Federal Way Condominium is not opposed to routing the 21st Ave S extension in a curve over the SE property corner.	The extension of 21st Avenue S to S 344th Street is proposed to meet City of Federal Way code requirements, which do not allow a cul-de-sac in this location. Sound Transit would continue to work with Federal Way and affected property owners on the design of the 21st Avenue S extension.

GarageTown Federal Way Condominium Association (Communication ID 539132)		
Comment ID	**Comment Text**	**Response**
	A secondary emergency property access gate is located at the NE property corner. Although currently unused, this gate could be re-purposed for an emergency fire entrance if the SE corner entrance is deemed to be unusable from the new street extension. The NE corner is very near the elevation of the existing road to the north, and would require little modification to serve as a secondary emergency entrance. The GarageTown Federal Way Condominium Association is not opposed to such a modification, should it become necessary. Locating other property entrances at the eastern property border is undesirable due to the likely change in elevation from the existing property driveway and the proposed new 21st Ave S extension, which will be several feet below. C. retention of cul-de-sac - unnecessary and undesirable The proposed design shows that the cul-de-sac at the eastern terminus of S 544th St would be retained, although redesigned. Such a turn-around would no longer be necessary since vehicles could exit through the new 21st Ave S extension rather than having to execute a U-turn as they do now. In addition, this isolated cul-de-sac is well-known to the Federal Way Police as a site for illicit activity, illegal dumping, and vagrancy. Removing this nuisance would be a net benefit to the area, and the Garage Town Federal Way Condominium Association strongly advocates removing this cul-de-sac should the 21st Ave S extension be constructed.	
5	3. Proposed revisions to the path of the east fork of Hylebos Creek in the S 344th St Alternative impose significant risk to the GarageTown Federal Way property. As proposed in Appendix C, page 15, the existing culvert will be replaced with a fish-passable structure. “ the stream would be conveyed under the 21st Avenue S extension and S 344th Street in a new structure that would replace the existing, approximately 315-foot-long culvert. “ The GarageTown Federal Way Condominium Association is strongly opposed to this feature. The culvert passes through the GarageTown property near the SE corner of a concrete building. The culvert is buried approximately 15 feet, requiring substantial excavation on the property, imposing risk of damage to the adjacent building through settling or vibration. As an alternative, the creek could be re-routed to the east of the intersection with the new 21st Ave S extension and S 344th St. Such a re-route would remove the requirement to excavate the existing culvert and would benefit the stream hydraulics through additional daylighting of the stream path through the area. This option is suggested in the same appendix as part of the S344th Alternative: Page G3-83 | Appendix G3: Ecosystem Resources Technical Report “ approximately 420 linear feet of East Fork Hylebos Tributary immediately north of S 344th Street would be removed from an existing culvert and restored to	FTA and Sound Transit acknowledge the Association's concerns regarding potential property damage associated with removal of the existing culvert. Final design of the replacement fish-passable structure would be done with the goal of avoiding and minimizing alterations to surrounding properties. If the Preferred Alternative is selected as the project to be built, Sound Transit will continue to coordinate with GarageTown on the potential effects to the property as the design advances.

GarageTown Federal Way Condominium Association (Communication ID 539132)		
Comment ID	**Comment Text**	**Response**
	approximately 570 linear feet of surface-flowing channel. Daylighting this segment would increase the amount of functioning aquatic and riparian habitat available in the stream system." The GarageTown Federal Condominium Association strongly advocates consideration of this design change since it both benefits the stream and removes a substantial risk to the GarageTown Federal Way property.	

OMF SITES ~ FEDERAL WAY

Roger Flygare [redacted]
Mon 11/6/2023 3:50 PM
To:OMF South <OMFsouth@soundtransit.org>
Cc:Roger Flygare <rgflygare@gmail.com>

You don't often get email from [redacted]. Learn why this is important

CAUTION: This email originated from a contact outside Sound Transit. Remember, do not click any links or open any attachments unless you recognize the sender and know the content is safe. Report any suspicious email by clicking the “fish” button in Outlook. Thank you! ST Information Security

November 6, 2023

To: OMF South @ Erin Green
Sound Transit
401 Jackson Street
Seattle, WA 98104

I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way. The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids.

The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.

We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end, resulting in more considerable business and traffic impacts.

Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is outrageous to expect that our city is to accommodate all of Sound Transits needs, especially one that is industrialized and goes against city developmental policies.

These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of housing, community facilities, daycares would further exploit our community members and fortify their economic struggle.

To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are current bus line options already in place.

There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way.

This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellanos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church.

Assumptions are being made by Sound Transit that our city’s Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted.

There is a distinction between “working with the city” and expecting the city to disregard their policies. The Transportation Technical report needs to be corrected and clarified on numerous issues.

This includes eliminating 20th Ave. S., as this is the only access for emergency vehicles. Any delay in response time can have serious negative health impacts to our community members.

The suggested solution to bulldoze a road through a critical wetland is also not an acceptable option. Mitigations took place in 1994, our water district operates within this area, it serves as an aquifer recharge area and is home to numerous wildlife species.

The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas." A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife. The open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.

Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated portions of the East Branch of the Hylebos, a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.

The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMFSouth at either of these locations. The landfill is a most doable site. if the Federal government or the state would be invited to assist in the funding, according to public conversations posted, between Sound Transit planners and engineers. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.

I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.

Respectfully submitted,

Roger Flygare
Federal Way Resident
[redacted]

The content of this email is confidential and intended for the recipient(s) specified in this email. It is strictly forbidden to share any part of this message with any third party, without a written consent of the sender. If you received this message by mistake, please reply to this message and follow with its deletion, so that we can ensure such a mistake does not occur in the future.

Roger Flygare (Communications ID 539987)		
Comment ID	**Comment Text**	**Response**
1	I am writing to you today in full opposition to both potential OMF sites (S. 336th St. & S. 344th St.) here in the city of Federal Way.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
2	The Puyallup Tribe has emphatically stated that pipelines and underground drainage conveyances offer NO means of water treatment or ground water recharge whatsoever and therefore are viewed as incompatible with fish recovery. Regardless of whether fish travel up to this area, it is the microbenthic vertebrae (food) that must travel via rocks, trees, and water to reach the lower reaches of the Hylebos East branch that must sustain healthy salmonoids. The tribes have spent tens of millions of dollars on property acquisitions, restoration plans, habitat restoration, stream enhancements and contaminant cleanup sites on lands that sit below the S. 336th St. and S. 344th St. sites. Loss of water treatment opportunities and recharge are NOT an acceptable option for the tribe. As stewards of these lands since time memorial, I support the Puyallup Tribes Sovereignty for preservation.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS. Final EIS Section 3.10, Ecosystem Resources, and Appendix G3, Ecosystems Resources Technical Report, further detail the impacts and avoidance, minimization, and mitigation measures concerning Hylebos Creek.
3	We are a small city of only 22 Square miles. Sound Transit has recently taken over and built their transit light rail station at our cities core at S. 320th. Expected build out of another transit transfer station and parking garage is planned for our south end, resulting in more considerable business and traffic impacts. Now the citizens of Federal Way are expected to sacrifice not one but two possible locations in our midtown. It is outrageous to expect that our city is to accommodate all of Sound Transits needs, especially one that is industrialized and goes against city developmental policies.	Please see the response to Common Comment 4 in Table L.1-1, Responses to Common Comments, in the Final EIS.
4	These two sites were studied by Sound Transit as having a higher percentage of low-income and minority persons than the Sound Transit service district and King County. Displacement of housing, community facilities, daycares would further exploit our community members and fortify their economic struggle. To assume that an industrial build such as the proposed 67-acre OMF facility would offset the impacts to the minority population because they would benefit from riding the train is absurd. They would still have to travel outside of their area to utilize a transfer station. Causing them time and money. There are current bus line options already in place.	Sound Transit and FTA have updated Final EIS Appendix E, Environmental Justice Assessment, and Section 3.6, Environmental Justice, Social Resources, Community Facilities, and Neighborhoods, to discuss in greater detail the potential impacts to minority and low-income populations as well as project mitigation and benefits. After consideration of the additional analysis, FTA maintains the preliminary determination that OMF South would not result in disproportionately adverse effects on environmental justice populations.

Roger Flygare (Communications ID 539987)		
Comment ID	**Comment Text**	**Response**
5	There simply is no M2 or M3 (heavy industries that generate noise, traffic, or pollutants) zoning here in the city of Federal Way. This unseeming and inconsistent development would have devastating/catastrophic effects on businesses like Ellenos Yogurt, N.W. Equipment Sales/Rentals, Garage Town, Voice of Hope Church, Family Life Community Church, Christian Faith Church and associated schools, Redwood Church of God, and Tabernacle Temple of Praise Church. Assumptions are being made by Sound Transit that our city's Comprehensive Plan policies of converting our only light industrial zone in Federal Way (S. 344th St.), vacating public roads and modifications of development standards will be permitted. There is a distinction between "working with the city" and expecting the city to disregard their policies.	An OMF would not have the same effects as a heavy industrial facility. The potential impacts of OMF South for the topics mentioned in the comment are described in Section 3.2, Transportation, and Section 3.9, Noise and Vibration, of the Final EIS.
6	The Transportation Technical report needs to be corrected and clarified on numerous issues. This includes eliminating 20th Ave. S., as this is the only access for emergency vehicles. Any delay in response time can have serious negative health impacts to our community members.	Appendix G1, Transportation Technical Analysis, and Section 3.2, Transportation, of the Final EIS have been updated to correct errors that were identified in the public comments. Potential impacts to emergency vehicle response times under the Preferred and South 344th Street alternatives are discussed in Section 3.14, Public Services.
7	The suggested solution to bulldoze a road through a critical wetland is also not an acceptable option. Mitigations took place in 1994, our water district operates within this area, it serves as an aquifer recharge area and is home to numerous wildlife species. The S. 336th St. option runs with a never-ending Concomitant Agreement, that is not negotiable, and as Christian Faith owners stated in their 2021 letter, "we have commitments to stormwater management, site access, mitigation, and recreational areas." A reminder that this land is a part of the iconic Weyerhaeuser Campus, in which visual impacts were NOT adequately addressed in previous Draft statements. The Christian Faith land WAS already mitigated in 1994 and it was the citizens who fought for four long years to preserve the functionality of the Hylebos Creek, surrounding tributaries and wetlands. It should not be allowed to be mitigated again. This is a Corporate Park zoning with highly sensitive areas, that do not warrant a Heavy Industrial Equipment zoning. Noise and vibration impacts will be considerably undesirable and unhealthy for residents and wildlife. The open spaces, creek and native forests provide food, water, and shelter as it is a part of the International Flight Pathway. 150 migrating species depend on these resources.	Please see the response to Common Comment 3 in Table L.1-1, Responses to Common Comments, in the Final EIS.

Roger Flygare (Communications ID 539987)

Comment ID	Comment Text	Response
8	Sound Transit, King County and the city of Federal Way must consider the cumulative impacts of future developments within the Hylebos Watershed. Hylebos Watershed and Lower Puget Sound Plan must be included and thoughtfully considered. Numerous large developments such as the two warehouses built recently on the Weyerhaeuser Campus has already negated portions of the East Branch of the Hylebos, a head water tributary, that fed not only the Hylebos, but the Duwamish/Green River Watersheds. Any further demolition of the Hylebos East Branch Creek will surely lead to its demise.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 8.
9	The cities of Kent, Des Moines and Auburn are in favor of the Midway landfill as The Preferred OMF site. They stand in opposition with the city of Federal Way for the construction of the OMF South at either of these locations. The landfill is a most doable site. if the Federal government or the state would be invited to assist in the funding, according to public conversations posted, between Sound Transit planners and engineers. Sound Transit should exhaust every available option before it forever displaces our citizens, businesses, environment, aquifer, and high quality of life here in Federal Way.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 9.
10	I urge Sound Transit to reconsider the two previous site options in Fife, as the zoning would permit a heavy industrial equipment build. These two options were dismissed to quickly, due to a lag of a mere 22 seconds in train journey travel in regards to reaching its set destinations. Surely this can be managed by the experts of Sound Transit, and should be a priority task moving forward.	Please see the response to Kerry Lesinski (Communications ID 539016) comment 10.